

VOL. IX. No. 2

OCTOBER, 1915

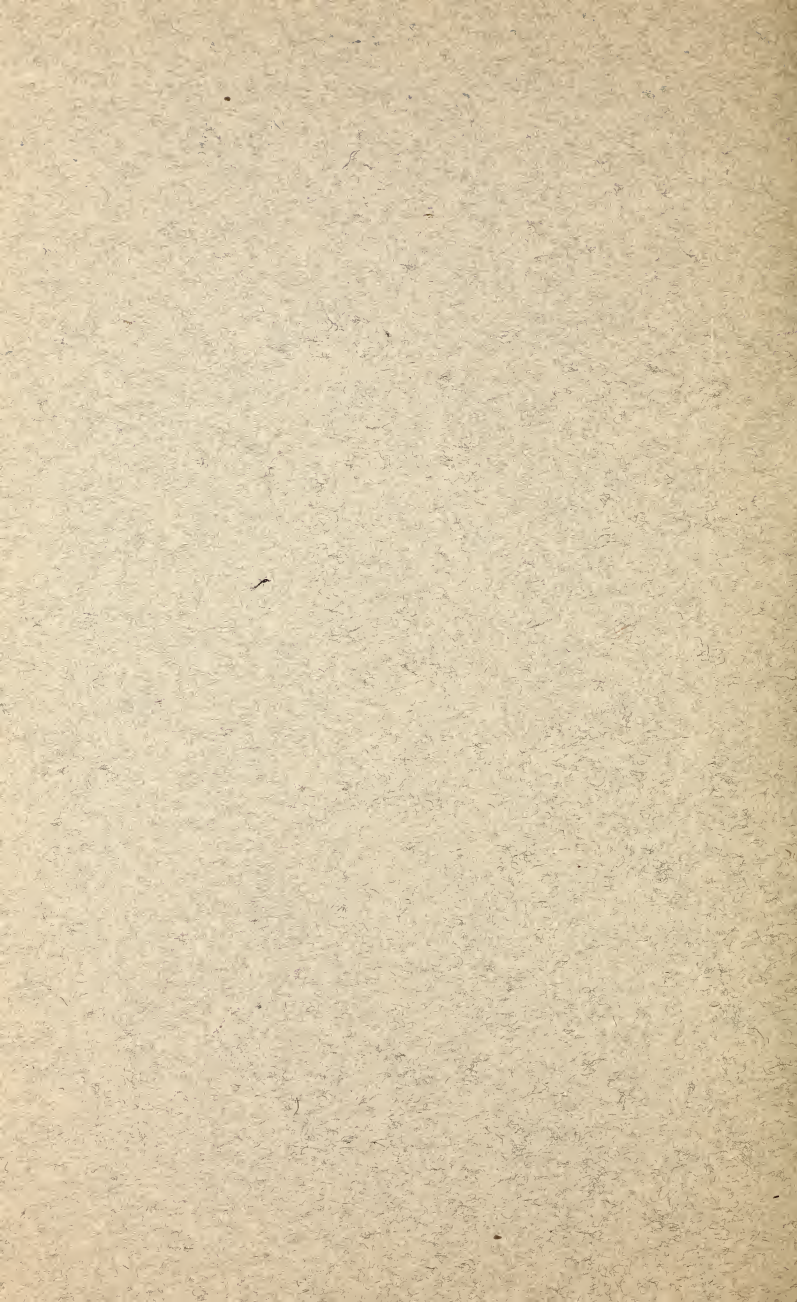
BULLETIN
OF THE
**College of
William and Mary**
Williamsburg, Virginia



COMMENCEMENT EXERCISES
JUNE, 1915

ADDRESS OF CLARENCE WINTHROP BOWEN, PH. D.
NEW YORK

ADDRESS OF LYON GARDINER TYLER, LL. D.
President




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Commencement June, 1915

The Commencement exercises of the session 1914-1915 were marked by many interesting features.

The Baccalaureate sermon was delivered by Rev. G. C. Kelley, of Norfolk, Va.

The Literary Societies held joint contests on the nights of Monday and Tuesday, June 7th and 8th.

The Educational address was delivered by Dr. Philander P. Claxton, of the Bureau of Education, Washington, D. C., June 10th.

The address to the graduates was made by Dr. Clarence Winthrop Bowen, of New York.

Dr. Cary Grayson, physician to the President, addressed the Alumni on the night of June 9th.

One of the most interesting features of the Commencement was the program rendered by the senior class. Their exercises were held on the campus on the evening of the 8th, and were of an especially high order and embraced many original and interesting parts. The exercises closed with the College Prom.

The Present Session

The College of William and Mary entered upon its two hundred and twenty-second session on September 16, 1915. The indications are that this will be the banner year in our history. The College roll is already far ahead of all previous years. The development of the high schools of the State is being reflected in the personnel of the student body, which has shown marked improvement from year to year. Our dormitories are taxed to their utmost capacity, with students still applying for admission. If we are to accommodate further applicants we must have a new dormitory before the opening of another session.

The healthy increase which William and Mary is experiencing is due largely to a fuller realization on the part of our clientele of the progressive spirit of the old college and its true mission of educating the boys of limited means, who would otherwise be deprived of an opportunity. This college exists solely for the benefit of the worthy and ambitious young men who enter its halls and no labor is spared to make it wholesome and helpful to all.

Students from Virginia get through William and Mary at a cost per session of less than \$250.00 and have every advantage that can be offered by a college giving strictly academic courses.

Pre-Medical Course

Besides the regular work for the Teachers' Diploma and three strong courses leading to the A. B., B. S., and M. A. degrees, we have, beginning with this session, established a Preliminary Course for Medical Students. This course is intended to meet the latest requirements for admission to the various medical schools belonging to the Association of American Medical Colleges. The course includes, not only the minimum requirements for admission to standard medical colleges, but additional subjects that will be directly useful in medical work.

Graduates, 1915

TEACHER'S DIPLOMAS

Bennington, Seth, Camp, Va.
Bishop, Joseph Masby, Duffield, Va.
Bonney, John Harvey, London Bridge, Va.
Booth, George Wythe, Middletown, Va.
Grimsley, William Morgan, Van Dyke, Va.
Harris, Herman Lee, Coeburn, Va.
James, Edwin Ralph, Dendron, Va.
Jennings, Clarence, Hickory, Va.
Kyle, Zelma Talmage, Galax, Va.
Mitchell, Benjamin Burruss, Washington, Va.
Maffette, Raymond, Leesburg, Va.
Mauzy, Robert Eagle, Hightown, Va.

