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The engineering and technological education of Black Americans : 1865-1950.

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THE ENGINEERING AND TECHNOLOGICAL EDUCATION
OF BLACK AMERICANS: 1865-1950

A Dissertation Presented

by

DAVID EUGENE WHARTON

Submitted to the Graduate School of the
University of Massachusetts in partial fulfillment
of the requirements for the degree of

DOCTOR OF EDUCATION

February 1991

School of Education

THE ENGINEERING AND TECHNOLOGICAL EDUCATION OF BLACK AMERICANS:
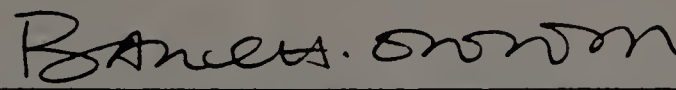1865-1950

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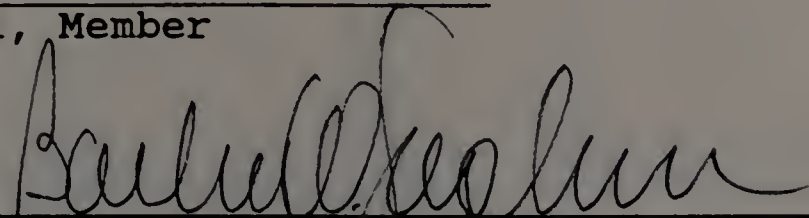
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I am grateful to all of those who assisted me in the compilation of this material. Special thanks, however, must go to Ms. Portia James, Curator of the Anacostia Neighborhood Museum of Washington, D.C., a museum of Afro-American history and culture. Her generosity, kindness, and expertise went far toward convincing me of the necessity for such a project. As the Curator of the recent Afro-American Inventors Exhibit, Ms. James was in a unique position to discuss the merits of my undertaking. Her advice to me was both encouraging and sound. She was able to direct me to sources that were housed at her parent institution, the Smithsonian.

Thanks to one man who in times of self doubt always had the words to reenergize me and encourage me to stay with the project. In return I taught him about the Homestead Grays.

Thanks also to the university community, my dissertation committee included, for its extreme tolerance of my questions.

My sincere appreciation goes as well to all of those who made this work possible; the black engineers, the technologically inclined black Americans of the early twentieth century, the teachers, the institutions, and to those who longed for the elusive opportunity to explore these fields. To all of these I am pleased to submit this work as

part of the ongoing legacy of writings that chronicle the

black American experience.

ABSTRACT

THE ENGINEERING AND TECHNOLOGICAL EDUCATION OF

BLACK AMERICANS:

1865-1950

FEBRUARY 1991

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Directed by: Professor Gretchen Rossman

The purpose of this study is to research the history of
black involvement in engineering and technological education
from Emancipation to the year 1950. The educational
opportunities, or the lack thereof, that existed for black
Americans during this period are seen in terms of their
ability to move this former slave population into the
technologically advanced twentieth century.

The tactics employed by individual states in reaction to
black insistence for advanced learning are also examined.
This is done as we gain an understanding of the black
protestations centered on the lack of access and the outright
refusal of some states to field the question of black higher
education.

The question of educational parity is addressed by voices from both sides of the racial barrier. Prominent in this discussion are teachers, politicians, and statesmen all displaying a range of views that both astounded and empowered the forces that worked on either side of the controversy. Racism, both institutional and individual, is a focal point. Tolerance, where one might least expect it, is shown as a continuing thread throughout this struggle, and alliances that forged a new era of cooperation between the races and among institutions are researched and reported.

Institutions and individuals responsible for the racial and educational climate are examined in detail, and prominent spokespersons, both black and white, are included to give an overall feel for the struggle for parity in this area of the educational arena. Institutions, their policies and practices, their willingness to look beyond the color of an applicant's skin, and their efforts to include a diverse student body are examined. There is also a discussion of the emergence of a national policy that went far to establish broad guidelines that at one point aided in the denial of access to black technological aspirants during this time period.

The struggle for the opportunity and acceptance of black participants in the technological arena has been a struggle worthy of note. This struggle and the reporting of this topic is important because, despite the significance of the

topic, it is one that has been minimally explored. This is
a beginning.

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CHAPTER I: INTRODUCTION

Statement Of The Problem

This dissertation is written to fill a void that exists in the educational history of American black people. Researchers have examined the education of the slave, the newly freed black, and those who have come between the Civil War and the present day but have failed to chronicle the history of black involvement in the fields of engineering and technology. In American educational histories the topic is rarely mentioned. When mentioned it is seldom, if ever, explored.

This dissertation will record the events and attitudes that shaped American society and the resulting impact on access to and the nature of technological training of black Americans between 1865 and 1950. Viewed from the vantage point of a people seeking equality of opportunity, this becomes a period of turbulent change in America.

American higher education, the fount to which all prospective engineers in this country must come, has been a preserve of the white power structure since its inception. It was made so by the exclusion of blacks from the preparatory programs that lead to faculty and staff positions. The long struggle to overturn this system has been opposed by legislative mandates many in the educational community. That struggle continues today.

The denial of opportunity preceded the campus and is rooted in the patterns of slavery. To deny another human being literacy is an inhumane act yet it was the law that made millions of enslaved blacks intellectual prisoners during and after their tenure as American slaves. For years after the Emancipation, blacks would still be forced to depend on whites for their educational sustenance. Few inroads would be made during the first 75 years of freedom.

By the year 1870, over 1200 colleges had come into existence in the United States. There is little evidence that any black ever attended any of these institutions (Weinberg, 1979, p. 263). With few notable exceptions, this pattern of exclusion of blacks from higher education continued well into the twentieth century. For those who wished to enter the fields of technology, the record is worse. Racial exclusion was not a practice generated and practiced exclusively by former southern slaveholders. Rather, this was a widespread practice known to exist in the most prestigious schools. As late as 1940, with a single exception, black faculty were to be found only on black college campuses. As late as 1946 at the University of Chicago, the respected sociologist William F. Ogburn made the assertion that all white graduate students would withdraw if a black was appointed to the faculty (Weinberg, 1979, p. 288).

As late as 1970 many of the authors of the texts on which American educational philosophy was built were products of a system born of division and exclusion. Many knew little or nothing of the darker tenth of the nation, yet they wrote all inclusively of American academia.

At least two examples of the resulting oversight of black contributions rest at the doors of Lawrence R. Veysey and Frederick Rudolph. Both are authors of works chronicling the higher education history of our nation. Rudolph's 1962 work, The American College and University: A History and Veysey's 1965 The Emergence of The American University for many years were cornerstones of educational readings. When Rudolph speaks of Harvard University in his 516 page compendium, he does so with more than 70 entries; for Yale, more than 60, and for the University of Chicago, more than 25. When Rudolph speaks of black colleges he speaks of Howard and Fisk Universities, and he includes them on one page and does not speak of them again. There is no mention of Atlanta University, Morehouse College, or any other black school. It is as if they did not exist. Veysey, an author whose work followed American higher education until the early teens of this century, makes no mention of either Howard or Fisk though both were viable institutions as early as 1910. Neither does he mention any other school that might cause his readers to believe that there was a black constituency abroad in the land. These omissions of relevant materials

concerning black efforts for educational fulfillment in many of the standard texts became an accepted and damaging method of portraying black people.

This meant that at the highest levels of academia the omission of black people from the espoused history was endorsed and approved. It is time that a new history was written. This paper is a beginning looking at one small area of higher education: engineering and technological education.

Significance Of The Study

It is important to tell the stories of black inventors and of the evolution of engineering and technological education for blacks. The stories, like so many other stories of American blacks, must be exhumed, written, and put into the larger story, the story of America. Without them, our history is weaker, or worse, a lie. Without them, a significant number of our people have no sense of hope or control over their own destinies.

In this study I will recount some of the many stories that should serve to strengthen the black community. After all, this is a record of people coming to grips with society's inadequacies and inequities and moving beyond these to a participatory role in the nation's technological and engineering community. This recounting can also serve to increase the understanding and the critical appreciation of a system that had the power to withhold membership or ignore

worthy contributions of certain individuals while advancing

and promoting other participants in the world of technology.

I view this work as an important task because far too

often black students, as well as the black community at large

are introduced to a world in which the vast majority of

heroes are white. Black students deserve more; they need to

know that black expertise has played a role in America's

growth. They need to hear of the victory over educational

tyranny that is part of their legacy. But most of all, this

work is important to me because without it I, too, become

part of those who withhold the truth from the young.

Today, the legal barriers to segregated education have

been torn away, and institutional behavior comes under

greater scrutiny. In spite of this, I am under no illusions

that the present day students do not suffer many of the same

indignities as their predecessors.

Methodology

This research is an historical account of the

experiences of black engineers and the development of

technological education for blacks. As such, iti s a story,

or a series of stories that have been overlooked and need to

be added to the larger story of American education.

With the help of many interested persons I have been

able to discover some ofttimes forgotten or overlooked facts

that reveal a strong commitment of blacks to engineering and

technology in America during the twentieth century. It has

not been a pleasant experience. More often than not, blacks wishing to investigate or research their past are sent to whites as authorities on their past repression. No matter how liberal or how understanding the whites, they can never speak with the justified anger and outrage that this topic demands. I, like other blacks involved in the recounting of their history, am writing this with the anger and outrage of one who is personally impacted by wrong.

I am aware of the bias that this might produce in this writing. As a result, I have pledged to write a fair recounting of the facts, as free of bias as I am able. Until I became closely involved with the teaching of young blacks in this field, it did not seem as glaring an omission or as pivotal an item in their education. Now, I realize that this history reveals systematic prejudice and patterns of exclusion that are clearly racist.

I began my research reviewing the current literature. This would have been of assistance had I been researching black engineers since 1970. Statistical compilations, discussions on access, industrial placement and advancement, the labor market vis-a-vis blacks, and many other issues are well researched in the current literature. Conspicuous by its absence, however, is any discussion of the black in these areas prior to 1970. It is as though they did not exist in terms of technology before this time. If one wishes to research George Washington Carver, "The Wizard of Tuskeegee,"

there is a wealth of information to be explored. However, engineering, architecture, technical inventions, all want for black inclusion.

Among these writings is one by Paul B. Zuber who wrote a piece entitled "Playing It Straight," in which he suggests guidelines that should be followed if a greater number of blacks are to enter and complete engineering courses. Mr. Zuber shared his experiences at Rensselaer Polytechnic Institute. Though this document bears a 1974 date of publication, 24 years beyond the limits of my own work, he implied that there remain codes of conduct that students, institutions, or both must continually reaffirm if a new population of students is to find its way into the world of technology. Those codes of conduct are based in a new sense of inclusion for all who are part of the institution.

This analysis of the literature showed that in terms of engineering and technology, blacks were not present in significant enough numbers before 1965-70 to be a part of the history. I then broadened my search to include all forms of higher education in the belief that somewhere I would find material suitable for use in this work.

The method of research that I employed was basically a four step process:

1. <u>I gathered a body of oral information that has meaning for the subject</u>. The years between 1914, the year of the founding of the first black engineering school, and 1950

are years of transition for blacks interested in engineering and technology. I interviewed blacks who lived through and participated in this transitional phase of blacks in engineering (relatives, offspring, and friends who were affected by the success or failure of the engineering venture). In each of my interviews I spoke with subjects at least two hours. At the close of the interviews I asked if there was any memorabilia, work records, newspaper articles, or professional affiliations that might increase my understanding of of what had been discussed. I then wrote the interview into my research and sent a copy of the work to the interviewee as a check on my understanding of what had been said. Only when we agreed did I finalize the inclusion. In the case of Gordon Grady, I was given his entire work history. The Livas family allowed me to interview the widow and the son of the former architect and then sent me to former professional associates.

2. <u>Categorized and verified the information</u>. On the basis of their guidance, I looked for racially specific forms of reporting that trace the time period. This included minority magazines and newspapers of the time, college records that traced the entrance and graduation of blacks from engineering schools, or consulting the regional and national press sources for the climate that accompanied this transitional period.

3. <u>I enlisted the aid of library professionals that have a specialized knowledge of this topic</u>. I visited the repositories of black books, black authors and black artifacts, attend symposia that speak to this time period, contacted black schools that existed during the time period for records that have a bearing on the topic (see below, p.14).

4. <u>I attempted to pinpoint the transition of black reliance on whites to of self reliance</u>. There are only a few traditionally black schools that actually made the complete transition to a self-contained engineering program and they are the focus of a great deal of the investigation. The means by which this came about, the resistance to such a move and the rewards or lack of the same that accompanied completion of these programs is closely followed throughout this period.

Future researchers should know that the traditional literature reveals little in terms of oppressed groups. Even though these sources do not give specific information about black engineering efforts, However, they do paint a vivid picture of the climate that existed in the late nineteenth and early twentieth centuries both in and out of American higher education.

The Interviews

To research the subject fully, it would be useful to assume that of the few blacks who achieved technological

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sufficiency during this period, either they or their relatives could provide useful information. The years between 1914, the year of the founding of the first black engineering school, and 1950 are years of transition for blacks interested in engineering and technology. I interviewed two black families, the Grays and the Livas', five professional engineers who acquired their degrees during this period, and eight men who were discouraged by the lack of access. Each had lived through and paricipated in this transitional phase of blacks in engineering and their relatives, offspring, and friends had been affected by the success or failure of the engineering venture. In each of my interviews I spoke with the subjects at least two hours. At the close of the interview I always asked if there were any memorabilia, work records, newspaper articles, or professional affiliations that might increase my understanding of what had been discussed. I then wrote the interview into my research and sent a copy of the work to the interviewee as a check on my understanding of what had been said. Only when we agreed did I finalize the inclusion.

In addition to Gordon Grady, a 20 year veteran of General Electric Company engineering, the wife and son of the late Henry Livas, a highly respected southern architect and teacher, consented to speak with me at length about the experiences of black engineers and architects during the thirties and forties. In each instance their accounts

differed in intensity from white accounts of the lack of educational and vocational opportunity. In each instance they viewed the denial of opportunity as a greater ill than a mere educational inequity; they saw it as a most damaging political statement being made by the state and nation.

It is difficult for anyone to capture the depth of feeling that blacks who were denied an opportunity exude. To do so, one must hear Gordon Grady tell of the positions he was denied to know that each instance of denial drove a deepening wedge between him and the America of the thirties and forties. Or hear Mrs. Livas or her son to know the lost sense of direction suffered when husband or father was refused equal opportunity to compete for architectural appointments.

As I began my research, I took the advice of these people who had been at the front line of the transition. I chose to follow a course that I believed would lead to a truer representation of the times and events. First were the interviews to set my course.

College Records

Then I chose, from among several options, to write to selected colleges north of the Mason-Dixon Line that had long standing engineering programs. My hope was that they could supply me with the names of graduates to whom I might write for additional background information. Among the colleges to which letters were sent were Case Western Reserve University,

Ohio State University, Clarkson University, Purdue
University, Drexel University, Yale University, and
Massachusetts Institute of Technology. In some cases the
letter was followed by phone calls for greater clarity of the
response.

Of the many letters sent, only Massachusetts Institute
of Technology gave a response that led to other graduates.
No other school had a record of black graduates. I later
discovered that many of these school had imposed stringent
racial barriers to attendance. In one reply the respondent
said it was "not the policy of this institution to identify
the race of its students." Though it is speculation, there
may have been no attempt to identify black graduates. But
from the lack of diversity of the student body, it would seem
reasonable to conclude that this institution identified black
applicants, and more often than not rejected their
applications.

The search for graduates has led to a dead end in terms
of information, but it was very revealing in terms of the
historical search. It was obvious that I had to go to a
source that took pride in the names and numbers that I
sought; that source would be the black press of the day.

Minority Magazines and Newspapers

The sources I used and the areas they served were:

1. Afro-American (Maryland, D.C., Virginia,
   Carolinas)

2. <u>Pittsburgh Courier</u> (Pennsylvania, New York,

Delaware,Maryland,D.C.)

3. <u>Amsterdam News</u> (New York, New Jersey, national)

4. <u>The Guardian</u> (national)

In addition to these newspapers there was the voice of the NAACP, <u>Crisis Magazine</u>, that took pride in its educational reporting. There were other lesser known publications, many in circulation for only a few years, but valuable for contemporary reporting.

1. <u>The Colored American Magazine</u> (1900-1909)

2. <u>The Competitor</u> (1920-1921)

3. <u>Voice of the Negro</u> (1904-1907)

4. <u>Opportunity; A Journal of Negro Life</u> (1923-1939)

5. <u>Alexander's Magazine</u> (1905-1909)

<u>Libraries</u>

These publications are not easily located. To help, I sought the aid of librarians at the following libraries:

1. University of Massachusetts, Amherst & Boston

2. Salem State College, Salem, Massachusetts

3. University of Lowell, Lowell, Massachusetts

4. Boston Public Library, Boston, Massachusetts

5. Harvard University, Cambridge, Massachusetts

6. Howard University, Washington, D.C.

7. The Anacostia Museum (Washington, D.C.)

8. The Smithsonian Museum (Washington, D.C.)

9. Hampton University, Hampton, Virginia

10. Tuskeegee University, Tuskeegee, Alabama

I chose most of these institutions because of their unique place in this recounting or because I believed that they would have papers and documents not readily found elsewhere. Howard University was the first black school to produce engineers; Hampton followed during the decade of the forties. Both schools had valuable materials of a special type that could be found in no other collection. Harvard University had an extensive collection of Carter G. Woodson papers that I had begun researching at the Smithsonian in Washington, D.C.

Tuskeegee University archives houses many works of Booker T. Washington that can not be found in other collections, while Boston Public Library, Salem State College, the University of Lowell, and the University of Massachusetts libraries were the base libraries at which I conducted my primary investigations.

Southern Press

To provide a balanced portrait I also used southern newspapers whose editorial policies were against any form of black educational preparation. These publications were available at several of the libraries. Their importance is heightened since the positions taken by these publications had a direct effect on black collegiate access for blacks living in the south. From 65% to 80% of the black population

of America, depending on the decade, lived in the south(Anderson, 1988, p. 41).

