never known himself so well and, above all, never before has he had it in his power to direct so definitely the course of his own development. Our civilization is certainly imperiled, but there will be no downfall if mankind can be taught to follow the light already before it. As lantern bearers, it is the clear duty of the Fifth Estate to show the way. In the past the world has suffered grievously from lack of knowledge; to-day it suffers from its rejection or misapplication. Could the springs of human conduct and the affairs of peoples now be regulated only as wisely as we now know how there would be work and leisure and decent living for all. The criminal, the defective, the feeble-minded would be breeded out, and sane minds in sound bodies breeded in. The loss and suffering from preventable disease and accident would not be tolerated. Higher standards would govern the selection for the public service. Planning would replace *laissez-faire* development, and a rational conservation check the reckless waste of our resources. Production and distribution would attain to levels of efficiency altogether new, and the many injustices now existent in human relations would well-nigh disappear. With the reaction of a freed intelligence on politics, religion, morals we might hope for a broader tolerance, a better mutual understanding. With the recognition of the spirituality of science and the divinity of research and discovery should come larger interests and a new breadth of vision to the average man, and to us all acknowledgment of the steadfast purposive striving shown in the development of the created world and a reverent appreciation of man's privilege to aid and further this development.

We might reasonably expect ugliness to be replaced by beauty in our cities and small towns and later even in our homes. Government by intelligence for the general good of all should supersede government by special interests, blocs, faddists and fear of organized minorities and the uninformed crowd. With it all would come relief from the economic pressure, which bears so heavily upon the Fifth Estate that its children, which should be counted among the best assets of the community, are now a luxury.

The world needs most a new tolerance, a new understanding, an appreciation of the knowledge now at hand. For these it can look nowhere with such confidence as to the members of the Fifth Estate. Let us, therefore, recognize the obligation we are under. Ours is the duty and the privilege of bringing home to every man the wonders, the significance and the underlying harmony of the world in which we live.

ARTHUR D. LITTLE

JOHN MACLEAN—CHEMIST[1]

JOHN MACLEAN, M.D., the first professor of chemistry in the College of New Jersey (Princeton) and, according to Dr. Edgar F. Smith, one of the first chemists in the country at the close of the 18th century, was born in Glasgow, March 1, 1771, which made him a contemporary of Davy, Dalton, Priestley, Lavoisier, Berzelius, Avogadro and other very eminent chemists. His father, for whom he was named, was a surgeon of note, who was present at the capture of Quebec from the French, and he was the third man to scale the formidable heights of Abraham. His mother was Agnes Lang, of Glasgow.

While very young he lost both of his parents, whereupon George Macintosh, a gentleman of rare worth, became his guardian. It is of interest to note that he was the father of Charles Macintosh, F.R.S., a wealthy chemical manufacturer who invented the water-proof cloth.

Young Maclean received his early education at the Glasgow Grammar School and in the university, which he entered before he was 13 years of age, thus indicating that he was a precocious lad. This is borne out by the fact that he was awarded several premiums in school and in the university. It appears that he was much interested in the classics, particularly Latin, and in later years he wrote to his son, John Maclean, Jr., who became the tenth president of Princeton, as follows: "Be assured, that notwithstanding what ignorant and lazy people say, it is a matter of great consequence for every gentleman or professional man to be a good classical scholar."

At the university it is said that he gave close attention to chemistry, mathematics and natural philosophy, and especially to chemistry. In the 16th year of his age he joined the Chemical Society of Glasgow, before which he read at least seven papers, including one on *respiration*, another on *fermentation* and another on *alkalies*. Some of these papers contained suggestions in advance of the science of that day.

While at Glasgow Dr. Maclean also studied medicine and anatomy, for it was his purpose to become a surgeon. From Glasgow he went to Edinburgh, primarily, it may be presumed, to attend the chemical lectures of the celebrated Dr. Black. From Edinburgh he repaired to London and to Paris, where he had the best facilities for the study of chemistry and surgery. While a student at Paris, Lavoisier, Berthollet and other famous chemists were busy with their investigations, and Maclean was no doubt greatly impressed by them.

[1] A paper read before the Section of History of Chemistry at the 67th Meeting of the American Chemical Society, Washington, D. C., April 21 to 26, 1924.