Graduates, 1915—Continued

Newton, Robert Murphy, Hague, Va.
Ownbey, Arthur Dennis, Grundy, Va.
Page, Robert Massie, Batesville, Va.
Pierce, Alfred Kerkley, Capron, Va.
Presson, John Morris, Hampton, Va.
Prillaman, Henry Andrew, Callaway, Va.
Rothwell, Stuart, North Garden, Va.
Shands, William Ridley, Courtland, Va.
Somers, Wilson Edward, Bloxom, Va.
Swecker, Harry Tucker, Monterey, Va.
Smith, Jesse Fielding, Banco, Va.
Stone, Webster Thompson, Rawlings, Va.
Tucker, Alfred Peoples, Merry Mount, N. C.
Taylor, Preston Philips, Urbanna, Va.
Wallace, Robert Perry, Hampton, Va.

BACHELORS OF SCIENCE

Barnes, Franklin Mason, Williamsburg, Va.
Emery, Victor Ewart Gladstone, Kinsman, Ohio.
Goodwin, Frederick Deane, Ashland, Va.
Horne, John Robert, Sugar Grove, Va.
Renick, Charles Clark, Callaway, Va.

BACHELORS OF ARTS

Cooke, Francis West, Gloucester, Va.
Emery, Victor Ewart Gladstone, Kinsman, Ohio.
Frey, Oliver Walter, Allentown, Pa.
Harris, Herman Lee, Coeburn, Va.
Jennings, Clarence, Hickory, Va.
Jones, Lewis, Urbanna, Va.
Massey, John William, Newport News, Va.
Shackelford, Wilburn Stephen, Richmond, Va.
Smith, John Waller, Waynesboro, Va.
Somers, Wilson Edward, Bloxom, Va.
Taylor, Preston Philips, Urbanna, Va.
Wright, Ernest Linwood, Tappahannock, Va.

MASTER OF ARTS

Games, Lemuel Frances, Norfolk, Va.

Baccalaureate Address

Delivered Before the Faculty and Students of the
College of William and Mary, at the Two
Hundred and Twenty-second Annual
Commencement at Williams-
burg, Va., June 10, 1915

By Clarence Winthrop Bowen, Ph. D.

Mr President, Gentlemen of the Faculty, Gentlemen of the Graduating Class, Ladies and Gentlemen:

It is a genuine pleasure to visit this ancient seat of learning, the oldest save one of all the colleges in America, "their Majesties' Royall College of William and Mary." The name of this historic town and former capital, as well as the name of your State itself, shows our relationship to the sovereigns of our mother country. Even New England was once called North Virginia.¹ But it was many years after the death of Queen Elizabeth before English sovereigns could think of establishing an institution of learning in America. Although the question of founding a college in Virginia was considered in 1660,² it was not until 1691, as you know, that Reverend James Blair was selected as the agent of the colony to go to England to secure a charter for a proposed college.

If it could actually have been painted from life, I have often thought how inspiring would be a painting of John Winthrop, Jr., Lawyer, Traveller, Magistrate, Physician, Diplomatist and Gentleman, the son of the Governor of Massachusetts, portraying him

¹"The Letters and Times of the Tylers," by Lyon G. Tyler, Vol. 1, 10.

²"Williamsburg the Old Colonial Capital," by Lyon G. Tyler, p. 112.

as he stood before Charles II in 1662 to ask for a charter for the Colony of Connecticut, of which the younger Winthrop was for so many years Governor. But more impressive than that picture of the imagination is the canvas before you of the distinguished divine bearing the noble Virginia name of Blair who for fifty years was your first President, representing him as he appeared in London in 1691 in the Chamber of the Privy Council over which King William of blessed memory presided, and on being introduced by the Archbishop of Canterbury said: "Please your Majesty, here is a humble supplication from the Government of Virginia for your Majesty's charter to erect a free school and college for the education of their youth."¹ A favorable report was considered the following year² by the Privy Council over which Queen Mary presided, and the charter was duly signed.³ In 1694⁴ the Heralds' College in London issued authority for the College in Virginia to use a Coat of Arms. While Kings College in New York, or Columbia University as it is now called, received a charter in the name of the King from the Royal Governor of New York, "it is an interesting fact that no other college American or even English has perhaps a seal of such high origin,"⁵ as the College of William and Mary.

To one who comes from outside the bounds of the Old Dominion how interesting it is to be told that the plan of this College was drawn by Sir Christopher Wren, who designed St. Paul's Cathedral, and also to be told that George Whitefield, the founder of Methodism, visited Williamsburg in 1739, where he found in these halls masters from Oxford University, two of whom were his cotemporaries. "I rejoice in seeing such a place in America," said Whitefield in his diary,⁶ and we to-day rejoice, I am sure, in seeing this same College and this same Williamsburg. Equally impressive to a Northerner is the fact that in 1776 was

¹ "Williamsburg the Old Colonial Capital," by Lyon G. Tyler, p. 116.

² September 1, 1692.

³ February 8, 1693.

⁴ May 10, 1694.

⁵ "Williamsburg the Old Colonial Capital," by Lyon G. Tyler, p. 120.

⁶ "Williamsburg the Old Colonial Capital," by Lyon G. Tyler, p. 141.

established at William and Mary the first intercollegiate fraternity, the Phi Beta Kappa Society so-called, a member of which was John Marshall, a student here in 1779 and afterwards Chief Justice of the United States. To another William and Mary Student, Elisha Parmalee, of Connecticut, was granted permission to establish the Phi Beta Kappa Chapters at Yale and Harvard. It might be added that the education of Indian children was a feature here down to the days of the Revolutionary War.

What a wealth of historic associations cluster about this ancient college! How it stirs the admiration of those who come from a distance to hear the roll-call of students or friends of the college of former generations: Peyton Randolph, first President of the Continental Congress, a student about 1735; Thomas Jefferson, a student in 1760, and those three other students at William and Mary who were likewise "Signers" of the immortal "Declaration:" Carter Braxton, Benjamin Harrison, and George Wythe; John Tyler, Sr., Governor of Virginia, author of the Proposition for a Convention of the States at Annapolis in 1786, a student at the Grammar School in 1754; Edmund Randolph, Secretary of State of the United States, a student in 1766 and later in life your chancellor; James Monroe, President of the United States, a student in 1775; James Madison, Sr., your President from 1777 to 1812; John Randolph, of Roanoke; John J. Crittenden; William C. Rives; John Nelson; William B. Giles; Hugh Blair Grigsby, another chancellor, one whose portrait hangs on yonder wall; General Winfield Scott; the Byrds, Carys, Pages and Tuckers; the Masons and Prestons; the Lees, Nelsons, Harrisons and Carters; and that Virginian George Washington who was your chancellor while President of the United States. All honor therefore, to the College of William and Mary, regarding which, Mr. President, your father John Tyler, President of the United States and also your chancellor said: "The oldest save one of all the literary institutions of the United States, she has contributed her full share to the public enlightenment, and she has made her mark on the tablets of history which neither fire can consume nor dust or ashes can obscure."¹

¹ De Bow's "Review," August, 1859, p. 149.