These papers consistently opposed higher education for black Americans. They were molders of attitudes among their readers, and they were the most strident publications on race. The New Orleans Picayune, noted for its conservative stance, could often be counted on to espouse the philosophy of the southern politicians. Among the these publications are:

1. Charlotte News and Courier

2. Memphis Commercial Appeal

3. Manufacturers' Record

4. New Orleans Picayune.

The complaints of these newspapers centered upon the fears that educated blacks would seek political parity, that educated blacks would no longer be willing to work the fields, and, finally, that blacks, educated or not, might mistake education for a license to fraternize with their white superiors.

Presentation of the Material

The body of this dissertation is divided into five distinct sections:

(1) Chapter II describes some of the contributions made by black tinkers, a term given to inventors and innovators during the late nineteenth and early twentieth centuries. They differed from other contributors because

they lacked formal education. Chapter II also tells of the work of James Baker, the man chiefly responsible for cataloguing black contributions. This chapter also gives some idea of the social conditions faced by freed slaves between Emancipation and World War I.

(2) Chapter III covers the battle that raged between W.E.B. DuBois and Booker T. Washington over an appropriate philosophy for the education of black people. I do not pretend to cover the breadth of contributions either man made during their long lives of service; I only deal with their positions as they help or hinder the cause of black technological education.

(3) Chapter IV recounts the development of black institutions of higher education and, in more detail, the emergence of black schools of engineering and the engineering opportunities that were available to black graduates during the late nineteenth and early twentieth centuries. Chapter IV also covers a portion of the struggle of black colleges to move into the professional mainstream of engineering education. It traces the development of black schools of engineering from Howard's entry in 1914 through the establishment of the program at Hampton Institute.

(4) Chapter V presents bigographies of three blacks who not only succeeded but excelled in spite of the early twentieth century restraints. They are included as examples of the potential contributions that were available to the

American economy had higher education for blacks been a
reality.

(5) In the final chapter I draw conclusions based on my
research and detail the implications of this study. I have
had to rely on the oral history as given by persons who lived
through this period. There are bound to be inconsistencies
in the memories and the retelling of the past. Journals and
periodicals of the day are not to be construed as carefully
researched histories; they are, however, another source to
which one must go for information. In many areas of this
research records no longer exist and this presents a
limitaion that can not be overcome. In other instances those
who made the history have left no written testimony. These
limitations only serve to increase the importance as well as
the need for research such as this. Clearly, those who
follow will need a point from which to depart. This is that
point of departure.

CHARTER II

Inventors And Tinkers

The Emancipation Proclamation proclaimed a new era for all Americans, an era in which all persons could not only receive the blessings of liberty but also make meaningful contributions to those institutions that were the guarantors of that liberty. For former slaves, both propositions held a measure of unreality. To be looked upon as the political equal of former slave owners was something to be hoped for, not realized. To be able to contribute to the framework that supported such parity was, for many, beyond comprehension. The blessings that were forthcoming were sparse--often negligible. Every concession by former masters would have to be won through struggle, but this was to be expected in this new era.

The right to contribute to this new institution of freedom should have been available to all, but in many cases the gifts of the emancipated were unwanted. Those talents and gifts that had sustained and improved a way of life for much of America for two centuries--talents and gifts that had been prized during the many years of black servitude--were now to be squandered because provisions for their productive use in the free market had never been planned. Talents and

gifts that displayed brains more than brawn, tenacity more than tempo were spurned. The idea that a former slave could make a significant contribution to his new nation has taken more than a century to find root in the American psyche.

During the time of slavery the inventiveness of slaves, although encouraged by slave holders, was never fully documented. The law did not permit slaves to receive any recognition for their contributions. The protection of patent rights did not extend to slaves. A letter from the U.S. Attorney General's office to the Commissioner of Patents dated June 10, 1858 makes this point quite clear (Figure #1). Another letter, postmarked September 16, 1903 from Isaiah Montgomery to Henry Baker, also of the Patent Office, shows that the inventions of slaves were put to use and at times became commercial successes (Figure #2).

The battle for parity continues to this day. Looking at America's training of our industrial and technical forces, one can see the high price that this denial of opportunity has exacted and passed onto succeeding generations. One can also see the systematic destruction of hope for technical education in those communities most affected by this denial.

An examination of history will show that American minorities have made significant contributions to the industrial growth of this country despite the restriction imposed by society.

INVENTION OF A SLAVE.

A new and useful machine invented by a slave cannot be patented.

Attorney General's Office,
June 10, 1858.

Sir:

I fully concur with the Commissioner of Patents in the opinion he has given on the application of Mr. O. T. R. Stewart, of Mississippi. For the reasons given by the Commissioner, I think as he does, that a machine invented by a slave, though it be new and useful, cannot, in the present state of the law, be patented. I may add that if such a patent were issued to the master, it would not protect him in the courts against persons who might infringe it.

Very respectfully, yours, &c.,
J. S. BLACK.

Hon. Jacob Thompson,
Secretary of the Interior.

A letter from the U.S. Attorney General to the
Commissioner of Patents, June 10, 1858
Figure 1

Jackson, Miss., Sept. 16, 1903.

Mr. Henry E. Baker,

Room 236, Patent Office,

Washington City.

My dear Sir:-

Through the courtesy of my friend, Mr. R. D. Littlejohn of Columbus, I am in receipt of your interesting letter of the 9th inst. And I would say in reply, that my father, Benjamin T. Montgomery, had several articles before the U. S. Patent office; those presented previous to the war were looked after by Mr. Jefferson Davis (of Confederate States fame); he experienced considerable trouble in presenting articles for a Patent by himself, which I have always thought was responsible for that clause of the Confederate States' Constitution, which allowed patents to be issued in the name of slaves.

The articles to which you refer consisted of a system of walking paddles for the propulsion of boats; the patent was not pressed after the war owing to the opinion of many boatmen that the paddles could not be sufficiently protected from damage by drift, and other floating substances; but my father constructed two boats(handled by man power) using double hulls, and operating the paddles between them, which proved quite superior to the propelling power of oars. Mr. Davis designated the swiftest of those boats the Nautilus, owing to its likeness to that fish or water creature. You may also cross some improvements in cotton bale purposes, which were handled by Mann and Co., after the war.

Another Montgomery, Peter T., brother of my father, had a ditching plow in the 6th Auditor's Office) has secured patent for a device for holding books, papers etc., to be read or copied with a typewriter. If you could run across him up there, he will be able to talk interestingly about all of the cases above referred to.

I shall be quite glad to have a few copies of the issue of the Post containing your article, and will pay the cost of the same if sent to my home address, Mound Bayou, Miss., (Bolivar County)

Very respectfully yours,

Isaiah T. Montgomery

IS

A letter from Isaiah Montgomery of Mound Bayou, Mississippi
to Henry Baker, U.S. Patent Office, September 16, 1903
Figure 2

Contributions made in engineering by minorities are numerous and have occurred in many of the industries where blacks have participated. Prior to the recent increase in minority engineers, many of the contributors were not college graduates. The early contributors were called "tinkers." The term does not fully describe the intricacies of their work.

During the late nineteenth and early twentieth centuries tinkers accounted for the creation of many of the labor-saving devices that aided in the growth of American industry. Today, they would be considered research and development engineers. Among the contributors were:

> 1. Andrew Baird who invented the Jenny coupler, an automatic device which secures two train cars when they are bumped;
>
> 2. Frederick McKinley Jones who invented the first mechanical refrigeration units for railroad cars and trucks;
>
> 3. Garrett A. Morgan, inventor of the gas mask;
>
> 4. Grantville Woods who invented the incubator which revolutionized the egg in-dustry, and the Synchronous Multiplex Telegraph, a device designed to avert railway collisions;
>
> 5. Jan Matzeliger inventor of the shoe lasting machine, a machine that revolutionized the industry; and
>
> 6. H.C. Webb, who invented a labor saving piece of farm machinery that had great application in the early twentieth century.
> (Harris, 1974, p. 114).

Certainly the contributions of these six do not begin to show the breadth of involvement of American minorities in en-

gineering in the years following the Civil War. To show
that, it would be necessary to begin with egg beaters (W.
Johnson, Patent #292821) and include such items as the
automatic gear shift (R.D. Spikes, Patent #1,889,814), the
self-binding harvesting machine (William Douglass, Patent
#789,010), or the steam gauge (O'Conner and Turner, Patent
#566, 615)(Harris, 1974, p. 110-112).

In the South, prior to the Civil War, most of the
industrial labor, both agricultural and mechanical, was borne
by slaves. Consequently, most of the artisans, mechanics,
skilled and ordinary laborers were black. From this group
came a variety of mechanical labor saving devices. Though it
may be groundless, there has always been the persistent rumor
that the cotton gin was Eli Whitney's in name only.

For nearly fifty years after the Civil War, blacks made
significant, but unpublicized, contributions to the
industrial retooling of America. In as many cases as not,
blacks refused to accept the notoriety that came with their
contributions for fear of rejection by the commercial market.
By so doing, the deeds and contributions of many are a part
of history that has been lost.

One outstanding inventor whose work would not be hidden
was Grantville Woods, the inventor of the telegraph and
holder, during his lifetime, of over fifty patents. His
notoriety came as much from his inventions as the court cases
they caused.

Grantville Woods

Grantville Woods was born in Columbus, Ohio on April 23, 1856. By the age of ten he had begun his working life as a machine shop employee spending his evenings attending school or receiving private instructions (Logan, 1982, p. 663). At 16 he went to Missouri and worked as a fireman and engineer. He also worked in New York City as a machine shop employee and in a Springfield, Illinois steel mill. During all of this time he continued to pursue electrical and mechanical engineering courses. Shortly before his twenty-second birthday, Woods embarked on a long tour aboard the steamship "Ironsides" returning in 1884, at which time he and his brother Lyates opened their own machine shop in Cincinatti. It was now time for the engineering lessons to pay dividends.

Woods was to become the most celebrated inventor of his day, but throughout his life there would be those who would deny both his inventiveness and his race. In April, 1895, Cosmopolitan magazine, on pages 761 and 762, claimed he was "notable for his ancestry." The article claimed his mother's father was Malay Indian and "his other grandparents were by birth, full blooded savages, Australian aborigines, born in the wilds back of Melbourne" (Balch, 1895, p. 762). This, in order to claim he had little or no Afro-American ancestry (Christopher, 1895, p. 270). It is interesting to note that the Cosmopolitan article claims that Woods, as a boy of ten,

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began his career operating the bellows at an Australian
railroad repair yard. It goes on to tell of his family's
emigration to America when he was 16, making the year of his
family's migration 1872. The likelihood of a black
Aborigine/Malay Indian family migrating from Australia to
America and deciding to settle in Missouri, a former slave
state, seems extremely slight.

Industrialists realized long before this Cosmopolitan
article that Woods' inventions had wide application in
American industry (Christopher, 1981, p. 270). But to
advance a black American inventor in the era following the
Civil War would have been difficult. Cosmopolitan's
'reconstructed' youth and family history was one way of
avoiding the confrontation, but Woods, in a biographical
sketch in Simmons' Men of Mark, published in 1887, set the
record straight (Logan, 1982, p. 665). Woods was a native of
Columbus, Ohio, where he apprenticed as a machinist and a
blacksmith. There is nothing in this account of Woods' life
to suggest Australian ancestry.

After succeeding at progressively demanding jobs and
classes in electronics, mechanical and electrical
engineering, Woods became a locomotive engineer on the
Danville & Southern Raildoad. In 1884, he received his first
patent for a steam boiler furnace. His next two patents were
awarded for an incubator capable of hatching 50,000 eggs at
once, and a telephone transmitter much like the ones in use

today. He experimented with circuit design and the
generation of electricity. Two results of this work were the
Automatic Safety Cut-Outs for electrical circuits, and a
"System of Electrical Distribution." In April 1888 he
received a patent for a galvanic battery.

He contributed to the development of the "third rail";
he invented an automatic air brake for railway systems, and,
in 1892, he introduced a complete electric railway that
operated at Coney Island. The railway had no exposed wires,
secondary batteries, or slotted way.

His most important invention was the Synchronous
Multiplex Railway Telegraph. This invention became the radar
system for the railroads, notifying trains and station
masters of the relative positions of their rolling stock. He
was hailed as a genius and, in his time, given greater
acclaim than Bell, Westinghouse, or Edison. But his success
was to be short-lived (Christopher, 1981, p. 270).

Woods founded the Woods' Electric Company after
successfully holding off the challenge of Thomas Alva Edison
who claimed the right to the telegraph. Yet he would find it
difficult to hold an enterprise during the late nineteenth
century and early twentieth century (Christopher, 1981, p.
269-276).

In a national climate in which lynchings and segregation
were rampant, any minority who competed with whites was
deemed a threat to the status quo and someone to be dealt

with. And so it was with Woods. In the end he would succumb

to the economic tyranny that large, influential bankers would

apply. But in 1895, if never again, Woods had a victorious

day in court.

Among the many inventions that he marketed was a

dynamotor, a revolutionary apparatus, for the time. As

Cosmopolitan reported it,

> "...Certain features of this invention are now
> involved in interference proceedings in the United
> States Patent Office with five rival inventors. Of
> these, only one had the invention perfected to the
> extent of using the dynamotor. This one is Dr.
> Schuyler S. Wheeler of the Crocker-Wheeler
> Electric Company. The proceedings, however, showed
> that Woods completely developed his invention when
> there was no prior model to guide him, and when the
> others were, at most, only taking the preliminary
> steps which led them years later in the same
> direction. The Crocker-Wheeler Company was forced
> to accept Mr. Woods as a partner in order to retain
> the improvements independently invented by Dr.
> Wheeler" (Balch, 1895, p. 762).

On this occasion in 1895 Woods prevailed but his

fortunes would change dramatically. Woods could not raise

money to finance the business that his inventions might have

fostered. As a result, he was forced to sell his patent for

the electric railway to Thomas Edison's General Electric

Company; his telephone to the American Bell telephone

Company; and his electric brakes to Westinghouse Electric

Company (Christopher, 1981, p.275). Once the sale of the

patent rights was completed no vestige of the black inventor

was left, and, as a result, generations of Americans, both

black and white, have had little or no knowledge of the contributions of this inventor.

To have been deprived of the notoriety that comes with the uniqueness of the inventions was not new to blacks. Since the institution of slavery the practice had always been to distance blacks from any of the residuals of their contributions. In this case, however, slavery had been abolished, but in the eyes of the industrialists Woods name would not enhance the acceptance of the product. Instead, the electric railway bore the name Edison, the telephone bore the name of Bell, and to this day many believe that the Westinghouse electric brake is an invention of that firm. Not only was Woods denied the deserved praise for his work, others presented his inventions as products of their labor.

As an example of Woods' ability, consider the following inventions and the industrial entities to which they were assigned:

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Electric Railway System
              to American Engineering Co.,     1891
Electric Railway Conduit
              to Universal Electric Co.,       1883
System of Electrical Distribution to S.E. Riley,     1896
Electric Railway to General Electric,     1901, 1902, 1904
Electric Railway System
              to Electro Magnetic Traction Co,     1901
   Regulating and Controlling Electrical Translating
         Devices to Harry Ward Leonard,         1901, 1902
System of Electrical Control
              to Townsend-Decker Trustees,         1904
Patents for railway brake apparatus
              to Westinghouse                 1904,1905