After being absent from Glasgow about three years (1787–1790), he returned and resumed his studies for another year, and then engaged most successfully in the practice of his profession, continuing at the same time his researches in chemistry. In the 21st year of his age he became a member of the Faculty of Physicians and Surgeons of Glasgow University.

Being thoroughly in sympathy with the political sentiments of America, Dr. Maclean left Scotland in April, 1795, and arrived at New York the following month. From this city he went to Philadelphia, where he met Dr. Benjamin Rush, who advised him to go to Princeton. Acting upon this suggestion, he formed in Princeton a partnership with Dr. Ebenezer Stockton for the practice of physic and surgery. This partnership was soon dissolved, however, for Dr. Maclean was elected to a chair of chemistry in the College of New Jersey and he soon decided to devote his entire time to teaching.

It is of further interest to note that Dr. Maclean came to America the year after Priestley—the same year in which Lavoisier was beheaded. This was before Dalton and Avogadro had propounded their hypotheses, before Gay-Lussac had enunciated the law of gaseous volumes, and years before Berzelius introduced modern chemical symbols.

In the early summer of 1795, Dr. Maclean delivered in Nassau Hall a short course of lectures on chemistry, which made a favorable impression. On October 1, 1795, he was elected professor of chemistry and natural history; but the name of the chair was subsequently changed to "mathematics, natural philosophy and chemistry."

In 1797 his salary was 250 pounds ($666.66) per annum; and it was "ordered that chemistry and natural history be taught as branches of natural philosophy." The instruction in these branches was given only to juniors and seniors. Dr. Maclean taught at Princeton until 1812, and for several years his salary was $1,250 a year, together with the use of a college house.

Benjamin Silliman, M.D., the first professor of chemistry in Yale College, left in his diary the following statement:

> At this celebrated seat of learning (Princeton), an eminent gentleman, Dr. John Maclean, resided as professor of chemistry, etc. I early attained an introduction to him by correspondence, and he favored me with a list of books for the promotion of my studies. . . . I also passed a few days with Dr. Maclean in my different travels to and from Philadelphia, and obtained from him a general insight into my future occupation; inspected his library and apparatus, and obtained his advice respecting many things. Dr. Maclean was a man of brilliant mind, with all the acuteness of his native Scotland; and a sparkling wit gave variety to his conversation. I regard him as my earliest master in chemistry and Princeton as my starting point in that pursuit: although I had not an opportunity to attend lectures there.

Many years later Dr. Silliman revisited Princeton, and he said to President Maclean upon visiting the chemical laboratory: "It was in this room that I saw the first experiments in chemistry ever witnessed by me."

The younger Professor Silliman, of Yale, in a paper entitled "American contributions to chemistry," and read July 31, 1874, on the occasion of the Priestley Centennial, said: "Of the public seminaries of learning other than medical institutions where chemistry was taught from a separate chair, and as a distinct branch of the college curriculum of instruction prior to 1800, we find but one, and that distinction belongs to Nassau Hall, Princeton, New Jersey."

It should be stated in this connection, however, that James Hutchinson and Dr. James Woodhouse of the University of Pennsylvania, Aaron Dexter of Harvard, and Dr. Samuel Mitchell of Columbia were contemporaries of Maclean, and taught more or less chemistry at a very early date in those institutions; but the speaker is unable to state just when chemistry was taught in those institutions "from a separate chair, and as a distinct branch of the college curriculum." From Dr. Silliman's paper just referred to, I also beg to quote as follows:

> Dr. Maclean ever deserves honorable mention as one of the earliest and most successful teachers of our science in this country. . . . In Paris Dr. Maclean learned to admire the antiphlogistic theory, as the "new chemistry" of Lavoisier was called, and which he taught and defended at Princeton. In 1795 he published "Two lectures on chemistry, read at Nassau Hall, containing an examination of Dr. Priestley's consideration on the doctrine of phlogiston and the decomposition of water." These lectures display both ability and learning and form an interesting chapter in the history of phlogistic discussion.
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> Dr. Maclean contributed several articles to the New York *Medical Repository*, and his name is associated with that of Professor Silliman in editing the first American edition of Henry's "Chemistry," in 1808.