But the history of the two hundred and twenty-two years of this institution means nothing if it does not teach us what to do to-day, and guide us in telling others what to do to-morrow. The education men have received at institutions like this should fit them to help others. Men to-day are as determined to make genuine progress as men centuries ago were determined to win glory. How can I amuse myself is no longer a riddle to be solved. How can I improve myself is the question of the hour. Governments, whose rulers held their power by treating their subjects as children fit only to be pleased, have long since been swept out of existence. Those nations to-day are the most prosperous that try the hardest to elevate and educate the people. In our own country, therefore, where the Government means the people, self-improvement is a necessity, and when we realize our own shortcomings it becomes easier to improve ourselves and to help others. Determination to have unlimited confidence in ourselves will help us in overcoming difficulties. To believe that the insignificant position we hold in life is an insurmountable obstacle against self-improvement, is to say that we are animals and not men. One of England's great Lord Chancellors, Lord Eldon, said: "The first requisite to distinction is not to be worth a shilling." That remark, no doubt, applied to himself, for his first year's earnings as a lawyer were exactly nine shillings. He arose at four o'clock in the morning and studied until late at night. Amid all discouragements he clung to his favorite work. His confidence in his ultimate success could not be shaken. He believed in himself when no one else did.

Struggles with poverty or a succession of failures have only made great inventors more determined to give to the world the result of their labors. Sir Richard Arkwright and the spinning machine, James Watt and the steam engine, George Stephenson and the locomotive, Samuel Morse and the electric telegraph, Elias Howe and the sewing machine, are a few of the illustrations that occur in mind. Another important quality that a man must possess to succeed in his calling is a decided love and enthusiasm for his work. Lukewarmness in your daily work is the dry rot that surely brings misery and failure. How many men about us are more interested in watching the hands of the clock in its daily

course than in conscientiously performing the work of the day! To cheat his employer out of a half-hour's time or an honest day's labor seems to be regarded as the privilege of an employee. Such men have never succeeded and never will succeed, no matter what their occupation is. But the man that does more than is required of him and regards his employer's interests as his own, scarcely ever knows the meaning of the word failure. Dr. John Hall, of New York, in addressing some students of theology, once said: "Young men, if you ever wish to leave an humble field of work for a larger one, make yourselves conspicuously effective where you are." So, if you wish to rise, make yourself a necessity in the position you now hold. The man that hates his work is a failure. The man that loves his work is a success. The English statesman, Lord Brougham, loved work so much that he thought it almost wicked to waste a minute of time. For nearly sixty years he was lawyer, statesman, author and scientist, and won distinction in every calling. Michael Angelo's untiring zeal as architect of St. Peter's in Rome, when nearly ninety years old, begrudging the hours of sleep which he was obliged to take because they kept him from his work; Christopher Columbus's anxiety to open a new road to a new world; the blind John Milton's passion to dictate his inimitable poems of "Paradise Lost" and "Paradise Regained"; the historian Gibbon's unrest until he had finished his great work on "The Decline and Fall of the Roman Empire," are a few of the thousand of illustrations that might be cited to show the love that successful men have had for their work.

Every Irishman loves the great Liberator, Daniel O'Connell, the man whose eloquence electrified Great Britain eighty-five years ago. It was not because O'Connell was a great orator that he was loved in Ireland, hated in England, and his memory is still revered in America. It was because he was opposed to the legislative union between England and Ireland and thought that Roman Catholics should have the same political privileges as Protestants and devoted his life to and threw his whole heart into this work. His life work made him great. He did not make his life work great. The man who concentrates all his energy upon any honest

work is a hero. And yet we hear it said that a man fails because he has never had a chance. He has been always kept down. His friends, we are told, drag him down, his birth keeps him down. When I believe that there is no God in Heaven, then I will believe that a man must be what he always has been.

Look at Michael Faraday, an errand boy in a bookseller's store at thirteen years of age, and later in life discovering that magnets will make electricity, and that machines for producing electricity for the electric light could therefore be given to the world. The Scotchman, Robert Burns, was a day laborer. He was also the author of one of the most beautiful poems in the English language: "The Cotter's Saturday Night." John Bunyan was a tinker; he was also the man who wrote the immortal "Pilgrim's Progress." Ben Jonson began life three hundred and forty-three years ago, as a mason and bricklayer. He was afterwards Poet Laureate of England, and was buried in Westminster Abbey. It was a succession of undiscouraged failures that at last made Benjamin Disraeli Prime Minister of England. If the English author, Thomas Carlyle, had not loved his work, could he have re-written from memory the first volume of his "French Revolution," after the original manuscript had been lost? The town in New England where Elihu Burritt lived knew him as a blacksmith. The world knows him as the man who learned half a hundred languages and as the advocate of universal peace as opposed to war.

But why multiply illustrations? The noblest examples of success, whether as ministers, lawyers, statesmen, merchants, mechanics, laborers of the lowest or most exalted rank, have been men who have loved their work. Temptations of the subtlest sort only make such men determined to succeed. All honor, therefore, to the men who have a love and enthusiasm for their work.

Another and most important quality that young men and particularly students like yourselves must have is individuality. We are unconsciously imitators ourselves, but we have a contempt for imitation when we see it in others. We admire the man who thinks and acts for himself, who does a thing because he believes it to be right, who never shrinks from a duty because he might

be regarded as eccentric. The importance of that noble Greek precept, "Know thyself," cannot be exaggerated. A man should study his own nature, his special qualities and powers, his fitnesses and capabilities, and then he will be better enabled to carry out the bent of his genius. Know *yourself*, not somebody else. You may have the greatest faults; you also have a free will. The most sublime of English poets has written:

"They say best men are moulded out of faults;
And, for the most, become much more the better
For being a little bad."