Two Patents for Safety Apparatus
              to General Electric                   1906
  Vehicle Controlling Device to General Electric     1907
```

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Woods stands as the black inventor responsible for themost patents applied for and granted and he is noted for the wideand varied areas of interest he pursued. But Woods is not theonly black inventor of the time who made significant contributions. At least four additional contributors can be included with him: Lewis H. Latimer, Garret A. Morgan, Jan Matzeliger, and H.C. Webb.

<u>Lewis Latimer (1848-1928)</u>

Lewis Latimer was born in Chelsea, Massachusetts on September 4, 1848, the son of a slave who had escaped from Virginia andgone to Boston. Lewis and his mother were abandoned in 1858,when he was ten years old.   He was able to get an education by enrolling in a farm school. Later he joined the Navy and saw action on the James River aboard the U.S.S. Massasoit.   Honorably discharged in 1865, he found, after many disapointments, a job as office boy in the firm of Brosby and Gould,patent solicitors. Purchasing a set of second-hand drafting tools and reading available books, Latimer asked his employers to permit him to do some drawings. The request was granted and he was given a desk with an increase in pay. The office where he was employed was located near the school where Alexander Graham Bell was conducting experiments on the telephone. They became friends and, according to contemporaries of Latimer, Bell asked him to draw each part of the telephone that Bell was perfecting

to illustrate how it worked. When the drawing and the machine were completed, Bell was granted a patent in 1876.

In 1880 Latimer was employed by the United States Electric Lighting Company, Bridgeport, Connecticut, where he worked with Hiram S. Maxim. Latimer invented carbon filaments for the Maxim electric incandescent lamp and obtained a patent for it in 1881; he also invented a cheap method for making the filaments. Maxim and an associate raised money to set up factories to manufacture Latimer's inventions which were used in railroad stations in the United States, Canada, and other countries.

Latimer began his association with Thomas Alva Edison in 1883, serving as an engineer, chief draftsman, and expert witness on the Board of Patent Control in gathering evidence against the infringement of patents held by Westinghouse and General Electric. Latimer was one of the first to be selected for the formation of the Edison Pioneers, a hand picked group of investigators assigned to difficult technical tasks; he was the only black member. A "Statement of the Edison Pioneers" on the occasion of his death, December 11, 1928, ended:

> Broad-mindedness, versatility in the ac-
> complishment of things intellectual and cul-
> tural, a linguist, a devoted husband and
> father, all were characteristics of him, and
> his genial presence will be missed from our
> gatherings (Logan, 1982, p.386).

Garrett Morgan (1875-1963)

Garrett Morgan was born and raised on a farm in Paris, Kentucky. At the age of fourteen Morgan, with only six weeks of schooling, he went to Cincinnati where he worked as a handyman for a wealthy landowner. The job allowed him to hire a tutor to help him with his grammar. In 1895, he moved to Cleveland where in 1908 he married Mary Anne Hassek, who lived with him at 5202 Harlem Avenue Northwest for most of the next fifty-five years. It was here that he patented his inventions.

His first job in Cleveland, as a sewing machine adjuster for a clothing manufacturer, sparked his lifelong interest and skill with things mechanical. Morgan lived a quiet life in Cleveland, devoting himself to his family and his love of tinkering. The first of his many inventions was introduced to the public on July 25, 1916. On that day, an explosion ripped though a Cleveland waterworks tunnel 250 feet below Lake Erie, trapping several workman. Two rescue attempts were made by the city's police and fire departments. Nine of the eleven would-be rescuers were killed by exploding gases. After the second attempt failed, Morgan was called to the disaster and was asked to use his 1914 invention, the Morgan Safety Hood. He was able to save three workmen trapped in the gas and smoke filled tunnels. They were carried to safety by Morgan and rescuers wearing the safety hood (Logan, 1982, p. 453).

Morgan first appeared with his safety hood and smoke
protector, the forerunner of the gas mask, in 1912, and
improved his invention over the next two years. The safety
hood, designed for speedy work had no valves to adjust, no
bindings about the neck, no straps to buckle, and no heavy
tanks of air. It could be put on or taken off as easily as
tipping your hat. The hood could be donned in seven seconds
and taken off in three. The protective hood had an air supply
that allowed a rescuer to stand in the midst of suffocating
gasses for fifteen to twenty minutes, and could be adapted
for use when spraying deadly chemicals. Morgan's "Breathing
Device" was granted a patent in 1914 (Logan, 1982, p. 453).

After the 1916 life saving performance of his perfected
mask, Morgan's National Safety Device Company produced it and
fire departments, both here and abroad, purchased and used
his invention. He traveled from state to state demonstrating
his gas mask. However, racial attitudes in many southern
states forced him to hire a white man to demonstrate his
invention, while he passed for an Indian. When it became
widely known that the gas mask's inventor was black, Morgan's
production was severely slowed. In the south, the sales
virtually ended. The gas mask found new life when the
government used the invention in World War I to protect
soldiers from deadly chlorine gas fumes. Ironically, the
wartime use of the invention more than compensated for the
civilian boycott.

Morgan later received a patent for his three-way automatic traffic signal. It was a totally new idea that went beyond the usual "stop-go" designations. His signal incorporated, for the first time, a "caution," or yellow light and it required no one to attend it. In addition to his American patent, patents were granted in Canada and England. He sold his rights to the signal in 1923 to General Electric for $40,000 (Logan, 1982, p. 452).

For his work as an inventor Morgan received the First Grand Prize Golden Medal by the National Safety Device Company at the Second International Exposition of Safety and Sanitation in 1914, honorary membership in the International Association of Fire Engineers, a United States Government citation for his traffic signal, and national recognition at the Emancipation Centennial Celebration in Chicago in September 1963 (Logan, 1982, p. 453).

Jan Matzeliger

Jan Matzeliger emigrated to the United States from Dutch Guiana in the 1870's, and worked as a shoemaker's apprentice in Philadelphia and New York. When he was twenty-five he moved to Lynn, Massachusetts, to work in the shoe industry. After five years as a factory worker and part-time tinker, he invented a machine that was to revitalize the American shoe industry. Prior to the invention of his shoe lasting machine, the shoe industry relied totally on hand lasting to

join the shoe uppers to the sole. This meant that the skill
was kept in the hands of a few artisans and that the
competition among shoe manufacturers for reasonable pricing
was limited. Matzeliger's machine was the initial step
toward the automation of the industry and went far
beyond any previous effort to upgrade and streamline the
process. His machine would cut, sew and tack shoes, arrange
the heel, drive the nails and deliver the finished product
all in a minute's time. The invention meant a fifty per cent
reduction in the price of shoes, a doubling of the wages of
shoe workers, and an improvement in the working conditions
for an entire industry. He was offered, but refused, $1,500
for his original invention. In 1883, Matzeliger patented his
lasting machine (Baker, 1969, p.226).

Matzeliger realized the far reaching effects of his new
invention and began to set up a stock corporation to market
the machine. He never realized the deserved wealth from this
enterprise because of his lack of business experience and his
poor health leading to an early death. Businessmen were
quick to purchase all of the stock of his company, laying the
foundation for the organization of the United Shoe Machinery
Company (USM), the largest and most productive company of its
kind in the world (Baker, 1906, p. 10-12).

The invention was bought by the USM and little was ever
said of the inventor once USM acquired the patent. In
October, 1889

the Lynn (Mass) News reported the United Shoe Machine Company
had erected a school specifically designed to instruct
students on this new technology. Classes of two hundred were
common. Upon graduation the students were dispatched to
various parts of the world to instruct others in the workings
of this new Matzeliger Shoe Lasting Machine. The machine was
a marvel of complexity and belied the lack of formal
engineering education of its inventor. Jan Matzeliger had
gained his appreciation for machinery by working in machine
shops throughout New England (Crisis, August, 1913, p. 7).
He died a young man of 36, leaving much of his stock to the
North Congregational Society, of Lynn, Massachusetts. Due to
the magnitude of his invention, there were those who never
admitted that Matzeliger was black. It required a certified
copy of his death certificate to prove what many had known:
the shoe industry had been revitalized by the invention of a
black man.

H.C. Webb

The last of these inventors was H.C. Webb, the inventor
of the Webb Palmetto Grubbing Machine. This machine
represented the newest in farming technology in 1916.
American farming had always been a labor intensive
undertaking, and attempts to reduce the dependence on a now
free labor force were always welcomed. This was also a time
when America began to see the possibility of being drawn into
a war which would limit the availability of farm labor.

Webb's invention drastically reduced the need for large numbers of farm hands for the preparation of the soil for crops. It also reduced the number of persons needed to tend the crops during the growing season.

Webb was not a college engineering graduate. He had come by his experience as a worker in sawmills and blacksmith shops and his natural inclination toward farming implements gathered over sixteen years spent as a farm laborer in his native North Carolina (Crisis, February, 1917, p. 10).

By listing these inventors it is obvious that black Americans did make significant technological contributions. Obvious, too, is the lack of recognition that these men received during and after their moments of greatness. These inventors show that there was always an unharnessed supply of technical expertise in the black community. Given the correct exposure, these black contributors could have spawned a generation of black youngsters for whom they might have been the role models. The lack of recognition has meant that succeeding generations of black Americans have no knowledge of their technological past.

Fortunately there were those who worked to bring these invention to a wider, more appreciative audience. Chief among these were Henry E. Baker and C. H. Duell of the Department of the Interior.

<u>Henry E. Baker, U. S. Patent Office</u>

<u>Recoder of Black Progress</u>

Henry Baker is an important figure in the development of black Engineering in America. As a middle management employee of the Department of the Interior, he corresponded with whites professionals who under other circumstances might not have acknowledged him. Because of his dedication, Baker compiled evidence of hundreds of black patent holders, inventors and technological contributors. Baker, through his correspondence, reveals the attitudes of several patent attorneys. This is important since they were the agents with whom inventors worked in order to have their inventions registered.

Baker's work between 1900 and 1910 came at a time when, across the city from his work place, Howard University was introducing its first courses in engineering. To initiate these courses, a grant from the federal government was required, and Baker's work was available as proof of black participation in technological fields.

In 1900, under the guidance of C. H. Duell, the then Commissioner of Patents, the Department of the Interior sought to locate black patent holders to exhibit their inventions in a "Negro Exhibit" at the Paris Exhibition. On June 26, 1900, letters were sent to patent attorneys in an effort to get some idea of the availability of the black

inventions and inventors. The replies to Duell's questionnaire tell much about the racial climate at the turn of the century. There were those who said they had heard of or knew of one or two patent holders, but in the main, their letters were like that of Attorney E. J. O'Brien of St. Louis, Missouri who dismissed the question as absurd. A copy of his reply is included (Figure #3).

Much of what has been preserved about the early black inventors is due to the work of this man, a black middle management employee of the U. S. Patent Office. Not much is known about Baker except that he was a cadet at the Naval Academy in 1875 but was forced to leave in 1877 as a result of the white prejudice that he found at the Academy. In 1877 he was hired as a copyist at the U.S. Patent Office. In 1879 he entered Harvard Law School graduating in 1881. He returned to the Patent Office and rose to the position of Second Examiner (Baker, 1969, p. 1). In that position he was responsible for much of what is known about black inventors of his day (Baker, 1969, p. 11).

Baker aided black Congressman George H. Murray in the compilation of material that allowed the congressman to enter into the Congressional Record on August 10, 1894, the particulars of more than 90 patents held by black inventors. By 1900, Baker had compiled a substantial resource of black inventors and planned to publish his findings on the fiftieth anniversary of the Emancipation Proclamation, 1915. In his

St. Louis Feby 9. 1900.

Hon C.H. Duell
Commr &c
Dear Sir:

In 30 yrs. experience in patent practice I never met a Negro inventor in St. Louis or elsewhere. Organically the Negro is like the Mongolian — he is an imitator and not an originator. I have known negroes who were the most reliable of men to keep an engine, i.e. (a steam engine) up to its best capacity. But such were instructed, and developed nothing beyond what was given them by others.

May be that is because of location, Missouri being on the borderline twixt bond and free in former times their minds while susceptible of the originating or inventive faculty here could not find vent, because of the incubus of caste, and its natural sequences. But I doubt it! It could be demonstrated if so. Gather North. No. I don't know any negro inventors, and I don't think I ever will.

Yours Truly, E.J. O'B —

A letter from Attorney E.J. O'Brien, of St. Louis,
Missouri to C.H. Duell, Commissioner of Patents,
February 9, 1900
Figure 3
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quest for a more complete listing of contributors, and since there was no mention of race on the patent application, Baker decided to write to a patent attorneys asking for help in locating persons he might have overlooked.

During the years 1911-13 Baker corresponded with more than 8,000 of the 12,000 patent attorneys in America, and over 2,500 replied. Most of Baker's replies were similar to the response of Attorney O'Brien sent to Duell 10 years earlier. Most said that they had never heard of a colored inventor, and more than a few said that they never expected to hear from one (Baker, 1969, p. 11). Perhaps the most pointed reply came from patent attorney B.J. Nolan of 320 Temple Court, Chattanooga, Tennessee, on June 24, 1914:

> I never knew a Negro to even suggest a new idea. Much less to patent one. And I have dealt with them all of my life.
>
> P.S. I have asked other lawyers around me for data on negro inventions. And they took it as a joke (Baker, 1969, p. 11)(Figure #4).

Mr. Nolan's remarks have been cataloged as part of a larger Carter G. Woodson Collection by the Library of Congress. Replies from other attorneys are also available. F.E. Stebbins, of Stebbins and Wright of Washington, D.C., replied that he knew of no black inventors but that he did recall the denial of a patent to a slave-inventor (Figure #5). Replies from Frank R. Williams of Syracuse, New York and George Lamar of the District of Columbia, Cedarville, Ohio were perhaps the most vile (Figures #7,8). Hood's

stationery identifies him as a lawyer, consulting engineer, and a surveyor. His remarks identify him as a racist.

It is important to note that if any of the respondents used a fountain pen to reply, he was using the invention of W.B. Purvis whose invention had been patented twenty-three years earlier (Harris, 1974, p. 110). If he wrote in pencil, he may have used a pencil sharpener, the brainchild of another black inventor, J.L. Love. Love's patent had been granted sixteen years before Mr. Nolan wrote that letter (Harris, 1974, p. 111).

Still, it was Nolan's attitude that prevailed. The racism of Mr. Nolan and his colleagues would soon expand to provide the barriers to minority access to the specialization and sophistication that industrial America demanded. To the innocent onlooker, the strides that minority tinker/inventors were making were the natural progression for former mechanics who were thoroughly familiar with many of the implements that they improved or surpassed. To the more astute observer, there was a different interpretation.

For blacks who may have had leanings toward engineering or the technologies an entire cadre of role models were passing from view. Though their contributions would continue to insure a better way of life for most Americans, any association with black inventors would be obliterated.

Most American school children would grow up learning of Bell and Edison and never hear the names of Woods, Latimer,

B. J. Nolan
320 Temple Court
Chattanooga, Tenn.

Reg. No. 8759

Dear Sir:

This Office is endeavoring to obtain information concerning patents to colored inventors, in accordance with a request from the Emancipation Proclamation Commission of the State of Pennsylvania, authorized by the Legislature of that State to prepare an exhibit showing the progress of the colored people of the United States during the 50 years following the Emancipation Proclamation in 1863, the exhibit to be held in Philadelphia, Pa., in September, 1913.

To aid in this work, you are requested to send to this Office, in the inclosed envelope, which will not require a postage stamp, the names of any colored inventors you can furnish, together with the date of grant, title of invention, and patent number, so that a list without errors can be prepared.

You will confer a special favor by aiding in the preparation of this list by filling in the blank form below and sending in any replies as promptly as possible. Should you be unable to furnish any data, will you kindly inform us of that fact?

Very respectfully,

E. B. Moore
Commissioner of Patents.

9/24 1913

NAME	NUMBER	DATE	INVENTION

I never knew a Negro to even suggest a new idea, much less try to patent one. And I have dealt with them all my life.

B. J. Nolan

P.S. — I have asked other Negroes around here for data of Negro information. And they take it as a joke.

A letter from B.J. Nolan, Chattanooga, Tennessee to E.B. Moore, Commissioner of Patents, June 26, 1913

Figure 4

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R. HOOD

CEDARVILLE, OHIO June 25. 1910

Hon. Commissioner of Patents.

Answering your request for information I have to say: No colored person within my knowledge is an inventor. and none that I know of has ever made any effort in that direction.

My personal experience in Ohio with them for 15 years is that their elevation to good citizenship is a failure. I have tried here in Greene Co with others to form a Colored Y.M.C.A. at Cedarville. Where of a population of about 1400 we have about 400 Niggers, we started with 17. After about 3 months effort we ended with 0. I then tried to form a Bible Class of Outside Young Buck Niggers that also was failure. The 15th Amendment has helped to

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2

R. HOOD

CEDARVILLE, OHIO

Make them hasty, lazy, supercilious. Lack of the elements of good citizenship shows that with half a century of freedom with few exceptions the draft remains licentious, criminal.

In the widest sense the doctrine that human destiny turns on the theory of personal responsibility is incumbent on both white and black. It proves that more than half a century is required to awaken them to the great fact that with full Citizenship under the 15th Amendment they have failed to discover this great fact so immediately at the basis of election;

Faithfully
Robt Hood.

A letter from Engineer/Attorney Robert Hood, Cedarville, Ohio to the Commissioner of Patents, June 25, 1910
Figure 6

A letter from Attorney Frank R. Williams to
E.B. Moore, Commissioner of Patents
Figure 7

Geo. H. Lamar,
Kendall Building
Wash City

Reg. No. 1724

Dear Sir:

This Office is endeavoring to obtain information concerning patents to colored inventors, in accordance with a request from the Emancipation Proclamation Commission of the State of Pennsylvania, authorized by the Legislature of that State to prepare an exhibit showing the progress of the colored people of the United States during the 50 years following the Emancipation Proclamation in 1863, the exhibit to be held in Philadelphia, Pa., in September, 1913.

To aid in this work, you are requested to send to this Office, in the inclosed envelope, which will not require a postage stamp, the names of any colored inventors you can furnish, together with the date of grant, title of invention, and patent number, so that a list without errors can be prepared.

You will confer a special favor by aiding in the preparation of this list by filling in the blank form below and sending in any replies as promptly as possible. Should you be unable to furnish any data, will you kindly inform us of that fact?

Very respectfully.

E. B. Moore
Commissioner of Patents.

I am unable to supply any information on the subject.

I know of no inventor of the African race.

As a son of a slaveholder of the South and a social or his close observer of the negro during my life of 45 years, I am impressed with the idea that the negro is an apt imitator but not ordinarily given to constructive or original lines of thought.

Some of them are good mechanics.

...Geo. H. Lamar.

A letter from George Lamar, Washington, D.C.
to E.B. Moore, Commissioner of Patents, 1913