The speaker has been fortunate enough to find in the Library of Princeton University a notebook on chemistry by John Eager Howard, Jr.,[2] of Baltimore, bearing the date of 1806. Howard was a pupil of Dr. Maclean, and his notes are very full and beautifully written. Apparently they are a transcript of Dr. Maclean's lectures. In these notes we find the topics

[2] John Eager Howard, Jr., was a son of General John Eager Howard, and a grandson of Justice Chew. He graduated at Princeton in 1806 and was at one time a member of Congress.

discussed by the lecturer. The following statements are taken from this notebook:

Chemistry is the investigation of those intimate and mutual actions of bodies on each other, by which their properties are altered, or their individuality destroyed. . . .

Matter may be divided into dead and living. Of dead substances some are simple and others compound. The simple are those whose composition is unknown, and the compound are such as have been analyzed into simpler parts. The substances which, according to the above definitions, may be considered as simple are:

caloric	silex	fluoric acid	antimony
light	alumine	boracic acid	mercury
electricity	magnesia	arsenic	zinc
oxygene	lime	tungstein	tin
azote	barytes	cobalt	lead
hydrogene	strontites	malybdena	copper
sulphur	pot-ash	bismuth	silver
phosphorus	soda	nickel	gold
carbone	muriatic acid	manganese	platina

There are 37 of these "simple substances," which constitute the titles of so many chapters in the notebook. 17 of these were regarded as metals, which were divided into semi-metals (brittle) and metals.

Dr. Maclean also gave a second course in chemistry, which had to do with *living* or *animated bodies*. This was a much shorter course, dealing with the structure and organization of vegetables, vegetable productions, fixed gross or fat oils, volatile oils, the composition of vegetables and tanning and currying.

It thus appears that Dr. Maclean gave attention to the relation of chemistry to agriculture and manufactures as well as to medicine.

Finally, Dr. Maclean resigned at Princeton in 1812 to accept the chair of chemistry in William and Mary College. He spent a year at Williamsburgh; but, being in poor health, he returned to Princeton at the close of the college year, where he died February 17, 1814, and two days later he was buried in the so-called "Westminster Abbey of America," his grave being contiguous to those of the college presidents and professors, and where all who still come and go may read the following extract taken from the Latin inscription on his tomb: "Exceedingly beloved and esteemed by the professors and youth of the college, he departed this life lamented by all."

WILLIAM FOSTER

PRINCETON UNIVERSITY

GEOLOGICAL FEATURES OF CITY PARKS

As a result of the request of the Committee on the Features of City Parks appointed by the American Association for the Advancement of Science a little over a year ago the following announcement was made March 26, 1924:

From 35 writers encouraging reports were received. Most of them stated that a beginning had been made in the way of conferences; a few told that work had been begun; two, Pittsburgh, Pennsylvania, and St. Joseph, Missouri, reported good progress; and Hartford, Connecticut, announced a completed task, in the way of selecting, clearing and marking a good number of geological features in that city.

Because Hartford and Trinity College were the first to report work completed along the lines suggested by the committee, Professor Davis, its chairman, has asked me to make a statement concerning our endeavors.

At the time of the 1923 centennial celebration of Trinity College there was published a special number of the *Trinity College Bulletin,* setting forth in description, photographs and diagrams the principal features of the rocks of the campus and the adjacent Rocky Ridge Park. Although this was not precisely what the committee wanted (except for some excavating which had been done to expose glacial grooves) yet the work in preparing the bulletin furnished the happy background, and it was an easy matter and a next logical step forward to place signs here and there to designate the chief features which had been observed.

Ten signs were put on the campus and in the park. Three of them were large printed labels, under glass, located near the entrances or at other especially important positions and each shows a diagram of the whole area with the locations of all the stations, a main text or summary of the general geological features, on one side three block diagrams representing the structure in its stages of development and on the other a description and photograph of the particular feature which the sign is intended to explain.

In addition to the large signs there are seven small ones each with a brief inscription painted on wood: one calls attention to some "grooves at your feet made 100,000 years ago by the glacier," another is near a huge glacial boulder, another marks the contact between the trap rock and sandstone, and so on for the seven.

So far as the classes in geology are concerned the rocks of the campus and park have furnished us a veritable museum and laboratory for the study of earth phenomena. The structure is well shown and is typical of the whole Connecticut Valley. Besides the major rift represented by the Rocky Ridge itself, so well known to geologists, there is a small clear-cut fault with a throw of about four feet; the fault zone presents slickensides, breccia and dragging; the fault surface is marked by a thick vein of white barite with a half dozen other minerals. The red sandstone and trap rocks have much of interest; the physiographic features illustrate many of the prin-