I knew of a young man who came from the country years ago, and entered a store in New York. His fellow-clerks laughed at him because he worked harder than they did, and because he refused to enter into the amusements and hundred and one things that would consume his evenings and leisure moments. But ridicule only made him give closer attention to his business, and he rose step by step until he became one of the most prominent and successful merchants in the city of New York. That man may have been unpopular at the beginning of his career, but he did his own thinking and was successful.

One hundred and eleven years ago was born in England Richard Cobden. Upon the death of his father, who was a poor farmer, he entered a warehouse in London. As he grew older the stagnation of trade in England set him to thinking, but instead of blindly following the political economists of the day, he organized the Anti-Corn Law League, which resulted in the abolition of the odious corn laws of Great Britain. It is impossible to recall the name of a man in this age or in any age, in this country or in any country, who owes his title of distinction to the fact that he has simply followed in the path trod by celebrities. Do not be afraid of being called "queer." Cranks are the men that move the world. A man with a hobby is never anybody's slave. The more unlike you are to others and the more true you are to yourself, the more respected will you be by those who know you.

In Faneuil Hall, in the city of Boston, eighty-nine years ago, stood a man dressed in tight-fitting knee-breeches and long

flowing gown delivering a eulogy on the characters of John Adams and Thomas Jefferson, two Presidents of the United States who had died fifty years to a day after the signing of the Declaration of Independence. Not simply the crowded audience in Faneuil Hall, but the whole country heard that eulogy. They cared not that the orator was the son of a farmer and inn-keeper, and had once been a country school-teacher. He was to them the great Daniel Webster, the glory of his native State, the pride of his adopted State, the mightiest intellect of the American nation. Webster in that day, like Patrick Henry in an earlier day, was the type of what an American should be. Like Webster, like Patrick Henry, like all Americans who have added lustre to this nation's greatness, we must hold with the tightest grip the individuality that God has given us. The consciousness of being able to carry out our own ideas of what a useful, profitable and honorable life should be, is an inspiration to every man. It belongs to the lives of the men whose names have been cited and it can belong to every one of us.

Men of the College of William and Mary, one more point I must make in this plain talk that I am having with you to-day. A quality indispensable to every one of you into whose faces I am now looking is integrity. All other good qualities are as nothing if integrity is lacking. As well attempt to draw a cart without wheels as to journey through life without integrity. A good character and honor are a man's most valuable possessions. Let the love of honor be as strong in a man as his love of life or his love to his family, and you will see a man among men, one upon whom the village or even the State may lean in a crisis and upon whose shoulders responsibilities are sure to fall.

Hector in "Troilus and Cressida" says:

"Life every man holds dear; but the dear man
Holds honor far more precious dear than life."

And Shakespeare makes another of his characters say:

"I rather would have lost my life betimes,
Than bring a burden of dishonor home."

It is easier to make light out of darkness than to make a successful man out of one whose integrity is a matter of doubt.

"Has that man ability?" you ask. "Can he be trusted?" is a thousand times more important question. At eleven years of age the world-renowned philanthropist George Peabody began to earn his living. For the first four years he worked in a little grocery store. His weekly earnings he gave to his mother, but the precious lesson of honor and integrity which he learned he carried with him through life. Without that possession he never would have been honored at home and honored abroad, and he never would have been able to give to charity and to the cause of education throughout this Southland the immense sums which astonished the world.

A man with all the possessions in the world without integrity is contemptible. A man with integrity is never poor, and is always honored. No matter what a man's occupation is, therefore, to succeed he must be worthy of trust.

But gentlemen of Virginia, and you who come from other States in the South, the instruction, the inspiration, the ideals you have received here will be of no avail if you are not impelled to help those less fortunate than yourselves. You must acquire qualities of heart and mind to win the respect and love of all with whom you are associated. The education you get here is but a fraction of that larger education which will come to you from a life filled, no doubt, with failures and sacrifices, but also with triumphs and successes which will make your lives worth living. While the first part of your life is spent in perfecting yourselves, the maturer years which now lie before you must be devoted in giving help to your neighbors, in giving service to your native State and in giving the best that is in you, even your life if necessary, for the glory of your country. The United States of America will be what you make it to be. The ideals of civil liberty which have come down to you through Anglo-Saxon inheritance must be broadened and extended, and later transmitted to others as they have been transmitted by your fathers to you.

The State in which you Virginians live is governed by you and by you individually. If Henry Carter Stuart is chosen to be your

Governor, or Woodrow Wilson, now the champion of democracy and of the rights of humanity, is elected to be your President, they are your servants and must carry out your wishes and the wishes of the humblest citizen in the community in which you live. The will of the people is the theory upon which our Government was founded, and the will of the people since the days of Washington and Jefferson, of Madison and Monroe, has been to give an enlightened education to all. The immense strides that have been made in education and the vast sums that have been spent to promote it have had a civilizing influence that cannot be over-estimated; but universal education, the progress in the arts and sciences, the multiplication of priceless inventions and a hundred and one other benefits to our civilization would not have come down to us if the founders of this Government, men like the Virginian Thomas Jefferson, had not believed in and were not ready to sacrifice their lives for individual liberty.

The growth of the United States of America is founded on the simple principle that the people shall rule. In Massachusetts more than two hundred and eighty years ago, Reverend John Cotton said: "Democracy I do not conceive that ever God did ordain as a fit Government for Church or commonwealth." From that view Reverend Thomas Hooker dissented and went with his followers to the Connecticut River to found another colony, and uttered those memorable words: "In matters of greater consequence, which concern the common good, a general council, chosen by all, I conceive, under favor, most suitable to rule and most safe for relief of whole."¹

The blessings of democracy were never so apparent as they are to-day. We have seen on another continent an illustration of the annexation of territory against the will of its inhabitants, and we have also seen the violation of neutrality in time of war, but such disasters would never have occurred if the will of the individual, the wishes of the people had been consulted. Militarism is essentially autocracy. It cannot exist in a country like ours

¹ "Connecticut; A Study of a Commonwealth-Democracy," by Alexander Johnson; also article in "New Englander and Yale Review" (September, 1881), by John Addison Porter.

whose theory of government is founded on democracy. The growth of democracy in the Anglo-Saxon world means the spread of civilization throughout the rest of the world. The influence of example is a stronger weapon than the largest army or the biggest navy.

In Independence Hall, Philadelphia, one week from to-day, the one hundred and fortieth anniversary of the Battle of Bunker Hill, will be gathered a notable company of gentlemen, presided over by a former President of the United States, which will suggest that the nations of the world form a league of peace that will bind the signatory powers to use military force to keep any member from going to war without first submitting the cause of dispute to an International Court for settlement. A government like the United States, based on democracy, can with propriety formulate such an ideal plan. But governments in Europe, based on autocracy, before joining a league of peace must first throw off the chains of militarism and accept the voice of the people as the voice of God.