Figure 8
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or Matzeliger. As Bell and Edison served to inspire the inquisitive minds of some children; Woods, Latimer, and Matzeliger would have been equally powerful in shaping the futures of countless others. There are many points along this continuum where losses such as this may seem inconsequential. They are not. The lingering effects of the lack of recognition, the inability to secure financing, the elimination of the true identity of many contributors, and the phase-out of many black role models meant that blacks could not look with the pride of ownership at the new technologies. The lesson to be learned from these occurances was that in the world of technology blacks were consumers, not contributors.

Many of these inventions came during the first two decades of this century, a time when black education was being influenced by many groups. If technological contributions were to continue from the black community, a new educational system would be needed. Philanthropists, missionaries, black leaders, and church groups all demanded a voice in the structuring of the educational format of black Americans. Philosophical differences arose between the many factions and deep splits became apparent in terms of direction and content. For blacks, the sharpest divisions occurred between two of their standard bearers, Booker T. Washington and W.E.B. DuBois. Their differnces in the philosophy of education would demand center stage among the

many conflicting positions. Those differences are the

central focus of Chapter III.

CHAPTER III

THE WASHINGTON/DUBOIS DEBATE

This chapter exposes the deep philosophical rift that occurred in the black community as a result of several political concerns, chief among them was the question of black higher education. One faction in this dispute was led by Booker T. Washington, the other by William E.B. DuBois. The two were extremely different; Washington was the son of a former slave and entered the dispute with a clear knowledge of the hardships that slavery had wrought. DuBois was a native of Massachusetts, well educated and born to a family that had escaped the ravages of slavery a century before. Each believed his view was correct and, at times, went to great lengths to assure that others would believe in the efficacy of their position.

The period of American history between the Civil War and the First World War, 1865 to 1915, can be studied under many themes. An oft overlooked theme is that of Pan-Africanism. This was a movement that was abroad in the black community during this period was aimed at repatriating blacks to their homeland. The repatriationists formed the most radical of black political groups. Their existence threatened not only the philosophies of those who sought accommodation with whites but the goodwill of the northern white philanthropists

as well. It became a driving force with many of the
intellectuals of the day who became staunch advocates for the
positions held by Garvey, Sam, Turner and others. Henry
McNeal Turner, a Bishop in the A.M.E. church, was by far the
most articulate of the repatriationists in post
Reconstruction America. He visited Africa in 1891, 1893,
1895, and 1898. Turner saw no chance of manhood for blacks
in America (Moses, 1978, p. 201).

Chief Alfred C. Sam repatriated five dozen blacks to the
Gold Coast in 1914 in a crusade that he claimed had religious
significance for blacks. Neither of these men reached as
many blacks as the movement of Marcus Garvey. The Jamaican
emigree who founded the Universal Negro Improvement
Association and the African Communities League. Garvey was
able to attract a number of black intellectuals to his cause.
Among them were Frederick Douglass, Emmett J. Scott, former
secretary to Booker T. Washington, T. Thomas Fortune who
served as editor of the organization journal, The Negro
World; William H. Ferris who was its literary editor. In
addition there was Ida B. Wells, J. A. Rogers, the popular
historian, Egyptian nationalist, Duse Mohamed, and Amy Jaques
Garvey who edited the Spanish edition of the New World
(Moses, 1978, p. 264).

Pan-Africanism represented the most radical political
position taken by blacks. Neither Washington nor DuBois was
part of this movement but both rejected separatism, seeking

positions that were thought to be less confrontational. Both were Americans by birth and both sought to remedy the plight of black Americans within the confines of this society.

If one is to study this period under the theme of American black education, the name Booker T. Washington must stand out as the dominant figure of the time. Booker T. Washington was the last of the great black American leaders born a slave who went on to have a major influence in the socio-political life of the twentieth century. He became a major spokesperson for America's black millions.

Washington was born the son of a slave and a white man on a southern plantation in 1856 in southern Virginia. He knew, first hand, the tragedies of slavery. When freedom came to Virginia, Washington, (the name he chose for himself), his brother and his mother migrated to the mining community of Malden, West Virginia. It was in Malden that he was able to receive the raw beginnings of an education. He worked both as a miner and a houseboy during his childhood but never lost sight of education as his primary goal.

At age seventeen, he left his hometown for Hampton Institute in Virginia. At the time Hampton was a vocational high school that had been founded by the Freedmen's Bureau for the education of blacks. Washington graduated with honors in 1875, but more important was the impression he had made on the director, General Armstrong. Five years later when the Director of Hampton was asked to nominate someone

for the directorship of a new facility to be built in
Alabama, Washington was his choice. This was a most
important appointment and should have served as a warning for
blacks seeking political and social equality: Armstrong had
earned the reputation of a man who never trusted highly
educated blacks(Anderson, 1988, p. 57). He never gained the
confidence of those whom he oversaw. He represented a class
and a world outlook that was opposed to the higher
aspirations of the freed men. For Washington to be selected
by this man meant that his agendas, both political and
social, would not offend.

General Armstrong was not one to encourage the growth of
thought that would challenge the traditional inequalities of
wealth and power. In the monthly newspaper published at
Hampton, Armstrong packaged his conservatism to attract
northern white philanthropists. Armstrong advised black
leaders to stay out of politics for generations to come
(Anderson, 1988, p. 37).

At the time of his appointment, Washington was only
twenty-five. He started with little more than determination
and hope but in ten years Tuskeegee had more than 450
students, fourteen buildings and over 1,400 acres of
farmland. Much of this was due to his persuasive fund
raising. His success made him a prominent individual in
black southern education but that was soon to change.

Washington was the chief proponent of industrial education and designed his school, Tuskeegee Institute at Tuskeegee, Alabama, as the temple of that belief. He founded the school in 1881, only 16 years after Emancipation. Though no one disagreed that industrial education had its place in the lives of black people, there were those who thought that free men should have the right to choose from among the many disciplines, just as their white counterparts had always done. Washington's doctrine, a postulate of accommodation, became the scourge of blacks who saw themselves as equal to all other human beings. This schism, the disagreement over their rightful place as citizens and the thought that there would be those who would oppose him, caused Washington to exercise the overwhelming influence he had over the black community. To insure adherence to his doctrine, he began to dole out political appointments, philanthropic gifts, business opportunities, and jobs(Meier, 1966, p. 181).

Washington was a product of the highly conservative Hampton philosophy and his work at Tuskeegee showed him to be an avid student. At Tuskeegee, as at Hampton, political activism was not to be found, the economic philosophy that championed the black cause was absent, and the thought that education would move black graduates to a position of parity with whites was not present.   Washington opposed black migration to northern states, did not take a stand against

segregated facilities, and saw his black constituency as being "organically weak" (Moses, 1978, p. 96).

In 1895 Washington was asked to speak at the International Exposition in Atlanta, Georgia. On September 18, Washington delivered the address that delineated his philosophy and the road that he would travel in his attempt to secure a better life for black Americans. In that speech he allayed the fears of whites by instructing blacks to be patient and long suffering in their pursuit of equality. He pledged, on behalf of his black brethren, a new fidelity, love and cooperation with southern whites without seeking the guarantees of civil or constitutional rights. In his address he said,

> We shall stand by you with a devotion that no
> foreigner can approach, ready to lay down our
> lives, if need be, in defence of yours, interlacing
> our industrial, commercial, civil, and religious
> life with yours in a way that shall make the
> interests of both races one. In all things that
> are purely social we can be as separate as the
> fingers, yet one as the hand in all things
> essential to mutual progress (Moses, 1978, p. 98).

By the time he was finished, whites, who at the outset had been leery of him, applauded enthusiastically.

This speech, often called the Atlanta Compromise, was the launch pad for Washington's meteoric rise to national prominence. President Grover Cleveland sent his personal greeting. He was hailed as the "Black Moses", consulted by congressmen, funded by millionaires, and honored by Harvard University. He entertained and was entertained by the most influential political and social movers of the day.

Washington's acceptance in high places can best be seen by his 1899 trip abroad. In a three month trip he was entertained by Queen Victoria, two dukes, and several other members of the British aristocracy. He met James Bryce and Henry Stanley; ex president Harrison, Archbishop Ireland, and two justices of the Supreme Court received him at the Peace Conference at the Hague. In addition he received honorary degrees both from Harvard and Dartmouth (DuBois, 1940, p. 71). From 1901 to 1912 he was the political referee in many federal appointments or actions concerning blacks and in many regarding the white South (DuBois, 1940, p. 72).

Booker T. Washington had been anointed by the white American power structure as the leading spokesman man for blacks on all educational matters. As a result, the media was accessible, his plan was pushed forward, and he became the acceptable alternative to a more radical fringe group of blacks who were beginning to express disfavor with Washington. His influence grew in terms of black politics, black small business, and the ability to influence white public opinion. Perhaps unwittingly, Washington's rise to power was at a cost to his race that is still being determined. Until his death in 1915, Booker T. Washington remained one of the most powerful men in America (Berry, 1982, p. 274).

Washington's view of right was buoyed by the acceptance he received in high places of government and society. His

campus was visited and praised by the president of the United States. His industrial school concept became the accepted model throughout the world, but his vision for black Americans was short sighted. In terms of engineering, he forestalled the full fledged involvement and the resulting development of black engineers by 20 to 30 years. He also condemned bright young minds to vocations beneath their abilities, and for this he was applauded by most Americans.

Washington's methods and his philosophy, when taken to their logical conclusions, were not designed to produce the types of individuals who would compete with whites for jobs or political positions. This would have been disruptive to the calm that Washington advised blacks to strive for. It would certainly not have produced the corp of black engineers that was to come. Rather, blacks would have been relegated to second class positions in terms of training and vocations. Nevertheless, his doctrine had won him a place in history.

There were those who looked beyond the present. A group of black intellectuals denounced the work of Washington. This group was led by two Harvard graduates, William E.B. DuBois and William Monroe Trotter. Trotter was the owner of the Boston based newspaper, The Guardian, in which he wrote the most scathing appraisals of Washington's tactics. Trotter confronted Washington as the Tuskeegeean delivered a speech in Boston in 1905 at a meeting of The National Negro Business League. Trotter was arrested as a disruptive person

but made the most of this by editorializing in The Guardian on what came to be known as the Boston Riot.

This act, the Boston Riot, became the turning point for DuBois. DuBois wrote a letter to Trotter, who had been jailed, expressing his disfavor with Washington and his sympathy for Trotter since his incarceration was a clear violation of his civil rights. Trotter published the letter, an act which became the opening of a drama that would last far beyond the death of Booker T. Washington.

DuBois and Washington are a study in sharp contrasts. Dubios was born in 1868 in Great Barrington, Massachusetts. He graduated from high school in his home town in 1884 and entered Fisk University. Over the next decade, he attended and graduated from Fisk University, Harvard University and the University of Berlin (DuBois, 1971, p. 3). In 1905 Trotter and DuBois formed the Niagara Movement, a political organization dedicated to the continued agitation for civil rights, voting privileges, human rights, and equal education.

At first their opposition to Washington's leadership proved to be ineffective since their numbers were small and represented only a fraction of the community. DuBois came to the fight with a distinguished background as an author of articles for the Atlantic Monthly and the World's Work magazine. He had worked in Georgia to better the living conditions of blacks, to stop discrimination in the distribution of school funds, and he had lobbied the

Legislature for the elimination of discrimination in railway travel. He had also prepared an exhibition showing the condition of black Americans for the 1900 Paris Exposition which had won a grand prize. He was a Fellow of the American Association for the Advancement of Science in 1904 after his 1900 acceptance as a member. In fact, on his return to America from his doctoral studies at the University of Berlin, he applied to Tuskeegee for a job.

Between the two men, Washington and DuBois, there existed some common ground: the recognition of the value of education and a recognition of the necessity of black participation in skilled trades. The controversy that existed between the two came from the basic differences in their approaches to leadership and dominance and their vastly different philosophies regarding black higher education.

DuBois objected vehemently to the "Tuskeegee Machine," the name given to the structure of organizations, media, and the many groups that formed the Washington constituency. In some cases it was obvious that allegiances were bought. In other cases, groups went along many times out of fear (Franklin, 1982, p. 14).

The Souls of Black Folks, a 1903 work by Dubois shows the contempt with which he viewed Booker T. Washington's accommodationist's position. He pointed to Washington's willingness to submit to black disfranchisement, his complicity in the steady withdrawal of aid from black

institutions of higher education, and his unwillingness to
address the problems of civil rights (Meier, 1980, p.37).

Those involved in the Niagara Movement looked upon
Washington as a puppet of the white power structure. It was
well known that in addition to white philanthropists, a large
section of the black press and powerful white southern
politicians were deeply involved in Washington's movement.
By the time the Niagara Movement was mobilized, Washington's
influence had spread such that few black federal appointments
were made without his input. This was true not only of the
few black appointments but, many times, the white
appointments as well. Tuskeegee Institute became the center
for black information, a national bureau of black
information.

Much of this activity was financed by northern whites.
Their goal was to discourage black political participation
and to develop a strong labor force that would offset the
white unionized labor that was beginning to appear in the
north. Next, the task of the machine was to hammer into
submission and conformity the black intelligentsia. This
would prove to be a formidable task for the Tuskeegeean, but
with money and the help of whites the task seemed
reasonable(Anderson, 1988, p. 106).

Unlike Washington, DuBois was not a favorite of the
southern conservatives. Nor was he to be silenced. His
running battles with Washington over the direction that black

leadership should take became as great a battle within the race as the black/white struggle between the races.

The years between 1900 and 1910 brought to the surface the sharp differences that existed within the race. Washington's work had stifled the forward progress of blacks who did not agree with him and by so doing, robbed the black community and the nation of economic opportunities that would have been beneficial. His zeal for the task often caused him to use underhanded schemes against his opponents. On occasions, he hired Pinkerton detectives to spy on Niagara members; at other times he attempted to infiltrate their movement and if someone openly opposed him, as one newspaperman did, he had the power to destroy his or her career (Franklin, 1982, p. 14)

There was also a side to Booker T. Washington that went without public acclaim even though the stances he took at these times were positions that, even today, deserve praise. While locked in combat with his critics, Washington fought several race battles in which his name was never used. One of these was a legal case in which a black was held on a peonage charge. Due to Washington's intervention the case was won and the law declared unconstitutional. The lawyer, in this case, was secretly financed by Washington. In other instances he financed cases to overturn a ruling that disenfranchised blacks but lost at the Supreme Court level on technicalities. In these and other instances his involvement

was always hidden for fear that it might prejudice his appeal with northern philanthropists (Franklin, 1982, p. 13).

As students of black history look back, with the wisdom ofthe intervening years, it becomes clear that the ongoing struggle between Washington and DuBois is one of the great battles of black existence in America. Those who can now appreciate the strides made by blacks in terms of their constitutional guarantees realize that both men had flawed images of the black American.

For the first time since arriving on these shores, spokesmen of national prominence declared the worth of their race. To observant blacks, this meant that a new sense of self worth would be one of the fruitful outcomes of this struggle. DuBois' assessment of black worth challenged the status quo while Washington's was compliant. Few philanthropists agreed with DuBois; many agreed with Washington. As a result, Washington's ascendancy was complete (Berry, 1982, p. 274).

For young black people who wished to become engineers, medical doctors, or other types of professionals, the way was blocked. For although the philanthropists gave money to the Washington project at Tuskeegee, Washington and those who appointed him never insisted on equal status, equal primary and secondary education, fair and equitable distribution of public funds, or accreditation of the postsecondary programs.

They did not even ask that the graduates be sent north to take positions in industries.

DuBois, on the other hand, gave hope and inspiration to a group of blacks who wished to strive for goals beyond those prescribed by whites. Engineering, medicine, dentistry, and business were some of the spheres of education thought to be beyond the grasp of blacks but they were goals for which DuBois gave a lifetime of work. DuBois brought a new term into the language, "Talented Tenth". The term designated that small percentage of blacks who were endowed with the talents and brains to lead the race to self sufficiency. The idea that DuBois could fashion a scheme that excluded 90 percent of black America was taken as an affront by many of his followers. He insisted that a college trained elite could lift the lower class, an elitist plan that was as offensive as any accommodationist idea advanced by Washington.

Washington gave credence to the widespread belief of that era that blacks were inferior. The more Washington was praised, the more strident DuBois became in his opposition to Washington's doctrine. So adamant was DuBois about the entire race issue that he, along with others of similar persuasion, formed the very radical (for that time) National Association for the Advancement of Colored People (NAACP) (Aptheker, 1951, p. 876).

The ultimate example of the societal misuse of Booker T. Washington came when the northern philanthropists used him as the conduit for much of the money that was to be dispersed among the small black southern industrial schools, thereby assuring that southern black educational leaders were kept in line (Enck, January, 1976, p. 79). As a result of this funnelling, Washington's school had a permanent endowment of more than $1,800,000 in 1912 (Crisis, November, 1912, p. 34). This was the largest endowment of any black school and larger than many white institutions of the day. Much of this endowment had come as a result of a $600,000.00 gift given to the school by Washington's friend, Andrew Carnegie(DuBois, 1940, p. 72).

This battle took place while the nation underwent the most severe racial clash in its history, and while turn of the century southern politicians like "Pitchfork" Ben Tillman declared they wanted no Negro to vote -- not even men like Booker T. Washington -- and Governor Vardaman of Mississippi declared that "God created the Negro for a menial" (Hughes, 1968, p. 244). It was also a time of extreme legislative and judicial repression: legalized peonage laws, Jim Crow laws for public accommodations, and disenfranchisement. In spite of the turmoil, blacks persevered. Many colleges were opened by white philanthropists for blacks between 1865 and World War I