All the magnificence of historic empires that no longer exist; all the luxuries that have belonged to the proudest nations; all the books, paintings and cathedrals; all the laws, institutions and civilization of the past; all the arts, sciences and inventions; all the progress that has been made from the foundation of the world, amount to absolutely nothing if our civilization to-day does not also include equal rights to all men. There can be no lasting peace, no real civilization without democracy.

Virginia's Contribution to Science

An Address by Lyon G. Tyler, Read at the American Antiquarian Society, October 20, 1915

It is probable that no one doubts the conspicuous part played by Virginia along certain important lines of activity. In government she took a leading part in the American Revolution, and was the capital of the Southern Confederacy. In politics, she was the headquarters for many years of the great Jeffersonian party, and though a slave State, she was for years the strongest exponent of the Democratic principle. In war her population has shown a remarkable military spirit and the names of Washington, Scott, Taylor, Lee, Johnston, and Jackson easily stand pre-eminent among American generals. And in colonization, not only were her presidents foremost in the extension of the national domain, but the South and West teem with the millions, who are descendants of the early Virginia pioneers. Her association with science and scientific men is not so well recognized.

There is a reason for this. Science—practical science especially—loves the crowded centers, where its activity may receive adequate reward, and rural occupation and a scattered population are not supposed to be conducive to scientific pursuits. Now, Virginia has been a land of counties and not of cities or towns.

Nevertheless, her records are not a sealed book. It may be readily admitted that science as a profession has not flourished, but in the knowledge which has come down to us there have been indications of a spirit in Virginia leading to invention and research, which promises better things when population becomes denser and more compact. Especially in the case of the great immortals, who hold first place in the Temple, her contribution to science has, I think, been in no degree mean or contemptible.

At any rate, I opine, a rapid review of the evidences of the scientific spirit in the history of Virginia, which is the object of this paper, may possibly not be without some interest or value to those who like to delve in the mysteries of the past.

Not much is to be expected of the first century of settlement, when the attention of the people was absorbed in the mere necessities of living. But in the latter part of the seventeenth century the inquiring spirit began to manifest itself, especially along the lines of natural history. The new era begins with John Bannister, a man whom I consider as the pioneer scientist. He was born in England, emigrated first to Jamaica, and settled near what is now Petersburg, Virginia, as early as 1678, where he officiated as minister of the Church of England for the Parish of Appomattox, afterwards Bristol Parish. He was an ardent naturalist, and compiled a catalogue of Virginia plants, which is published in Ray's *Historia Plantarum*. He also contributed various papers to the *Philosophical Transactions* of the Royal Society. Among them "Observations on the Natural Productions of Jamaica," "Insects of Virginia," "Curiosities in Virginia," "On Several Sorts of Snails," and "Description of the Snake Root," in which he was probably the first to call public attention to the medicinal qualities of that plant. We know little in addition of his private history, except that he came to his death by a fall while engaged in pursuing his favorite researches in botany. His grandson, Col. John Bannister, was one of the prominent Virginians of the American Revolution.

Contemporary with John Bannister, but coming to Virginia at a later date was John Clayton, minister at Jamestown from 1684-1686. He was probably a graduate of Oxford University, as there are several John Claytons among the Oxford matriculates who might be taken for this man. In May, 1686, he was rector of Croxton at Wakefield in Yorkshire. He was a member of the Royal Society, and was a friend of Hon. Robert Boyle, the celebrated chemist, to whom he wrote from Jamestown, describing a remarkable instance of animal electricity and the fly called the fire-fly or "lightning bug." He was very fond of scientific studies, and his reflections on Virginia, published in the *Transactions* of the Royal Society on his return, might have been made more valuable, but for his loss on the way thither, as he states, of all his "books, chymical instruments, glasses and microscopes." As it is, we are under great obligations to him for

his description of Jamestown Island and of the climate, soil, animals and inhabitants of the colony. Some of his philosophic suggestions as to physical phenomena are rather amusing in the light of our present superior knowledge. In commenting upon the diseases in September, which were then very prevalent, and are now all but disappeared, he attributes them not to the troublesome mosquito, but to the change from summer to fall. Thus he writes: "That by the exhausting Heat and Ferment of the Blood raised too high and the Tone of the stomach relaxed, when the Weather breaks the blood falls, and like over fermented liquors, is depauperized, or turns eager and sharp, and there is a crude digestion, whence the named distempers may be supposed to ensue." Thunder in those days seemed to be considered a primal fact, and lightning was one of its qualities or attributes, and Dr. Clayton suggests to the learned Society, for which he is writing, that thunder, with its lightning, was probably identical with "a sulphureous, inflammable spirit," which he had often distilled from coal, by which I suppose he meant kerosene oil.

The early part of the eighteenth century was contemporary with a visit to Virginia of the great English naturalist, Mark Catesby, whose sister, Elizabeth, was the wife of Dr. William Cocke, Secretary of State of Virginia during the administration of Governor Alexander Spotswood. He remained in Virginia seven years, from 1712 to 1719, and traveled extensively, and when he returned brought to England the finest collection of natural objects which is said ever to have been brought from America to that country at any one time. Subsequently, he spent four years in the Southern colonies, and in 1726 began the publication of his "Natural History of Carolina, Florida and the Bahama Islands," the figures etched by himself and colored under his supervision.

More distinctly to the manor was Robert Beverley, born about 1676 in Virginia, son of Major Robert Beverley, of Gloucester County. He was an active, enterprising man, planter, naturalist and historian, mainly the last, and the only historian up to that time in any of the colonies, according to Dr. Jameson, of the Carnegie Institution, who had an original American spirit

about him, but none the less a scientist who had a shrewd love of observing nature. Probably the most interesting chapters in his work, "The History of Virginia," published in 1705, are those relating to the natural history of the colony.

Succeeding him should be noticed William Byrd, born in Virginia, in 1676, statesman, scholar, student of nature, Fellow of the Royal Society, and the intimate friend of Charles Boyle, Earl of Orrery, the philosopher and statesman, and nephew of the great Robert Boyle. He built the present noble brick mansion at Westover on James River, and gathered about him the finest library on the continent. He wrote several very interesting tracts upon Virginia, which, I believe, are admitted to have no equal in colonial literature for grace of style and composition. In his letters and tracts, "The Dividing Line," and the "Land of Eden," he makes valuable comment on the mineral, vegetable and animal products of the colony in words that scintillate with wit and humor.

Another name stands high in the list at this time—that of John Mitchell—by profession a physician. He emigrated to Virginia about 1700, and resided at Urbanna on the Rappahannock River. He devoted himself to botany and other scientific subjects, and discovered several new species of plants, one of which was called by Linnaeus in his memory "*Mitchella repens*." His articles published in the *Transactions* and in pamphlet form, discuss botany, the origin of color in races, the yellow fever and electricity. After remaining in Virginia for nearly half a century, he returned to England in 1744, where he was made a member of the Royal Society, published a map of Virginia, and died in March, 1768.

But the glory of colonial Virginia in this field of natural history during the eighteenth century was John Clayton—not the minister of Jamestown of the same name, but another and quite a different person. He was son of John Clayton, the learned attorney-general of Virginia, and grandson of Sir John Clayton, of Fulham in Middlesex, England. He was born at Fulham in 1685, studied medicine, and came with his father to Virginia in 1705. He was indefatigable in botanical researches. About 1723

he became clerk of Gloucester County, and held the post till his death December 15, 1773, at the age of eighty-eight years. His office gave him leisure for studying the soil and atmospheric phenomena affecting the vegetation of the colony. He kept a botanical garden at his home, known as "Windsor," on the Pianketank river, and from this garden and other sources he amassed a great number of plants, which he dried and forwarded to Gronovius, who, in conjunction with Linnaeus, published a list and description of them in Latin in a book which was called "Flora Virginica." This work contained the first complete enumeration of the Virginia plants, one species of which was christened in his honor by Gronovius *Claytonia*, and are occasionally met with. He was a correspondent of many learned men and was also a F. R. S.

In the meantime, a new era was impending in the history of science throughout the world. The iconoclasm of Voltaire and Rousseau against the dogmatism of the churches and the authority of rulers gave a stimulus to freer thought everywhere. Benjamin Franklin enthused both Europe and America by his remarkable demonstration that lightning was identical with the electric spark. In Virginia, where the church never had much influence, speculation on all kinds of questions became rife. In 1756 Franklin visited Williamsburg, the little capital near Jamestown, and received from the College of William and Mary the honorary degree of Master of Arts. In 1758 Francis Fauquier, a devotee of the sciences and a Fellow of the Royal Society, arrived as governor, and the same year Dr. William Small came to Williamsburg as professor of Mathematics and Natural Philosophy in the College of William and Mary. Fauquier and Small delighted in the society of young men, and at Fauquier's table, where Small was a constant attendant, the youth of Virginia—Jefferson, Page, Walker, McClurg—learned their lessons in the rights of man.

Dr. Small introduced in 1760 the lecture system at the College, and Jefferson, by nature a scientist himself and no mean inventor, referred to Dr. Small as the man who "fixed the destinies of his life," and John Page eulogized him as "the illustrious professor of Mathematics, the great Dr. Small, of Birmingham,

the darling friend of Darwin." In 1764, after a stay of six years in the colony, Small returned to England and took up his residence at Birmingham, where he had the society of the great English philosophers, who made that city the center of their life and labors. Besides being "the darling friend" of Erasmus Darwin, he was the intimate friend of James Watt, and it was on his advice that Watt, in 1773, left Glasgow and came to Birmingham, where he formed a partnership with Matthew Bolton, the founder of the Soho Engineering Works. For it must be remembered that in 1763, by his famous development of the steam engine, Watt furnished the key to the new era mentioned, which was one of invention and not chiefly one of observation as hitherto.

Under the expanding wings of this new departure a society for the promotion of manufactures was founded, in 1759, in Williamsburg, which was authorized by the General Assembly to offer bounties for discoveries and improvements, and in May, 1773, a Philosophical Society known as "THE VIRGINIA SOCIETY FOR THE PROMOTION OF USEFUL KNOWLEDGE" was established, of which the venerable John Clayton, of "Windsor," the botanist, was president, and John Page, of "Rosewell," was vice-president. Page, who was lieutenant-governor under Patrick Henry and afterwards governor, spent much of his time in scientific investigations. He invented an instrument, by which he measured the fall of dew and rain to the 300th part of an inch, and claims that his invention was the first of its kind ever used in America, "perhaps in the world," and at his residence on the York, he calculated an eclipse of the sun. As early as 1779, fifty years before Michael Faraday's wonderful experiments, in a communication published in the American Philosophical Society's *Transactions*, he suggested the identity of magnetism with electricity. His neighbors called him John Partridge after the noted Almanac maker in Scotland. There is preserved in the Virginia Historical Society a gold medal presented to John Hobday, of Gloucester County, by the Virginia Society of Science, for his invention of an improved method of threshing grain by horse power.

I have touched somewhat in detail upon these early manifestations of the scientific spirit in Virginia, and the rest of my article

must be of a mere general character. As we all know, invention and discovery came to its flower in the nineteenth century, and most important in the list of the early post-Revolutionary characters was James Rumsey, who though a native of Maryland, was a citizen of Virginia, and spent the active part of his life in that Commonwealth. He lived at Shepherdstown on the banks of the Potomac, where he was manager of a saw mill and superintendent of the Potomac Company, of which Washington was a member. Although, as has frequently happened in other cases, there were others to precede him, these were Europeans, and as an American he was the first in the country to construct and navigate a boat by steam. In this noble experiment he also greatly improved upon his European predecessors. His first steamboat was fifty or sixty feet long, drawn to a point at both ends and worked by a steam engine, which forced water through a pipe out at the stern. He privately tested his boat in 1786, and gave a public demonstration at Shepherdstown of its value in 1787, when the novel sight of a boat moving through the water against the current of a river at the rate of four or five miles an hour, was witnessed by many persons, including General Horatio Gates. Rumsey obtained patents for his invention from the Legislatures of Virginia, Maryland and New York, and in 1788 the Rumsey Society was formed in Pennsylvania, of which Benjamin Franklin was a principal member.

He then went to Great Britain where he demonstrated the utility of his plans to the Society of Arts in London and procured patents from the British government for his steamboat and for various improvements in steam engines, pumps, boilers and mill machinery. In spite of all kinds of pecuniary embarrassments he successfully constructed a new boat of about double the length of his American steamer, and after private trial, made preparations for its public exhibition on the Thames. But after all the burdens borne, and on the very eve of triumph, a stroke of apoplexy intervened between him and all earthly glory. On the evening of December 20, 1792, he delivered an eloquent lecture before the committee of mechanics of the Society of Arts on the subject of hydrostatics, at the conclusion of which, while en-

gaged in wording resolutions to be entered on the Society's book, he was taken with a violent pain in the temple. He became speechless and expired the next morning. Some few weeks later his boat was tried in the Thames, and according to the notice in the Gentleman's Magazine attained a speed of "four knots an hour."