(Bowles,298). Among them are many of the colleges refered to today under the umbrella of the United Negro Colleges.

In the end, Washington returned to Tuskeegee to live out his years while DuBois became the new focal point of black striving. And though others may measure the men against different standards, black engineering students know that the first black engineers to graduate from black schools came from Howard University, North Carolina Agricultural and Technical College, and Hampton Institute, not Tuskeegee.

The anger and discord that came as a result of the Washington-DuBois battle meant that blacks were becoming interested, not only in the men, but in the idea of choice in educational format. For most black Americans this option had never been available. Washington's industrial education had appeal for those who were not ready to meet the challenge of the real world, while DuBois' Talented Tenth held out promise for others. Collectively, they are responsible for the new black interest in all of education. The next chapter will explore some of the consequences of this renewed interest and the reactions of the greater society to that interest.

CHAPTER IV

EDUCATIONAL OPPORTUNITY AND THE
DEVELOPMENT OF BLACK INSTITUTIONS

Educational Opportunities 1900-1930

Prior to World War I there were few opportunities for
blacks to work in engineering fields and few blacks with the
required expertise. The 10 per cent of the black population
that lived outside the south might find opportunities for the
necessary education but those living within the states of the
Old Confederacy had little hope of such an outcome. During
the first three decades of the twentieth century many
converging attitudes and events became more apparent and
their combined effect meant that social justice and black
collegiate education were at risk. This was true nationally
but in the south it had extreme consequences. If we were
going to produce technologically trained black people, we
needed schools with classical curricula.   At the turn of
the century the pool of black teachers for southern public
schools was desperately low. The ratio was 1 to every 93
black children of school age (Anderson, 1988, p. 111). The
number of white missionaries that had once staffed the
schools of ex-slaves during the post Civil War era had
greatly diminished. This vacuum caused by the lack of
qualified teachers for black children became an area of
heated debate. An ideological battle raged among northern

industrial philanthropists, northern missionaries, black

leaders, and the white southern power structure.

Each group understood that the corps of black teachers

needed to staff black schools was the key to the transmission

of values and, ultimately, a way of life. Northern

industrial philanthropists were quick to form an alliance

with those institutions that represented the Hampton-

Tuskeegee ideology. They wanted manual and industrial

training as the basis of the curriculum (Weinberg, 1977,

p.269). A fund was founded, the General Education Board, to

underwrite many of the operational costs of school that fell

into this category. Northern missionaries, fewer than in

earlier years, were torn between the industrial model and the

classical liberal curriculum. Black leaders, with some

notable exceptions, believed the classical curriculum gave

blacks a greater list of options in, what they believed to

be, the new era. The white southern establishment gave no

indication of caring for either system. As a result,

southern state school were under funded and grossly

inadequate. In fact, if all school aged black children had

wished to enrol in the years prior to 1920, there would not

have been sufficient schools in which to house them

(Anderson, 1988, p. 110).

With this type of wrangling over the direction in which

black education should head and with the accompanying poor

funding many black children were miseducated or not educated

at all (Weinberg, 1977, p. 59). These children represented the collegiate aspirants that should have been produced for college entrance from 1925 to 1940. Engineers, technologically trained graduates, business persons, doctors and many other would-be professionals were lost to the black community because no southern state provided the basic tools of education.

Many black private institutions were greatly influenced by the financial support of northern philanthropists. Since these institutions relied on donations for their annual budget, many were forced to subscribe to the manual training philosophy for their survival. In cases where presidents and headmasters refused to submit to the outside influences, many were removed. In Fort Valley, Georgia an independent school had been founded by John W. Davison in 1890. Fort Valley High and Industrial School (the name was changed in 1932 to Fort Valley Normal and Industrial School and the to Fort Valley State College in 1939) received no funds from the state of Georgia and depended on donations and tuitions for its existence. Davison was removed from his post as president during the 1903-04 school year by the General Education Board.

At the root of his dismissal was Davison's refusal to abandon a liberal curriculum for the school. When he was dismissed, those who sympathized with his position on the educational direction of the school were also dismissed. The

Board of Trustees was purged of all black members and replaced by blacks who more closely identified with the intentions of the General Education Board. To be certain that the school would not "slip back" the Board insisted on a white man to head the school's Board of Trustees. With these alterations, the school could receive a liberal funding from the General Education Board (Anderson, 1988, p. 115).

In another such case in 1903, Richard R. Wright, Sr. was president of Georgia State Industrial College where the curriculum emphasized academic education and training in skilled trades. His refusal to alter the course of his institution meant that the Georgia State Industrial College was not among those schools receiving grants from the General Education Board (Anderson, 1988, p. 122).

By the year 1920, with civil rights at their lowest point since the Civil War and with race relations suffering under the weight of overt racist acts, many black citizens were convinced that their worth to the country was minimal. This was shortly after the first World War and at a time when many racist organizations were again gaining strength in both northern and southern communities.

Between the years of 1914 and 1924 a concentrated effort by the NAACP for racial tolerance was waged that inflamed white opposition (DuBois, 1940, p. 193). The backlash by whites to black political activism, combined with the refusal of the central government to act responsibly, led to grave

doubts and fear in the black community. Even the black participation in the war took on a demeaning cast. Blacks were allowed to serve in the Navy only as messboys and were barred entirely from the Marine Corps. The Army accepted blacks as enlisted men but had no intention of commissioning them as officers. Only the agitation of the NAACP and a group of prominent white citizens reversed the Army's decision. As a result, an officers' training installation was built near Des Moines, Iowa and in October, 1917, 639 black men were commissioned with ranks ranging from second lieutenant to captain (Meier, 1966, p. 193).

A tale often told during the twenties and current even in my own childhood tells with wizened humor the plight of the early twentieth century black. it tells of a cold, wet, and hungry black who appeals to the Lord for deliverance. He is advised by the Lord to "Go back to Mississippi." The black then asks if there are alternatives to which the Lord repeats "Go back to Mississippi." The black migrant, now deathly afraid, asks,"Lord will you go with me?" to which the Lord replies, "As far as Cincinnati."

A joke, to be sure, but it gives an accurate idea of the life of fear that the least of the black population lived. In 1917, race riots had occurred in Philadelphia and Chester, Pennsylvania, and East St. Louis, Illinois. Thirty-nine blacks were killed in these riots, yet no arrests were made (Meier, 1968, p. 192). During the summer of 1919 over 20 race

riots erupted from Washington, D.C. west to Chicago and as far south as Elaine, Arkansas and Longview, Texas (Meier, 1968, p. 194). Those who dared to rise above the status of the common person or to rebel against the racial tyranny of the twenties faced the most severe reactions from the white community.

Still, there were those who sought a college education. In 1914, Howard University graduated the largest class of black students in its history, 68 (Crisis, July, 1914, p. 15). In that year black colleges in the South graduated an additional 200 young people (Crisis, July, 1914, p. 15). Equally noteworthy was the fact that many young blacks had opted for formerly all white schools of the North. In 1913, three black students had graduated as engineers from formerly all white institutions: D.N. Crosthwaith and H.M. Taylor both from Purdue University, and James Arthur Dunn, the first black to graduate as an engineer from Ohio State (Crisis, July, 1913, p.114-116). Among the black graduates of 1914 were four young engineering graduates. They were Thomas Bailey of Clark University, Harvey A. Turner a civil engineer of Rhode Island College, Elmer Cheeks, an electrical engineer of Purdue University, and Daniel D. Fowler who graduated as an mining engineer of Case (Crisis, July, 1914, p. 16).

These seven young men followed in the mold set by Lawrence DeWitt Simmons, a 1906 graduate of the Yale University Sheffield Scientific School. Simmons was a native

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of New Orleans and had attended Talladega College in Alabama, graduating in 1903. He immediately applied to and was accepted at the Sheffield School from which he graduated three years later, thus receiving his bachelor's degree in engineering after a combined seven years of study. After graduation, he was employed by the General Electric Company at their Schenectady, New York plant where he remained for more than ten years (Crisis, April, 1914, p. 42).

Nearly all black engineering graduates of this time had been forced to attend northern colleges to obtain their engineering degree. If they were fortunate enough to have had the proper preparation, a bachelor's degree from a black institution with two or three years study in science or math, then the northern college stay might be as short as an additional three years; for most, it would be an additional four or five years. If, however, they were the products of inadequate or unaccredited southern preparatory education systems, the degree could take as long as an additional seven or eight years. As a result, the completion of each degree was the end of a tremendous investment of time, effort, and money.

While blacks were admitted to northern institutions, their stay was often troubled. Discrimination in housing and other forms of social isolation were common. Blacks were also barred from the collegiate engineering societies, a group in which membership traditionally was the first step

toward professional affiliation. If they graduated, they were then barred from professional engineering societies, the organizations that secured positions, set standards, and generally spoke for the profession (einberg, 1977, p. 290).

Most black applicants were discouraged from entering these institutions in subtle ways. As an example of the tactics used by institutions of higher learning, an inquiry from a black 1914 applicant to the Ohio State School of Engineering received the following response.

> I should be very glad to aid you in any way possible in securing an education in Electrical Engineering. I regret to say, however, that I have nothing at my disposal for your encouragement. There is no objection to your coming to Ohio State University and entering any course for which you are qualified. Every year we have a number of young people of both sexes of the Negro race who attend the University without embarrassment or hindrance. The way is entirely open so far as that is concerned, and I shall be glad to be of any assistance to you in my power. On one matter, however, I feel constrained to say just a word. The sentiment north of the Ohio River seems to be persistent against the Negro in skilled labor that I doubt very much whether an educated Negro has a fair show or a show worthwhile in this part oft the country (Crisis, July, 1914, p. 128-129).

One of the early black architectural engineering graduates of Drexel Institute of Philadelphia, Sidney Pittman, had such a career. Sidney Pittman was born in Montgomery, Alabama in 1875. In 1892 he entered Tuskeegee Institute and graduated in 1897. He moved to Philadelphia and entered Drexel Institute. Graduating as an honor student in 1900. Mr. Pittman returned to Alabama to accept a position at Tuskeegee Institute as the resident architect.

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Among the buildings he designed were the Y.M.C.A. building in
Washington, D.C., two state normal school structures in
Frankfort, Kentucky, and buildings on the campus of
Voorhees Industrial School, Denmark, South Carolina. The
National Training School in Durham, North Carolina, gave him
the contract for eight buildings. He secured a United States
Government contract to design the Negro Building for the
Jamestown Exposition at Norfolk, Virginia. He also designed
the Garfield Public School Building in Washington, D.C., the
Carnegie Library in Houston, Texas, the Hall for the United
Brothers of Friendship in San Antonio, and the Grand Temple
of the State Grand Lodge, Knights of Pythias, in Dallas. All
are works of Mr. Pittman. All are buildings used extensively
by blacks. Yet even as the son-in-law of the great Booker T.
Washington, Pittman could not land the contracts for
buildings with mixed race usage. It is doubtful that the
great number of contracts would have been awarded to him had
it not been for his familial connection. Stories such as
this help one to understand the duplicity of the system, on
the one hand allowing a black man to complete the required
education, then limiting the use of the end product of that
expertise, primarily, to black consumers. Nevertheless, Mr.
Pittman's work stands today as testimony of his early
contribution.

William Cook, a native of Greenville, South Carolina,
was educated at Claflin University and taught mechanical arts

there and at the Georgia State College. Cook attended
Massachusetts Institute of Technology for post-graduate
studies, after which he sat for the federal government
examination for senior draftsman. In 1908 he was assigned to
supervise the erection and completion of the post offices for
Lancaster, Pennsylvania, and Ashland, Ohio. Cook was the
second black man to hold the position of senior draftsman in
the federal system (the first was Lowell W. Baker) (Crisis,
May, 1917, p. 31). Cook's work on the Lancater, Pennsylvania
Post Office was one of the first projects overseen by a black
man that was designed for mixed race usage.

In each of these cases the engineer attended a black
college and then went on to attend a white school that had an
accredited engineering program. There were no accredited
black programs in 1915 and this fact is important since white
schools could determine the number and the identity of black
engineers. It also meant that those blacks who were admitted
usually came with superb transcripts and letters of heady
recommendation. As an example, between 1900 and 1914 four
black students graduated from the prestigious Sheffield
School, the engineering school of Yale University. They were
John Taylor Williams (1900), William Miller Thorne, Jr.
(1906), Lawrence DeWitt Simmons (1906), and James Weldon
Queenan (1906). The Yale Archival Collection lists the
academic preparation as part of each student's biography.
Williams attended Andover Academy, Thorne attended the Mount

Hermon School, and Simmons had attended Talladega College (Yale Archives, Sheffield School Histories).

In 1915 and 1916, five additional black engineers were graduated from northern schools. Charles A. Tribbett from Yale University, J.C. Webster from University of Pennsylvania, W.H. Steward from Armour Institute, C.H. Burch from Ohio State, and E.A. Brown from University of Illinois (Crisis, July, 1915, p. 137),(Crisis, July, 1916, p. 119-27). The production of black college graduates, engineers included, was beginning to spiral upward just as the nation went to war. Bright young men went to war and the effect of their patriotism was felt in the graduation statistics of 1918, 1919, and 1920.

For black college students in those years an examination of the June, July, and August issues of black publications from 1914 to 1929, produces the following graduation statistics. This 15 year span was chosen because there are definite records from at least two schools, Howard University and Massachusetts Institute of Technology, that fully cover this period and that can be used as comparisons. The statistics show the total of black graduates for any given year and the portion of the total that graduated from northern schools (Figure #11).

Darnley Howard was one of those who did not go to the Army. Instead, in 1920, he became the first black engineering graduate from the Polytechnic Institute

(Rensselaer) at Troy, New York (Allison, July, 1920, p. 126). He later accepted a position on the faculty of the Howard University School of Engineering (Figure #14).

The annual graduation records show that during this 15 year span, 1914 to 1929, 67 black engineers were graduated from only two of the many existing programs of the day. Thirty-one from MIT and an additional 36 from Howard University. These, plus others coming from the limited number of schools that would accept blacks, and the probability that only a small number would have been eligible since the preparatory programs were not in place, means that perhaps 400 may have been produced during this 15 year period. Four hundred is a good estimate since the 1930 census showed 500 black engineers and architects living in America.

Thus, the record shows that minority engineers were being produced, but the evidence of their acceptance as fully prepared coworkers on a national scale was slight. The tone had been set by President Woodrow Wilson who made great promises to blacks during his campaign. So convincing was he that W.E.B. DuBois spoke positively of his sincerity. Once elected Wilson changed dramatically. His passion for democracy and self determination was confined to caucasians of European descent, he eliminated nearly all of the black patronage jobs, and he ordered the segregation of the District of Columbia. For engineering hopefuls, he

segregated the federal bureaucracy, severely limiting the opportunities for blacks to work for government agencies (Morris, 1975, p. 193).

Education, the usual refuge for educated blacks of the day, had an overabundance of black technical types working in positions beneath their educational preparation. But when we look at the few black collegiate institutions that had reason to call for their services it is obvious that there was a disincentive for blacks to pursue the technologies. South of the Mason-Dixon line the acceptance was further hindered by the racial climate and the restrictive union membership rules.

The years between 1910 and 1930 are particularly pivotal, not only in the development of black engineering education but in terms of the overall philosophy of black higher education in this country. It is during these years that accreditation of black schools, poor state funding, union bias, insufficient elementary and secondary schools, and lack of community control combined to pose a severe threat to forward movement in black higher education.

Fortunately, there were voices that continued to rail against the inequities. The years between 1910 and 1930 are not years of dynamic change but rather a time of gradual shift in focus in black higher education. These are also years of growing self determination (Anderson, 1988, p. 267-68).

TOTAL BLACK COLLEGE GRADUATES 1914-1929

Year	Total Number	Total/Northern
1914	267	not available
1915	281	38
1916	338	not available
1917	445	77
1918	396	175
1919	373	53
1920	364	100
1921	461	not available
1922	523	77
1923	517	129
1924	523	183
1925	not available	not available
1926	1,000+	293
1927	1,100+	261
1928	1,277	339
1929	1,591	394

This chart is a compilation of graduation reports from Crisis
magazine, May through August, 1914 through 1929
TOTAL BLACK COLLEGE GRADUATES 1914-1929

Figure 9

The Twenties

Fisk University had been chosen as the capstone of black private post secondary education and northern industrial philanthropists plotted a strategy to gain control over the institution. This was accomplished with the help of black accommodationists and the Nashville Commercial Club, which included Tennessee's governor and the Mayor of Nashville. Promises of millions of dollars in endowments and gifts to eliminate the college's indebtedness were part of the lure.

Meanwhile, a white president, Fayette Avery McKenzie, had been appointed by the General Education Board. The board of trustees had been "reorganized" in 1920 removing all non-accommodationist blacks and replacing them with manual training ideologues. The decision was made to change the liberal curriculum of the college to more closely resemble that of both Hampton and Tuskeegee (Anderson, 1988, p. 263).

McKenzie disbanded the student government association, forbade student dissent, and suspended the Fisk Herald, the oldest student publication among black colleges. He refused to allow an NAACP chapter to be established on the campus and had the librarian remove radical articles from NAACP literature. New stringent rules of conduct were imposed, dancing and hand holding were forbidden on the assumption that "blacks are particularly sensuous beings" (Anderson, 1988, p. 268). McKenzie insisted on complete separation of

the races even though he hired whites to teach at the all black school (Anderson, 1988, p. 268).

In 1924, following many articles in the journals of black America, W.E.B. Dubois, a Fisk alumnus, was invited as the commencement speaker. The speech was highly critical of the Fisk administration. It enflamed the student body who found in DuBois a leader who spoke without fear about their dissatisfaction. Fisk alumni, community organizations, students, and black leaders mounted a campaign that unseated McKenzie in 1925 (Anderson, 1988, p. 268).