Rumsey had a close second in John Fitch, who contested his claim to precedence, but as far as I can understand the evidence, it appears conclusive in favor of Rumsey. He was backed by Washington, Jefferson, Franklin and Benjamin Rush. The last named in 1788 eulogized Rumsey's moral character, and represents Fitch as a man "equally known for plagiarism in philosophy and a licentious opposition to our constitution," which opinion of Dr. Rush is a delightful instance of the mingling of politics with science. Though Rumsey's steamboat never came into practical use, he paved the way for Fulton, whom he met in London, and several of his inventions survive in one modified form or another; as for instance, the tubular boiler, so superior to the old tub or still boiler in the presentation of fire surface and capacity for holding rarefied steam.

One of Rumsey's patrons was Thomas Jefferson, who succeeded Franklin as President of the American Philosophical Society. In the vast variety of objects which engaged his almost universal genius, philosophy held no insignificant place, as is abundantly shown by his famous *Notes on Virginia* and his numerous letters to men of science. It was something to defend America triumphantly from the charge of the Abbé Raynal of the degeneracy of the man of Europe transplanted to America, and something more to confound the naturalist Buffon with his superior knowledge on a question of natural history and force the admission from the French philosopher that he should have consulted the Virginian before publishing his work, "so as to be sure of his facts." He invented a plow, a hemp brake, a pedometer, and a copying press.

The name James Madison was rendered doubly distinguished at this period in being the common possession of the illustrious "Father of the Constitution" and of his cousin once removed

the First Bishop of the Episcopal Church of Virginia and first President of the College of William and Mary after the American Revolution. The latter held the chair of natural philosophy in William and Mary College and was a worthy successor of Dr. William Small. He was an ardent friend of the American Revolution, and so strong a champion of free principles that it is said of him that in his sermons he would never speak of "the kingdom of Heaven," but of "that great Republic where there was no distinction of rank and where all men were free and equal." Doubtless his introduction, in co-operation with Mr. Jefferson, of the elective system of study at William and Mary, in 1779, was an expression of this feeling. He had the use of an extensive apparatus selected by Dr. Small in London, perhaps the best in the United States at the time, and excelled in physics and astronomy. In a paper to the American Philosophical Society in 1779, he submitted an interesting disquisition on the Aurora Borealis, and in 1789 communicated his observation on a lunar eclipse and the transit of Mercury across the sun's disk. In the lecture room he was indefatigable, and spent four to six hours a day. He introduced what was the first systematic course of lectures on political economy in any American College, and his enthusiasm threw a peculiar charm over his lectures on Natural Philosophy.

A contemporary of Dr. Madison was Dr. James Greenway, of Dinwiddie County, an ardent botanist. He wrote a number of interesting letters for the Philadelphia Society, in which he dwelt upon the fertilizing value of the pea, the nature of a certain poisonous plant found in Virginia, and an extinct volcano in North Carolina.

The current of the nineteenth century now sets in strongly and the limits of my paper confines me to a very brief mention of names.

Ephraim McDowell, born in 1771, in Rockbridge County, a graduate of medicine in the University of Edinburgh, who practiced his profession at Danville, Virginia. He was the first to operate for ovarian tumor, and became famous as the father of ovariectomy.

Benjamin Winslow Dudley, of Spotsylvania County, born in 1783, a graduate of the University of Pennsylvania and student afterwards at London under Cooper and Abernathy. He performed the first operation for stone in the bladder and was spoken of as the greatest lithotomist. It has been said that Benjamin Dudley's career presents the longest list of successful operations of any surgeon of modern times.

William B. Rogers, a link between Massachusetts and Virginia, studied from 1819 to 1825 at William and Mary College, where his father, Patrick Kerr Rogers, was Professor of Chemistry and Natural Philosophy and subsequently held his father's chair, and some years later a similar one at the University of Virginia. As State Officer he made the first report on the geology of Virginia, a work which has no superior, and is full of original suggestions. After thirty-five years' service in Virginia he moved to Massachusetts, where in 1860 he founded in Boston the famous Institute of Technology, and died in that city in 1882, having seen his pet project crowned with success.

But Rogers never forgot the claims of Virginia, and shortly before his death, in a published letter to John W. Draper, he referred with enthusiasm to the freedom of its great University and "the large relative space," which it had always given to "physical and mathematical science," "an example," he said, "only slowly adopted by the older Universities," by which I suppose he meant Harvard and Yale, though he had too much politeness to mention them by name.

Edmund Ruffin, born in Prince Edward County, Virginia, January 5, 1794, and educated at William and Mary College. He was an immense reader of books and by his works on scientific farming produced an entire revolution in agriculture in Tidewater, Virginia. His system embraced the use of marl and leguminous crops as fertilizers of poor soil, drainage, blind ditching and the five field rotation of crops. Probably there was nothing positively new in this, but his books and writings as Editor of the *Farmer's Register* had a personal force about them that compelled results. Those results, as told by the census of the United States were that, whereas lands in Eastern Virginia had

steadily declined in value, since the Revolution, leading to large emigrations southward, they steadily increased from 1835 to 1860, by the millions of dollars, and Virginia was never so prosperous as when the Civil War came on.

John Peter Mettauer, of Prince Edward County, Bachelor of Arts of Hampden-Sidney College, Virginia, and M. D. of the University of Pennsylvania in 1809. He was the first on this continent to operate for cleft palate, the first to employ iodine in the treatment of scrofula, and was one of the first to conceive the idea of curing vesicovaginal fistula, and among the first in such major operations as amputation of the shoulder, legation of the carotid, and the resection of the superior maxilla.

Cyrus Hall McCormick, son of Robert McCormick, born February 15, 1809, in Rockbridge County, where on his father's farm for six years he experimented and perfected the reaper which revolutionized agriculture throughout the world. Not only did it vastly increase the area of grain cultivation, but it was the stimulus of the phenomenal development of every manner of farm implement. It had a profound influence upon the fate of the Union; for William H. Seward attributed to it and not to the armies of the North the subjugation of the South. "The reaper is to the North what slavery is to the South," he said. "By taking the place of regiments of young men in the Western harvest fields, it releases them to do battle for the Union at the front, and at the same time keeps up the supply of bread for the nation's armies. Thus without McCormick's reaper, I fear, the North could not win, and the Union would be dissolved."