In spite of the resounding repudiation of the manual training philosophy at Hampton and Tuskeegee, white industrialists continued to support the manual training ideology. Proof of the failure of this ideology was seen in the changes that took place at Hampton Institute during the twenties. Though the Hampton enrollment remained stable at between 1000 and 1100, the college division grew from 21 in 1920 to 417 in 1927. By 1929 applicants for admission had to be high school graduates.

This decade also saw a return of the strongly overt racist attitudes toward the limited integration of southern black college teaching staffs. Northern whites who had gone to teach in black southern schools of higher education had been forced out and replaced by a corp of intolerant white southern instructors. At schools that should have been in

the forefront of the battle for technological education, racist ideas were stifling any attempt at expansion.

At Fisk, southern white instructors, who were rapidly replacing black staff, often refused to acknowledge their black colleagues and at one point not a dean or head of department was black; at Lincoln University in Pennsylvania the teaching staff consisted of white professors, and at Hampton severe racial unrest existed (DuBois, 1971, p. 542). The emphasis at this point had to be on the preservation of these institutions and as a result, blacks were forced to make compromises that were not in their best interests.

In spite of this bleak outlook, a new organization, The National Technical Association, was founded in the mid twenties. Membership was limited to blacks with a degree in engineering or architecture plus five years experience in the field. Obviously, the membership was never large, but by 1937 the national organization boasted more than 200 members.

The organization was formed to foster the development of engineering opportunities for blacks and to expand the limited job market that black engineers faced. The association assisted in the retention of the College of Engineering and Architecture at Howard University, engaged in the placement of black engineers with municipal, state, and federal agencies, and agitated for more accommodation for blacks in the private sector (Daniel, October, 1937, p. 662).

In contrast to the American experience, McGill University Engineering School of Canada hired George F. Albergu as a member of their faculty in 1921. Albergou, a Jamaican, was educated at Jamaica's Monroe College and awarded the Jamaican scholarship of $3,000.00 with which he entered McGill in 1911. He won the Mathematics prize in 1913 and graduated from the McGill School of Engineering in 1915.

After graduation he worked as Chief Inspector in the munitions department of Cement County, Canada, for three years was a member of the Expeditionary Construction Battalion, and spent a year in the office of the Chief Engineer of the Canadian Railway (Crisis, January, 1922, p. 301-02).

The twenties saw movement in the black community toward greater self determination. The ousting of McKenzie at Fisk came after ten years in office. The repudiation of the manual training philosophy as the chief expression of black higher education came after a long and costly intra race struggle. Both of these situations show the vulnerability of black higher education in the early decades of the twentieth century. Fisk, as an example of the best in black post secondary institutions, could be intimidated by the lure of an endowment. This also shows the length to which outsiders, northern industrialists, directed the course of black education. The establishment of the National Technical Association has to be seen as an extremely bright

accomplishment, one that, ten years earlier, would have been impossible. This trend toward self reliance would continue in the thirties.

The Thirties

The thirties presented a confusing set of options for black students wishing to go beyond high school. During the thirties, many of the colleges and universities that were later to become open institutions were still practicing restrictive admissions. Though they did not openly admit the policy, white parents could be sure that if they sent their children to certain schools there would be no black students. This was true at northern schools such as Princeton University, Mills College (California), George Washington University, Worcester Polytech, Vassar, Swarthmore College, and most catholic schools like Catholic University, Holy Cross, and Notre Dame (Crisis, August, 1931, p. 262).

Other northern schools allowed blacks to attend but would not allow them to live in the dormitories. There were over 50 such schools. Included among them were Ohio University, Bryn Mawr College, Bucknell University, Southern California, Villanova, Whittier College, Washington and Jefferson, Wittenberg College, Colorado College, Indiana University, Indiana University, Kansas State, Knox College, Temple University, University of Arizona, University of

Cincinnati, University of Kansas, University of Oregon, and the University of Michigan (_Crisis_, August, 1931, p. 162).

During the long struggle for fair and equal treatment by accrediting organizations and engineering societies, black colleges, in spite of the lack of recognition, continued to produce young men and women of substance. It became quite clear that limited admissions to existing schools of engineering and the inability of black institutions to underwrite new engineering programs meant that only a fraction of the deserving students would ever become engineers, if the 1900-1930 pattern continued.

In terms of accreditation, those organizations with the power to approve black colleges were usually white and opposed viewing black schools as the equals of the traditional white colleges. Many times the persons on boards of accreditation were from schools that did not accept blacks as students. This fact alone caused deep and unsettling dissatisfaction in the black educational community. Volumes have been written on the circuitous routes taken to avoid black collegiate accreditation. The census of 1930 showed that of the 200,000 engineers in America, about 500 were blacks. This, at a time when blacks comprised 10% of the population. It also revealed that there were 66,000 engineering and architectural students of which approximately

100 were black. Thirty-one, nearly one-third of these students, attended Howard University with smaller, but significant, numbers attending Massachusetts Institute of Technology, Cornell University, Renssalaer Polytechnic Institute, Ohio State University, University of Pennsylvania, University of Pittsburgh, University of Michigan, University of Illinois, University of Wisconsin, and Armour Institute of Technology (Downing, June, 1935, p. 63). Each attendee represents a significant achievement for the thirties.

At the time of this census, there were over 150 schools of engineering and architecture, but still no fully accredited or "recognized" school on a black campus. If, in the late twenties, a more accepting attitude had prevailed in which black students had felt welcome at all institutions, the fact that a black school had not been accredited would not have been as pivotal in the developments that were to follow. There might have developed schools of engineering that recruited the finest students to build a new reality. Instead, the threat to educational attainment, posed by the racial barriers, meant that if blacks did not control their own institutions, they could never expect to rise to technological parity.

There was no lack of interest in engineering among black men of high school age. In 1930 Ralph Bullock, by use of a questionnaire, canvassed nearly 2000 black high school males concerning their career choices. The questionnaires went to

students in North Carolina, Tennessee, Georgia, Virginia, Missouri, and the District of Columbia, all with segregated school systems. These were systems where young men had the least hope of going to professional schools. The investigation revealed that medicine was the first choice for a professional career, engineering was fifth and architecture was twelfth. Many never achieved their goals but the survey showed that blacks were aware of the engineering profession and had aspirations for inclusion (Crisis, July, 1922, p. 301-03).

By 1931 there were more than 18,000 blacks enrolled in colleges throughout the United States (Crisis, August, 1931, p. 261-262). About ten per cent of them were enrolled in predominantly white institutions, but this figure tends to point up the lack of access for blacks rather than the degree to which American colleges welcomed this new population. The majority of blacks who attended northern colleges during the thirties were there on "state scholarships." They came from areas of the country that did not permit blacks to attend local public and private colleges within their states whether graduate or undergraduate.

The state scholarship was an innovation that originated in the twenties and came into vogue during the thirties as a means of legally extending the segregated status of higher education. States that did not provide professional higher education for blacks made available a limited number of

vouchers for blacks to study out of state. In Tennessee the
voucher read,

> The scholarship herein provided for shall be
> granted to the nearest university or institution of
> learning which the recipient can lawfully attend
> and which offers educational facilities equal to
> those of the University of Tennessee, whether such
> university or institution is located in Tennessee
> or elsewhere.
> (Cox, January, 1940, p. 24).

The genesis of the state scholarship program was the 1924
Missouri state law that provided monies for black collegians
to enrol at universities in adjacent states. By doing so the
legislature would ensure that the state institutions would
remain all white. Beginning in 1929, Missouri made biennial
appropriations of from $5,000.00 to $15,000.00 for tuition
aid. Kentucky, Maryland, Oklahoma, Tennessee, Virginia, and
West Virginia followed Missouri in providing the means to
keep their state institutions white (Johnson, 1970, p. 181).

The voucher program, with all its racist overtones, was
still more than some southern states would provide. As late
as 1939, Alabama, Arkansas, Delaware, Florida, Mississippi,
and South Carolina had made no provision for out of state
black collegiate attendance (Johnson, 1943, p.180-81).
During the 18 year period between the Missouri law that
provided vouchers for blacks was enacted and 1939 when six
southern states were still without programs, over 80% of all
black Americans resided in the south (Smythe, 1976, p. 164).
As a result, any ruling affecting the educational opportunity

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of southern blacks had a monumental effect on black education throughout the country.

This type of denial of access meant that in states that provided the vouchers, black Americans would have to travel beyond state boundaries to receive the education that whites were provided in their home state. In those states where no vouchers were provided no technological training for blacks existed and as a result, the probability of ever becoming an engineer or a technologically trained black person was extremely remote. In the six states providing no funds for black collegians over 3,750,000 black Americans lived (Anderson, 1988, p. 41).

Oliver Cox, in his treatise on the inherent inequality in these voucher systems, said this:

> A good college at home has the advantage of advertising education in the community and thus making it desirable to a larger percentage of the population. To many persons, there are cultural, sentimental, and hidden economic problems connected with the business of migrating to the North for an education. These problems may not always be solved by the payment of specified differential tuition and cost of living (Crisis, October, 1933, p. 25).

This meant that most blacks in America, regardless of aptitude, were cut off from professional education because the scholarships were few and not all states with segregated higher education provided them (Cox, January, 1940, p. 25).

In Maryland, if a black wanted to become an engineer, he would have to apply and qualify for an out of state scholarship.

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This meant he would be allowed to attend a professional school in the nearest state willing to accept him in that discipline. As a result, Ohio State University, because it bordered many of the southern states, had a black enrollment greater than 50 per cent of the black colleges during the thirties, while Columbia University became the haven for those southern teachers who wanted to further their training in that field. No southern state before 1930 provided an in-state engineering education for black aspirants, and between 1930 and 1940 only North Carolina, Washington, D.C., and West Virginia made the provision (Jenkins, January, 1940, p. 243). This denial, more than any inability on the part of blacks, meant that this decade would again limit the production of black engineers. It also meant that for decades to come blacks would look to this period as a time of educational despair.

The book, One Third Of A Nation, is a series of reports from Lorena Hickock, the government confidential investigator, to Harry Hopkins, the President's domestic advisor, during the Great Depression. In her recounting she tells a tale that gives some insight into the stance taken by the government for the plight of minorities during the thirties. In her May 4, 1934 report from Phoenix, Arizona, Ms. Hickock reported that in the middle of a crippling depression, the government had imposed a two tiered welfare system that Ms. Hickock says was sub par for white folk but

more than adequate for blacks and Mexicans-Americans.   At the time, she was aware that this dual system gave a larger monthly allotment to white recipients than to blacks or Mexican-Americans.   She based that assumption on her assessment of the unemployment and seeming idleness of the black and Mexican residents of the area.   As if to offer an apology she goes on to say that Mexicans and blacks "..can't get work."   If they were to apply for and receive employment while a white man remained unemployed "...there would be hell to pay.." (Lowitt, 1981, p. 238-239).   In other words, the unemployment of blacks and Mexican-Americans was more acceptable, more natural to her eyes.

One may see this as an incident in 1934 related by Ms. Hickock or one can understand that the crop of young people who should have been available for the educational mills of our nation two decades later had been seriously neglected and consequently damaged by government policy, racial bigotry, and the myopic view of Ms. Hickock.

It is clear that much of the momentum gained during the twenties was dampened by the Depression of the thirties.   The diversion of scarce funds from programs that might have been beneficial to the black community and various governmental policies worked to curtail the progress of blacks during the decade.   The introduction and acceptance of the voucher system rather than the open access to previously all - white institutions meant that few black college aspirants would

benefit from this program. The good college far from home was not the same as the good college within one's state boundary.

The optimism felt at the end of the twenties was being replaced by a confusing set of signals. Northern schools were accepting blacks but not allowing them to stay on campus. Some southern states did not provide vouchers and severe job discrimination was prevalent. Still the numbers of black college students increased.

But as the thirties ended and the national stance became more assured, new opportunities for all Americans would surface. Many of those opportunities were connected to the war effort. If there was to be a concerted drive for black technological inclusion, it should have been the decade of the forties.

The Forties

The forties brought new blacks into the engineering and technological fields. Defense programs demanded that a larger role be played by all citizens. This was not without opposition from entrenched racists both north and south. Skill trades, in all but a few instances, were closed to blacks (Johnson, 1970, p. 105). At the Charleston, South Carolina, Navy Yard black employees trained their white coworkers to serve as engineers in the engine room. Despite their superior experience blacks were never allowed to be engineers. The mechanics union denied them membership.

The Southern Welding Institute in Memphis prepared 180 blacks as welders, but despite the heavy demand for that skill, they could not get jobs unless they relocated. By 1943 the population of Mobile, Alabama had doubled to 200,000 with a 30% black presence. At government insistence the Alabama Dry Dock and Shipbuilding Company (ADDSCO) upgraded to welders 12 of the more than 7,000 blacks, who held the most menial jobs. They were amply qualified. Yet they were assigned to the night shift in an effort to mask their presence. As a result of this move a riot ensued in which more than forty blacks were injured. The company instituted a plan in which black welders and laborers were segregated from their white coworkers (Goldfield, 1990, p. 35) .

Interest in many fields of specialization is often born of a parent's knowledge and familiarity with that field. In these instances black fathers who might have directed their sons and daughters toward technical fields were dissuaded by the racial climate.

With the war came a new demand for housing throughout the nation. This would mean that black architects would have an opportunity to design large housing developments intended for black residents. Among those who rose to prominence during this period was Hillyard Robinson. Robinson was an architect of unusual ability who for thirteen years served as professor and Chairman of the School of Architecture at Howard University. In 1926, his design was chosen for the

historic restaurant in the Henry Hudson Hotel in Troy, New York. In 1927, he received the first, second, and fourth prizes offered by the professional journal, Architecture.

He was appointed by Federal Works Administrator, John Carmody, as consulting architect to design a large 250 unit housing development just beyond the Washington, D.C. city limits. Robinson's task was to render complete plans and architectural services to the point of construction including site plans and dwelling designs. Robinson had previously designed the Langston Terrace and the Frederick Douglass housing developments in Washington, D.C., both of which were seen as "break through" designs in the field of public housing. He had also designed Cook Hall at Howard University. On the Cook Hall project, Robinson used the expertise of the Howard faculty and engineering students (Crisis, September, 1941, p. 298).

In the same year, 1941, a $300,000 hospital for the city of Newport News, Virginia was designed by another black architect, William H. Moses, acting chairman of the Hampton Institute building construction department (Crisis, October, 1941, p. 308).

The decade of the forties, though similar in many ways to those preceding it, provided black engineering hopefuls with new opportunities. It is also the decade of the first great black American commercial engineer, Archie Alexander.

His success symbolized a new black engineering advancement that was becoming a reality.

Yet while such opportunities were broadening, there were those that remained closed. Yancy Williams, a Howard University engineering student, filed suit on January 17, 1941, in a District of Columbia court in order to compel the War Department to consider his application for enlistment in the United States Air Corps. He was represented by the lawyer for the National Association for the Advancement of Colored People (NAACP), Thurgood Marshall.

At twenty-four, Williams was a senior mechanical engineering student employed as a technician in Howard University's power plant. He had successfully completed the primary and secondary Civilian Aeronautics courses and held a private pilot's license. He had also passed the same physical examination given to incoming flight cadets. Williams had been recommended by Edward S. Hope, superintendent of buildings and grounds at the University, William T. Courtney, chief engineer of the power plant, and L.K. Downing, Dean of the School of Engineering. The official reply from the Army was as follows:

> Dear Sir,
> Receipt is acknowledged of your application
> for appointment as a flying cadet. The
> commanding general directs you be informed
> that appropriate Air Corps units are not
> available at this time.

The letter went on to instruct him to reapply when "colored

applicants can be given flying cadet training" (Crisis, March, 1941, p.87).

Snubs such as this caused the doubts and fears of young blacks to resurface time and time again during this period, in spite of the generally favorable overview of progress. In this instance, the end of the story is a triumph for all. Blacks were eventually integrated into all branches of the armed forced.

Yancey Williams was a Howard University student and would become a member of the United States Air Corps. But in the south where most black Americans still resided, black men could not be assimilated into the labor force in textile mills, too many white women worked there. In addition to the black man/white woman conflict, the textile mills had been mechanized and blacks were thought incompetent in the face of machinery. In contrast, the dexterity with which blacks handled the machines of the Virginia and North Carolina tobacco factories again marked them as inferior since, on this occasion, manual dexterity was seen as a trait associated with marginal intellect (Goldfield, 1990, p. 27).

As we review these decades it is important to remember that this was a period of great mechanization. Mechanization that displaced black expertise in many industries. In the building trades, steel was introduced limiting the need for skilled carpenters, trucks replaced draymen, wheelwrights and coopers were being replaced by factory machinery. Blacks

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were being eliminated at the low end of the labor market and barred from the professional ranks.

You have a continuum stretching across three and a half decades along which progress toward engineering and technological educational self sufficiency of black Americans can be measured. You may also measure, along this continuum, the resistance to that progress. For black Americans it is a battle of peaks and troughs. The topics that we have spoken about in this chapter, teacher training, choice of institutional leaders, union eligibility, or philanthropic funding are matters that blacks, by their strident refusal to be compliant, impacted. The degree to which this impact was felt is best seen four years beyond the scope of this research as it culminates in the Brown case for school desegregation.