Mathew Fontaine Maury, born in Spotsylvania County, Virginia, January 14, 1806, son of Richard Maury and Diana Minor, his wife. He was educated at private schools and entered the navy. He suggested a system of reforms in the Navy Department, which adopted in 1842 introduced order where chaotic conditions formerly prevailed. As head of the Naval Observatory in Washington he made a profound study of the varying depths, and the winds and currents of the sea and by his works, "Sailing Directions," and his "Physical Geography of the Sea and Its Meterology," which last work is said to have passed through more

editions than any modern book of its kind, won for him the name of "Pathfinder of the Seas." He suggested all the principles of the modern weather bureau operations, instituted a system of deep sea soundings, and showed that the bottom of the sea between New Foundland and Ireland was a plateau admirably adapted for a telegraphic cable. He suggested to Cyrus W. Field the character of the cable to be employed and how it should be laid. In generous recognition of this fact, Mr. Field said, "I am a man of few words: Maury furnished the brains; England gave the money; and I did the work."

As chief of the water defences of the South under the Confederacy, he was the father of the torpedo and mining system now employed so generally in the European War. He was covered with honors and medals by all the European governments, was urged by the French government to take charge of their great Observatory at Paris, and invited to Russia by a personal letter from the Grand Admiral Constantine. Instead of accepting he preferred to live a plain Virginia citizen, having charge at his death, February 1, 1873, of the chair of meteorology at the Virginia Military Institute at Lexington, Virginia. By many he was regarded as the greatest of all American scientists.

John L. Porter,¹ of Norfolk County, was born September 19, 1813, son of Joseph Porter, the proprietor of a ship building establishment at Portsmouth, Virginia, the largest south of the Potomac River. In 1846 he was appointed acting naval constructor in the United States Navy and superintended the construction of many ships. When Virginia seceded, he held a similar position under the Confederate Government, and later was promoted chief constructor. In 1846, when engaged in work for the United States Government at Pittsburgh, Pennsylvania, he conceived the design of an iron vessel capable of going to sea, which would, nevertheless, be shot proof. His plans and designs were submitted to the Navy Department and were not approved. This was ten years before England and France began thinking on the subject of ironclads, and so far as Mr. Porter was concerned was the

¹ For a sketch of John L. Porter, see *A History of Norfolk Co., etc.*, by John W. H. Porter.

result of his own ideas without assistance from anyone. In 1861 the possibility of the value of ironclads in war was generally discussed, and Mr. Porter recurred to his scheme. He submitted the plans of 1846 slightly modified to the Confederate Government, accompanied with a model, and his ideas were applied to the *Merrimac*, a Federal warship, which had been burnt to the water's edge when the Gosport Navy Yard at Portsmouth was abandoned in 1861 to the Confederates. The subsequent career of this vessel thus cased in armor is known to history. In a battle with the Federal wooden battleships at Newport News on March 8, 1862, the *Merrimac*, or *Virginia*, as she was now named, demonstrated in the most convincing manner the superiority of iron ships over wooden ones no matter how gallantly manned, and bravely fought. The battle was an epoch-making one, and revolutionized naval warfare throughout the world. It is a curious fact that in the use of the torpedo, mining, and the submarine, in the development of trench warfare, in the employment of the iron ships in battle, in the invention of the machine gun (by Gatling, a North Carolinian), and the choice of a uniform best adapted to service in the field, bluish gray (generally adopted in the great European war) the old agricultural South led the nations of the world.

John Mercer Brooke, son of General George Mercer Brooke, a distinguished officer of the old United States Army, a member of an old Virginian family, was born December 18, 1826. He was associated with Maury at the Naval Observatory, and aided him in his deep sea soundings, and devised the deep sea sounding apparatus, which was so useful when the submarine telegraph cable came to be laid. And in recognition of his service to science, he received from King William I of Prussia, the gold science medal of the Academy of Berlin. In 1863 Captain Brooke was made chief of ordnance and hydrography under the Confederacy, and among the innovations introduced by him was the "air space" in artillery, which was soon generally accepted as one of the most important improvements in ordnance.

Dr. Walter C. Reed, born in Gloucester County, in 1846, and educated at the University of Virginia, from which he graduated as Doctor of Medicine in 1868. As assistant surgeon in the

United States Army he studied the cause of yellow fever. In February, 1901, he read before the Pan-American Medical Congress at Havana a paper in which he gave a modest and scientific history of the results achieved by himself and his colleagues, which established one of the most remarkable discoveries of modern sciences—that yellow fever is conveyed by the bite of a mosquito of a certain species. On his return to the United States he was received with enthusiasm by the Johns Hopkins Medical Association and other medical bodies, who realized the soundness of his conclusions and the importance of his discovery. Dr. Reed stood pre-eminent both as a man of science and a disinterested lover of humanity. Since the cause was made known, rendering prevention possible, the dread scourge of yellow fever has practically ceased.

Probably I ought not to pass by Henry Draper, son of the eminent scientist Dr. John W. Draper, who was professor at Hampden-Sidney College for three years. Of him it may be said that England gave parentage, Virginia birth, and New York training and the field of action. He was the first to obtain a photograph of the fixed lines in the spectra of the stars and the first to prove in this way the existence of oxygen in the sun—pronounced at the time the most brilliant discovery ever made by an American.

With Draper, I finish this paper. Other names of closer identity with the State might be added, and I do not go into the field of the present day.

Doubtless, this resumé shows that there has been no lack of individual talent for science in Virginia, and that nowhere has science excited more interest, but it is clear that there has been little community spirit in its favor. Men born in Virginia have generally had to go elsewhere for preferment. The Philosophical Society established in 1773 died with the Revolution and probably would have died shortly anyway. None succeeded it, at least, none to count. The only societies that had a continuous existence were the political and agricultural societies. Country people cannot get together conveniently, and when they do it must be for merry-making, for politics, or for private and public business.

As a child, I saw the plantation life before the war, and was brought up with others that saw it more fully, and there was never anything equal to it for joy and happiness. The poorest white man had perfect independence, and even the slaves had a kind of independence which had to be coaxed to labor. But we missed in Virginia what we still miss, in spite of all changes that have ensued, that which we see here to-day in this society—the touch of mind with mind, the mingling of soul with soul, leading to great community results. If in Massachusetts personal independence has been less, community strength has been conspicuous from a very early period.