The efforts toward educational self sufficiency were fought on many fields. As some black schools sought to remove presidents, others in concurrent encounters, sought acceptance by a different body of agencies. These agencies had the power to grant approval and acceptance to colleges and professional schools. The fight for institutional acceptance, accreditation, is a battle that once again has the peaks and troughs that characterized the black higher education struggle.

The Accreditation Of Black Institutions

By the year 1890 few black Americans had any idea of the fields of engineering and technology. Forty years later, in 1930, many black Americans were aware of the field, while others, newly introduced to the idea of black participation in this area of the job market, became advocates for the lowering of the exclusionary barriers. This 40 year transition is both interesting and historically noteworthy since it shows an intellectual awakening in the black community to the broad spectrum of opportunity that existed in these fields. It is also a time when struggling black institutions addressed the realities of accreditation. They were caught between the increased awareness of the black community and the financial burden that accreditation would have imposed. These pressures make this a most conspicuous time in the development of black institutions.

Accreditation for educational institutions is the seal of approval by institutional peers. Strict guidelines are set forth that must be met if high schools, colleges, or universities wish to be awarded the seal of an accrediting agency. Early accrediting groups were the Middle States Association of Colleges and Secondary Schools, the Southern Association of Colleges and Secondary Schools, and the New England Association of Colleges and Secondary Schools. They worked to bring a more defined meaning to the terms "high school", "college", and "university."

These three powerful associations, Middle States, New England and the Southern, came into being late in the nineteenth century and were joined in the early twentieth century by other standardizing agencies such as the College Entrance Examination Board. This group of agencies worked to establish closer ties between institutions, to standardize college admission requirements, and to improve the academic quality of college and university education.

In 1913 a fourth accrediting group, the North Central Association of Colleges and Secondary Schools, issued the first list of regionally accredited colleges and universities. This was the first time American colleges were to be defined by specific factual, mechanical, and uniform standards (Anderson, 1984, p. 251). Within a decade of the first list of accredited schools it became obvious that no institution could be a prominent player without the approval of these accrediting agencies. To lose the approval or to be denied the approval of one of these agencies worked to the detriment of an institution. Job opportunities, acceptance to graduate school, and the acquisition of state licensure depended heavily upon the applicant's institution.

In 1928, the Southern Association of Colleges and Secondary Schools began to rate black schools on a separate listing. Similar attempts by W.E.B. DuBois in both 1900 and 1910 ended with a finding that Howard, Fisk, Atlanta, Morehouse, and Virginia Union were the most complete black

institutions (Anderson, 1988, p. 250). In 1917, with financing from wealthy philanthropists and the Federal Bureau of Education, Jesse Jones produced a two volume review of black colleges in which he found only Howard and Fisk to be credible institutions (Anderson, 1988, p. 251).

Most black colleges had small endowments and the institutional demands of the accrediting agencies were beyond the financial capabilities of the schools. The rating agencies demanded that colleges maintain at least six departments, or professorships, with one professor giving full time to each department. The annual income of the college had to be sufficient to maintain professors with advanced degrees and to supply adequate library and laboratory facilities. There could be no college preparatory departments connected to the college, and there had to be an endowment of at least $200,000.00. In 1917, only Hampton Institute and Tuskeegee had sufficient endowments to be considered, and both relied heavily on their preparatory programs (Anderson, 1988, p. 249-50).

The surveys by DuBois and later by Jones made it clear to black educators that if black colleges were going to be competitive, they could not exist apart from the power of the accrediting organizations. No matter how black the college it would have to submit to the regulations of white agencies.

The first of the black institutions to receive a
significant accreditation by a regional or national
accrediting agency was Howard University and that was for its
medical school not for its School of Engineering and
Architecture. Nevertheless that institution allows us a
starting point for black accreditation. At the other end of
the color spectrum were schools of engineering, such as the
Massachusetts Institute of Technology that were early
recipients of accreditation.

During the period from 1890 to 1930, there was a rise in
the level of professionalism in the field of engineering.
Credentials were becoming important and the origin of the
credential-the school from which one had graduated-was as
important as the transcript. In April of 1932, in a speech
before the North Central Association of College and Secondary
Schools, Walter A. Jessup, soon to be the head of this
accreditation group, described the need for standardization,
both in content and in length of curricula, in the
accreditation of institutions and specialized programs such
as engineering (Jessup, 1932, p. 112-120).

Later in the year, William Wickenden, an early
investigator of technical education, wrote an article
entitled "Who and What Determines the Educational Policies of
Engineering Schools?" In that article Wickenden explained
the difficulties in standardizing the evolving curriculum of
engineering schools. He started by showing the one-year

program and the "quasi" apprentice program that was begun in 1823 at Rensselaer, site of the first American program for engineering. This program was reorganized in 1849 and extended to three years. The poor high school preparation of entrants made it necessary to add a year of secondary school work and this was the origin of the four-year curriculum.

By 1870, several other schools had joined the list of institutions offering engineering. They were Massachusetts Institute of Technology (MIT), Columbia University, Cornell University, and the University of Michigan. For the next seventy-five years, these schools would be the accredited standard bearers for schools of engineering (Wickenden, July, 1932, p. 228-238).

Engineering Opportunities At Howard University And Massachusetts Institute Of Technology

Typical of the northern engineering schools after 1895 was MIT, a school with high academic standards, difficult entrance requirements, and a diploma that was extremely negotiable. Among black schools attempting to build programs, two schools were prominent, Howard University and Hampton Institute. By following the progress of blacks pursuing engineering degrees at Howard and MIT during the 35 year period from roughly 1895 to 1930, the magnitude of the struggle that had to be waged to bring engineering education within the reach of the black community becomes clearer.

Between 1892 and 1930 there were 40 black engineering and technically oriented black graduates of MIT (see Figure #10).   Though the numbers may be small, the fact that this school graduated its first black as early as 1892 says something about their willingness to provide access. That access at MIT led to greater exposure for many black students because the skills acquired here were often taken to the schools of the south that prepared black students. An 1892 graduate of MIT, Robinson Taylor, became the mechanical and architectural drawing instructor at Tuskeegee shortly after his graduation(Abney, 1983, p. 20). His contributions and skills placed him in a very conspicuous position for many who wished to follow in his academic footsteps. He is responsible for the design and creation of the chapel and the campus library on the Tuskeegee campus.

The years of black students graduations, more than the totals, say something of the upsurge in interest that was awakened in the black community. The list of MIT graduates by years is shown in figure 11. From 1892 to 1921 only 11 blacks graduated with not more than a single black in any given year. From that point forth, at least until 1929, there was always more than one black graduate, with years of five and seven. Of the 40 graduates, twenty-seven graduated between 1921 and 1929, a time when many black families were not financially solvent. This meant that the only black students who would get an opportunity to attend schools of

Massachusetts Institute Of Technology Engineering
Specializations of Black Graduates: 1890-1930

Civil. 9

Mechanical. 5

Electromechanical. 2

Architecture. 2

Chemistry. 5

Electrical 9

Chemical 2

Mining. 1

Engineering Management. . . .1

Not Available 4

Massachusetts Institute Of Technology Engineering
Specializations of Black Graduates: 1890-1930

(Abney, 1983, p. 35).

Figure 10

Black Graduates of Massachusetts Institute

of Technology: 1890-1930

YEAR/STUDENT	DISCIPLINE	HOMETOWN
1892		
Taylor, Robinson T.	Architecture	
1894		
Johnson, William Arthur		
1898		
Dixon, John Brown		
1899		
Dixon, Charles Sumner	Electrical	New Bedford, Ma
1900		
Smith, William Henry	Mechanical	Baltimore, Md
1903		
Smith, Daniel Arthur	Electrical	Houston, Tx
1906		
Terrell, Wendell Phillips	Mechanical	
1909		
Turner, Marie Celeste(a)	Chemistry	
1910		
Brown Jr, Dallas	Mechanical	New Bedford, Ma
1917		
Krigger, Anselmo	Civil	Cambridge, Ma
1918		
Jones, Bertram Francis	Chemistry	
1921		
Purnell, Lee Julian	Electrical	
Scott Jr, Emmett Jay	Civil	New York, N.Y.
1923		
Courtney, Roger Davis		Boston, Ma
Downing, Lewis King(b)	Eng'g Management	Roanoke, Va
Parker, Joseph Lincoln		Mount Vernon, N.Y.
1924		
Carter, John Churchel	Electrical	Washington, D.C.
Lindsey, Albert Eugene	Mining	
Smith, Victor Claude	Chemical	
Taylor, James Dennis	Architecture	Boston, Ma

Black Graduates of Massachusetts Institute
of Technology: 1890-1930

Figure 11

1925

Cain, Lief LittleJohn	Mechanical	Darlington, S.C.
Evan, James Carmichael	Electrical	Miami, Fla
Fassit, Andrew Jackson	Electrical	Boston, Ma
Robinson, John Bernard		
Washington, George L	Mechanical	

1926

Circhlow, Ernest Gordon	Biology	
Cooley, Courtney Brantly	Chemistry	
Diggs, George Lyle	Electrical	Boston, Ma
Fort, Marron William	ElectroMechanical	Cambridge, Ma
Hall, Chrisper Clement	Civil	
Hope, Edward Swain (c)	Civil	Atlanta, Ga
Jewell, Paul Vernon	ElectroMechanical	Cambridge, Ma

1927

Bethel, William Harold	Civil	
Bowles, George Francis	Chemical	
Edward, Arnold	Electrical	
Taylor, Westervelt A	Civil	Cambridge, Ma

1928

Duncan, Henry Benjamin	Civil	
Solomons, Gustave Martine	Electrical	Quincy, Ma

1929

Bethel, William Henry	Civil	Buffalo, N.Y.
Bonner, Joseph Andrew	Civil	Boston, Ma
Knox, William Jacob	Chemistry	

(a) did not receive her degree from MIT
(b) attended Howard University prior to MIT
(c) attended Morehouse College prior to MIT

Figure 11 continued

engineering, such as MIT, would be those who came from a certain economic strata or students who showed exceptional ability and could win scholarship support This is significant because at a time when public black education was being funded at low levels, the clamor for greater technical exposure increased in the black community.

These were years of extreme economic hardship for most black Americans which meant that the ability to pay one's way became more of a hinderance to access than all of the false barriers erected by the colleges.

By looking at the hometowns of the graduates, it is obvious that at least seven were from southern cities and two had attended black colleges, Morehouse College and Howard University, before coming to MIT (Abney, 1983, p. 16-21). The expense of attendance and the travel from southern cities to northern schools assured that the number of eligible applicants would always be small, no matter how wide the door of opportunity was opened. The "Jim Crow" travel laws and fear of physical harm also served as deterrents to northern college attendance. During the 1920s, the employment opportunities for black graduates of engineering schools were severely limited.

It is astounding to note that several students overcame the hardships of both costs and distance and were among the early graduates of MIT. When the barrier of distance is removed, the statistics are equally as dismal. The twenties

were a time when the Boston area school systems were noted for their tolerance and diversity. During this period, over 900 black students graduated from area school systems within a trolley's ride distance of the MIT campus. Only nine graduated from MIT in engineering and technical studies (Abney, 1983, p. 27). They came from Quincy, Boston and Cambridge public schools. The social climate that existed, even in the most welcoming institutions, was such that it was obvious that blacks needed their own institutions to overcome admission, financial, and travel difficulties involved in the pursuit of their education.

By contrast, while MIT was graduating a few blacks per year, Howard University and other black institutions were laying the ground work for a challenge to the meager number of admission slots that were distributed to blacks by the nation's engineering schools. As early as 1908, engineering courses were introduced to the curriculum of Howard, and made a full program in 1910. The early courses were in the areas of architecture, civil, electrical, and mechanical engineering. There was no separate school of engineering and as a result, the courses were offered by the School of Manual Arts and Applied Sciences. It was not until 1934 that the University established a separate school of engineering and architecture (Howard University catalog, 1988, p. 185).

Nevertheless, Howard University provided an alternative to the white institutions of the day. As early as 1914,

BLACK GRADUATES OF HOWARD UNIVERSITY SCHOOL OF ENGINEERING
AND ARCHITECTURE: 1914 TO 1930

YEAR/STUDENT	DISCIPLINE
1914	
Agosto, Manuel	Civil
1915	
Falu, Narcisco	Civil
Huskerson, William	Civil
1917	
Piper, Percival Robert	Electrical
1921	
Alston, Chester	Civil
Brannon, Clyde	Civil
Downing, Lewis King	Civil
Jefferson, Henry Homer	Civil
Ragsdale, Randolph David	Electrical
Thomas, William A.	Electrical
1922	
Gough, William Irving	Civil
1923	
Cheevers, Samuel R.	Civil
Ferguson, Arthur W.	Architecture
Gardner, Julius M.	Architecture
Madison, Robert J.	Civil
Taylor, James Henry	Electrical
Priestly, Alfred C.	Architecture
1926	
Brooks, Westley Herley	Architecture
Lee, Lawrence Augustus	Architecture
Logwood, Franklin Burrell	Electrical
Queen, Howard Donovan	Electrical
Welch, Ernest Rivers	Electrical
1927	
Patton, Joseph Samuel	Civil
Winder, Earl Theodore	Architecture
1928	
Batson, Thomas Everett	Electrical
Cope, Thomas C.	Electrical
1929	
Berry, Robert Lee	Civil
Borican, Charles Henry	Electrical
Myers, Victor Talmadge	Civil
Scott, James P.	Electrical

Black Graduates of Howard University School of Engineering
and Architecture: 1914-1930

Figure 12

1930
Dabney, Walter Hampton   Civil
Mayfield, Floyd A.   Architecture
Powers, Bernard Conrad   Civil
Saunders, Thomas Henry   Civil
Welch, John Austin   Architecture

Figure 12 continued

Howard graduated a student in engineering. He was Manuel A. Agosto. Between 1914, the year of the first engineering graduate and 1930, Howard graduated 41 engineers (Wilkinson, 1977, p. 178)(Figure #14). Of that number, 37 graduated between 1921 and 1930, parallelling the increase seen at MIT. This number surpasses the output of any other institution.

During the first twenty-five years of its existence, Howard's engineering program sent out 59 engineers and architects. This number was greater than that ofthan any other institution in America for the production of black engineers during the early decades of this century. This new door of opportunity assured that new faces would be present in the fields of engineering and technology.

This fact seems to have passed some parties without notice since the 1939 Hurt's College Blue Book, the outstanding college reference of the day, did not list Howard University as a viable option- not even in the section for "coloreds." Howard University suffered from this lack of recognition in terms of engineering and architecture, but did make the publication as a medical college and a school of dentistry (Hurt, 1939, p. 327). This snub took place after 25 years of engineering graduations from Howard and at a time when Howard University was advertising their electrical, civil, and mechanical engineering curricula in educational journals (Crisis, January,30 p. 7). Hurt's publication led the reader to believe that there existed only two engineering

schools in the District of Columbia, Catholic University and George Washington University (Hurt, 1939, p. 327).

Earlier, The Patterson's American Educational Directory for 1936, another of the era's authorities on colleges listed Howard University in terms of its engineering school along with the aforementioned schools in Washington, D.C. They did, however, mention parenthetically, that the school was for Coloreds (Patterson, 1936).

This omission of Howard University from college information books and the unwillingness of accrediting agencies and/or engineering societies to acknowledge and respect the effort that was being made appears to be the type of racism in vogue during the thirties among the intelligentsia. Blacks fought back. The thirties saw a new emphasis on professional and technical education and as early as 1930 Howard University boasted an engineering society of its own (Figure 15). Any student enrolled in the engineering or architectural curriculum was eligible for membership. A profound difference from the case of F.A. Gregory, a 1932 graduate of the Case School of Cleveland, Ohio, who was elected to Tau Beta Pi honorary engineering fraternity, a membership that was revoked when it was found that he was black (Crisis, 1932, p. 247-250).

The anger and frustration that this and similar incidents spawned is difficult to measure but meaningful if one is to thoroughly understand the barriers to black access

DEAN HATFIELD   DEAN DOWNING   DARNLEY HOWARD
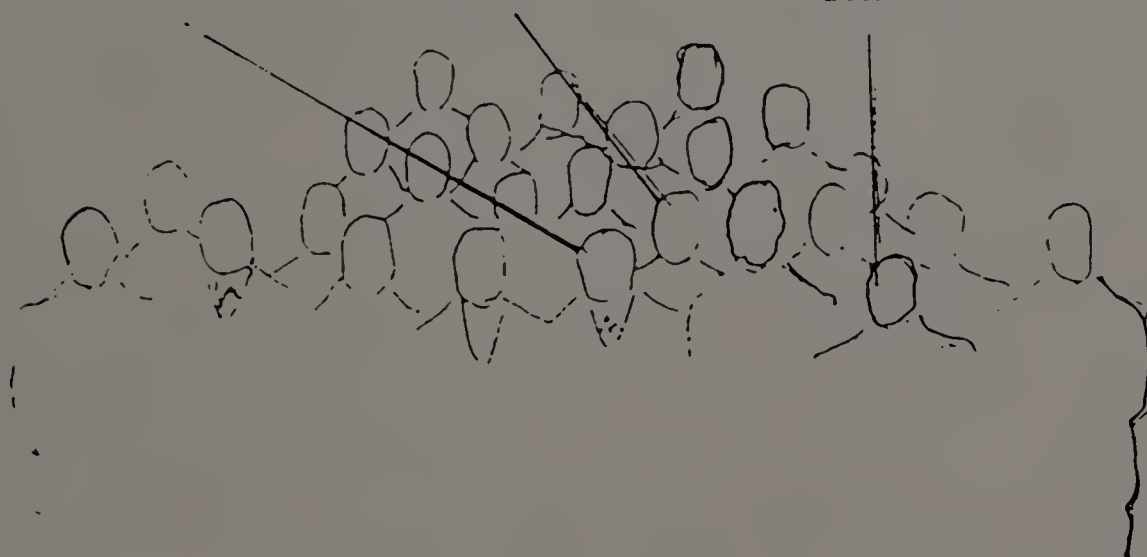
Howard University Engineering Society, 1930

(Figure 13)

during the thirties and forties. To appreciate fully the impact that prejudicial treatment had on black engineering aspirants who attended white schools where their future was uncertain, or those who were forced to attend black schools because these were the only doors open, one must follow them far beyond their years on campus.

The Development Of Black Schools Of Engineering

The development of black institutions that served a professional student body was decades in the making. Both the societal constraints and the inability of blacks to underwrite the cost of such a venture made the task seem insurmountable.

In many cases the black schools that were founded between 1865 and 1917 were extended high schools that served as a hedge against black illiteracy. Often they awarded high school diplomas, normal school certificates, and college degrees. The dates of their founding shows that they could not have had large student bodies prepared for the rigors of college work (Figure 14). Funding was inadequate, legislative oversight was weak, and most of all, the incentives for mass attendance, in both the private and the public sectors, were not present.

Schools for blacks could be divided into several categories. First there were schools provided solely by the state. These were supported by state funds and were seldom

the equal of those of their white counterparts. Few taught strictly college courses and even fewer were adequately staffed. This was the public sector.

There were also the missionary schools, many of which had been founded in the nineteenth century shortly after the Civil War. Many of these schools proved to be the salvation of black higher education since they were administered by religious orders and not dependent upon the state for financing. The Congregationalists founded and supported such schools as Atlanta University, Fisk University, Talladega College, Tougaloo in Mississippi, and Hampton Institute. The Methodist Episcopal Church, the Baptist, and the AME Zion church bodies all established colleges. These private institutions served as the cornerstone of black collegiate education for nearly 60 years following the Civil War(Meier, 1968, p. 146-47).

Many of these newly formed black colleges would never receive the accreditation of an educational association nor would they ever offer a purely collegiate curriculum. A few schools would be recognized early for their outstanding work, but even then it would only be in a very narrow category. Howard University was accredited by the Association of Medical Schools in 1912. It was the first black school to be so recognized. There would be no similar recognition by a national organization or regional accrediting agency for a black engineering school in the near future.

Early Black American Colleges

Location	Institution	Year of Founding
Alabama		
Birmingham	Daniel Payne College	1889
Birmingham	Miles College	1902
Greenville	Lomax-Hannan College	1893
Huntsville	Oakwood College	1896
Montgomery	Alabama State College	1873
Normal	Alabama A&M College	1875
Selma	Selma University	1878
Talladega	Talladega College	1881
Tuscaloosa	Stillman College	1867
Tuskeegee	Tuskeegee Institute	1881
Arkansas		
Little Rock	Arkansas Baptist College	1884
Little Rock	Philander Smith	1877
North Little Rock	Shorter College	1886
Pine Bluff	Arkansas Agricultural, Mechanical & Normal College	1873
District of Columbia		
Washington	D.C. Teachers College	1873
Washington	Howard University	1867
Florida		
Daytona Beach	Bethune-Cookman College	1904
Jacksonville	Edward Waters College	1883
Tallahassee	Florida A&M University	1887
Georgia		
Albany	Albany State College	1903
Atlanta	Atlanta University	1865
Atlanta	Clark College	1869
Atlanta	Morehouse College	1867
Atlanta	Morris Brown College	1881
Atlanta	Spellman College	1881
Augusta	Paine College	1882
Fort Valley	Fort Valley State College	1895
Savanah	Savanah State College	1890
Kentucky		
Frankfort	Kentucky State College	1886
Louisville	Simmons College	1879
Louisiana		
Baton Rouge	Southern University	1880
Grambling	Grambling College	1901
New Orleans	Dillard University	1868
Mississippi		
Holly Springs	Mississippi Industrial College	1905
Holly Springs	Rust College	1866

Early Black American Colleges
Figure 14

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Location	Institution	Year of Founding
Mississippi		
Itta Bena	Mississippi Valley State College	1905
Jackson	Jackson State College	1877
Lexington		
Lorman	Alcorn A&M College	1871
Natchez	Natchez Junior College	1885
Prentiss	Prentiss N&I Institute	1907
Tugaloo	Tugaloo College	1869
Missouri		
Jefferson City	Lincoln University	1866
Maryland		
Baltimore	Morgan State College	1867
Baltimore	Coppin State College	1900
Bowie	Bowie State College	1867
North Carolina		
Charlotte	Johnson C. Smith University	1867
Concord	Barber-Scotia College	1867
Durham	North Carolina College	1909
Elizabeth	Elizabeth City State College	1891
Fayetteville	Fayetteville State College	1891
Greensboro	North Carolina A&T State University	1891
Kittrell	Kittrell College	1886
Raleigh	St. Augustine's College	1867
Raleigh	Shaw University	1865
Salisbury	Livingstone College	1879
Ohio		
Wilberforce	Central State University	1887
Wilberforce	Wilberforce University	1856
Oklahoma		
Langston	Langston University	1897
South Carolina		
Columbia	Allen University	1870
Columbia	Benedict College	1870
Denmark	Voorhees College	1897
Orangeburg	Claflin College	1869
Orangeburg	South Carolina State College	1895
Rock Hill	Clinton College	1894
Rock Hill	Friendship Junior College	
Sumter	Morris College	1905
Tennessee		
Jackson	Lane College	1882
Knoxville	Knoxville College	1875
Memphis	LeMoyne-Owen College	1870
Nashville	Tennessee A&M College	1909

Figure #14 continued

Location	Institution	Year of Founding
Tennessee		
Nashville	Fisk University	1866
Nashville	Meharry Medical College	1876
Texas		
Austin	Houston-Tillotson College	1877
Crockett	Mary Allen College	1885
Dallas	Bishop College	1881
Hawkins	Jarvis Christian College	1912
Marshall	Wiley College	1873
Prairie View	Prairie View A&M College	1876
Tyler	Butler College	1905
Tyler	Texas College	1894
Waco	Paul Quinn College	1894
Virginia		
Hampton	Hampton Institute	1868
Lawrenceville	St. Paul's College	1888
Lynchburg	Virginia Seminary College	1888
Petersburg/Norfolk	Virginia State College	1895
Richmond	Virginia Union University	1865
West Virginia		
Institute	West Virginia State College	1891

Figure #14 continued

Between 1917 and 1930 the country experienced tremendous change. As a result of the international conflict and exposures to a new dimension of freedom, many black Americans came to see themselves as men capable of shaping their own destinies. Politically the changes meant a new militancy by returning black servicemen and a new press for both civil and voting rights (Moses, 1978, p. 247). The fear of large scale black participation turned the country from its progressive expansionism too a cloistered repressive mode that set the stage for many types of exclusionary legislation aimed at minorities and immigrants.

In spite of this, enterprising black students found outlets for their scholarship. It is at this point that the road to black academic attainment forks and leads both to northern schools willing to accept blacks, and to racially segregated southern schools were struggling to establish new programs. Both groups are worthy of praise because their efforts led to the eventual development of black schools of engineering in America.

Among the racially segregated schools in the south, the first black institution to claim a course in engineering was Tuskeegee Institute. The course was begun in 1898 and though touted as a course in electrical engineering it was a course in electricity (Pierce, May, 1904, p. 666). It gave students a working knowledge of the preparation, the

installation, the repair and maintenance of an electrical system. It was also a course in power station operation.

The course came about as Tuskeegee was bringing electric power to its campus. Under the direction of Charles W. Pierce the students learned by doing. They installed a 50 kilowatt alternator, strung the lines, and even cut the timber for the poles. After three years of training they received certificates which stated that they had completed a course in engineering (Pierce, May, 1904, p. 673).

The course had been improperly labeled. As a course in electricity, it was fine, as far as it went, but it fell far short of the sophistication and theoretical content that a true engineering course demanded. Nevertheless, the course attracted students from many cities throughout this country and many from foreign lands. In 1904, Tuskeegee enrolled students in this program from Haiti, Jamaica, Puerto Rico, Cuba, and from the states of Alabama, Georgia, Louisiana, Tennessee, Kansas, Texas, Indiana, Illinois, Montana, and the District of Columbia (Pierce, May, 1904, p. 666).

In 1922, only one true black engineering program existed. It was located at Howard University. Howard's success was coupled with a steadily growing number of black engineering graduates from both black and white institutions. In 1922, black engineers came from Harvard University, Kansas State University and the Case School; in 1923, from Ohio State, Cornell, and-as always-Howard University (Crisis,

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1922, p. 12), (Crisis, 1923, p. 123). In 1927, Frederick
Massiah, one of the bright young black engineers, won the
Harmon Foundation Award in the field of engineering (Downing,
June, 1935, p. 67). The prize came as a result of his work
on the Walnut Plaza Apartment in Philadelphia, a ten million
dollar structure and the Post Office in Camden, New Jersey, a
1.25 million dollar project. Both of these undertaking were
outrageously costly for the time. Massiah was not the first
black to win this award, he was the third. He followed James
A. Pearson of Dayton, Ohio, and James C. Evans of Institute,
West Virginia (Downing, June, 1935, p. 70).

When compared with the total number of graduates for any
single year or when compared with the number of engineering
graduates for a single year, the number of black college
students and black engineering graduates may seem
insignificant. It appears so if numbers are the only
concern. It is necessary to consider the conditions under
which each of the degrees was attained. Until the 1930s,
there was never a year of record in which 20 blacks graduated
from the combined schools of engineering. There were,
however, enough graduates to keep the belief alive that
blacks could compete in the technologies. There may have been
a year or two when the number of blacks approached twenty,
but colleges that admitted blacks have incomplete records or
claim to have been color blind in their selection of
students.

Dennis Harrison, archivist of Case University, admits that "there are no hard figures on minorities graduating from this institution for the years 1900-1930." The Sheffield School at Yale University appears to have fallen prey to the same inability to distinguish its black alumni. Massachusetts Institute of Technology does have a record of its black alumni during this period. There is a record of black participation that dates from the nineteenth century.

A critical look at the discriminatory practices of major colleges during the early twentieth century may shed some light on the extent to which white America went to deny blacks a college education. It may also explain why each small gain in graduation numbers was loudly applauded by the black community.

First, there was the extreme discrimination and often outright denial, regardless of the high school record or character references. Catholic colleges were notorious for their intolerance, and so, with few exceptions, blacks have no early twentieth century record of completion at these schools (Weinberg, 1979, p. 275). Rules and regulations that had never before been applied were formulated and enacted to bar access to black candidates (Weinberg, 1979, p. 275). In a rare admission, Loren Miller, a 1920s black engineering student at the University of Kansas, reported that the "Dean of the Engineering School regularly calls in all colored

engineering students and advises them to get out of his school" (Weinberg, 1979, p. 289).

This was the sort of climate that one might have expected on predominantly white campuses, but there were questionable situations that black students lived with on black campuses as well. Howard University, the yardstick of black educational progress, did not have a black president until 1926 (DuBois, May, 1926, p. 7). This may give the reader a better idea of the restraint under which much of black education labored.

In 1927 the students at Hampton Institute, one of the schools that funnelled students north to accredited schools of engineering, went on strike. Their complaint was that the recently passed Mussenberg bill which required the separation of the races in public halls in Virginia, made the day to day interface with the most of the faculty and the President an uneasy, if not impossible, task. The faculty and staff were predominantly white and in some instances openly declared membership in the Ku Klux Klan. The students were black.

Dr. Gregg, the president of Hampton, also hired former Klan members as faculty, including one who died on the job and was buried in full Klan regalia (Crisis, December, 1927, p. 345). The idea that instructors often serve as role models was lost on this group of students. For calling a strike, 22 members of the Student Committee were expelled.

By the mid-1920s, it was obvious that there would be little substantive help from agencies outside the black community in the effort to produce black technologically oriented graduates. With this realization came a re-examination of the educational stock of the black community. If there was to be a competitive school of engineering that welcomed black applicants Howard University was the logical starting point. As an example of this institution's ability to produce the needed professionals, the years between 1923 and 1928 are particularly important. During that five year period, a total of 586 black medical doctors were produced by the medical schools of America. Of that number, 475 came from the two black medical schools, Howard and Meharry College (Crisis, December, 1929, p. 145). The same type of statistic can be shown for nursing and dentistry. The few black schools offering the professional courses produced far more black graduates than the white schools for any comparable period. It would be the same in engineering, but it would be several years before the figures would bear this out.

The Fight For Howard University's School Of Engineering: L.K. Downing's Crusade

In addition to Hampton and Tuskeegee, two schools heavily financed by northern industrialists, there was another black post secondary institution that survived and

thrived during these difficult times of the early decades of the twentieth century. Howard University, founded in 1867, was to become the premier black institution in America. Supported by an act of Congress, the school attracted a faculty and student body that was competitive, and in many instances, superior to many white post secondary institutions (Downing, 1935, p. 63). In spite of its success in producing a cadre of black professionals, Howard was seen as posing no threat to the entrenched racial separatists who were in Congress. They could vote for appropriations for the black school without offending their constituents "back home" and at the same time declare that they had struck a blow for equal education.

Howard University was able to eliminate all secondary school work on its campus in 1922 and form a new system in which the first two years were called the junior college and the final two years, the senior college. Among the many offerings of this university were engineering and architecture. Engineering courses were introduced in 1908 and a true engineering program was begun in 1910, the first at any black post secondary institution. By 1931 over 30 per cent of all black engineering and architectural students in America attended Howard University (Downing, 1935, p. 63). By 1935, Howard was producing nearly 50 per cent of all of America's black engineers, doctors, lawyers, and Ph.D.s (Williams, 1922, p.157-158).

During the long struggle for fair and equal treatment by
accrediting organizations and engineering societies, black
colleges, in spite of the lack of recognition, continued to
produce young men and women of substance. It became quite
clear that limited admissions to schools of engineering and
the inability of black institutions to enter the ranks of the
"recognized" schools would allow only a fraction of the
deserving students, if the 1900-1930 pattern continued,to
become engineers. In the black community, the drive to
recruit more blacks to schools of engineering continued.
Spearheading the drive was L.K. Downing, acting Dean of the
College of Applied Sciences at Howard University. In a 1933
speech he reminded his audience that over $400,000,000 was
going to be spent by the Public Works Administration of the
National Recovery Act on roads, highways, dams, water
systems, and water supply projects (Crisis, October, p. 231).
He encouraged young people to enroll in Howard's architecture
and engineering courses because the need in the coming decade
would be overwhelming.

The contribution of L.K. Downing goes beyond his
encouragement of the young to become involved in the field of
engineering. He is very likely to be the pivotal person in
the development of the black schools of engineering. During
the thirties, many schools-both black and white-made the
decision to abolish the costly schools of engineering. Dr.

Mordecai Johnson, president of Howard University, considered closing both the architecture and the engineering schools because of the scarcity of funds. In the weeks to follow, Dean Downing showed both his commitment and his eloquence in defense of the schools.

Downing went to great lengths to show that only minimal savings would be realized if Howard was to close its school of engineering. He saw the school as the basis for the development of an appreciation of technology among blacks and a means of elevating blacks to positions of parity within the world of science. While Downing's impassioned plea went to the president of the university, William P. Commady, President of the Engineering society, sent a caring response to the university trustees. Letters were also received from many other interested parties. Among them was a letter from John A. Lankford of the National Technical Association. Lankford reminded the administration of the progress that had been made over the 20 years of the school's existence. In the end, those with vision prevailed, and the administration relented. In the fall of 1985, the Howard University engineering program, then in its seventy-fifth year, celebrated the work of Downing by making this episode in the school's existence the centerpiece of its journal, Diamond Scope. The entire article appears in the appendix (Appendix A).

Hampton Institute

Hampton Institute, scarcely one hundred miles south of
the Nation's capitol, was founded in 1868 and grew to
prominence in the black educational community as the producer
of tradesmen. Auto mechanics, home builders, bricklayers and
carpenters had seen trained there since its founding. By
1927, the Trade School of Hampton Institute offered courses
in agriculture, agricultural engineering, agronomy, animal
husbandry, biology, and building construction. The
curriculum of the building construction course included
architectural drawing, plans and working drawing, and
structural design. By 1939, they had added applied
mechanics, principles of architecture, strength of materials
I & II, and general physics. All this was included in a
four-year Bachelor's program of building construction, not
architecture or engineering.

In 1942, under the Directorship of George W. Davis, the
Armstrong-Slater Trade SChool of Hampton Institute proclaimed
two four-year courses in Architectural Engineering and
Architectural Design. For the Design curriculum, the Hampton
catalog of 1942-43 read as follows:

> It is the aim of this course to train creative
> architectural designers who will have the necessary
> preparation in engineering, professional procedure,
> business fundamentals, and cultural background to
> qualify them to meet the requirements of state
> examining boards for certification as architects.

In 1942 when Davis contemplated this move, Virginia was still
very much a southern state.

For the engineering course the catalog read:

> The training fits graduates to employ, organize,
> and direct intelligently the specialties required
> in modern building projects. The intensive
> instruction in the engineering aspects of
> architecture, combined with a cultural background,
> should prepare the graduate to be a designer of
> structures, field superintendent of construction,
> building contractor, and should prepare him to meet
> the educational requirements of state examining
> boards in structural engineering and various
> categories of civil service examinations.

Like Howard University, Hampton was preparing to be a factor in the coming wartime press for skilled personnel. By pointing the instruction toward the state requirement, the school was preparing their students for acceptance under the new Fair Employment Practices Commission guidelines introduced by President Roosevelt in 1941 (Morris, 1975, p. 221). Hampton presented the opportunity at a reasonable cost, $294.00 per year (Jenkins, January, 1940, p. 131). With this they hoped- unlike in the engineering societies- their graduates would be judged on the merit of their ability and not on their racial differences.

On January 22, 1945, the first architectural engineering graduate of Hampton Institute, Cecil Gilmore Johnson, received his diploma. Johnson was probably unaware that as late as 1945, only three other black schools had ever graduated an engineer. He was followed by thirty-two additional graduates by the year 1950. Until 1948 the Hampton graduation program carried the hometowns of graduates, and from that it can be gleaned that

of the thirteen young men who graduated prior to 1948, ten were from southern cities. Hampton's timely upgrade of their curriculum offerings to include engineering may have made the difference in the lives of these architects.

During the forties when George Davis sought to bring his institution into the mainstream of technological education by opening an engineering school at Hampton, he corresponded with many respected educators. He sent to established schools for information concerning their enrollments, per student costs, and the cost of academic support for their respective programs. Downing, at Howard was one of the first to reply (Appendix B). Some of the correspondence has been preserved by the university archivist. Among them are Davis' letter from Ovid Eschback of Northwestern University (Appendix C). It represents clear evidence of the tremendous capital outlay that was necessary to establish the type of facility he sought. The $600.00 annual expense allotted for the teaching of each student enrolled in engineering at Northwestern was more than double the annual tuition at Hampton.

In the letter from P.V. Jewell of Tennessee A&T State College, one sees the feelings of blacks about the likelihood of governmental aid to black schools of engineering. Jewell also mentions the limited opportunities for blacks in union apprenticeships (Appendix D). Together, these letters between black and white educators bring into sharp focus the

problem of the time. The high costs coupled with the unlikely circumstances of government aid made the prospect ofadditional black engineering schools quite bleak.

But Davis' spirits were raised when he received a letter from Ralph E. Winslow, head of the Department of Architecture at Rensselaer Polytechnic Institute of Troy, New York (Appendix E). Winslow held out the offer for Hampton to join in a 3+2 program in which, Hampton, like the predominantly white Trinity College, could give its students three years of pre-technical training and then have them transfer to Rensselaer for their final two years of training (Appendix E). This offer was a first for a black school but other predominantly white institutions, including Rutgers University and Williams College sending their students to MIT, had participated in similar arrangements for a number of years.

In the forties, Davis at Hampton like Downing at Howard, a decade before, was finding new challenges in areas unaccustomed to black participation. This change of direction was helped by the international conflict threatening the free world. Now America sought skilled hands in every segment of the population and that meant blacks as well as whites.

Government support went to institutions that met certain criteria as centers for teaching civilians condensed courses in architecture, engineering drawing, tool engineering,

chemistry of power explosives, and management defense training. This was the Engineering Defense Training Program under the auspices of the United States Office of Education. Of the ninety-one schools designated to participate in this program, Howard University was the first black school, starting in 1941 (Crisis, March, 1941 p. 67). It was closely followed later that same year by Hampton Institute (Crisis, January, 1943, p. 3). Both schools graduated many minorities who went on to assume government civil service positions of junior draftsmen and many different types of technicians (Crisis, March,1941, p.67). Though the positions did not display the full range of their potential, it did force whites to work side by side with blacks and to see them as productive human beings.

North Carolina Agricultural And Technical College

During the years 1930-1935, the economic impact of the Depression on blacks and whites was tremendously devastating. Jobs were scarce in all regions of the country, but in the south blacks held out little hope of deliverance. Ironically, it is here that gains would have to be made if there were going to be black engineers.

In 1930 North Carolina Agricultural and Technical College (A&T) of Greensboro, North Carolina began preparing black engineers, They were one of two schools in that state

producing engineers at the time and, needless to say, the only one open to black applicants.

North Carolina Agricultural and Technical College was founded in 1891 by an act of the state legislature as a land grant college. Two years earlier the state had founded the North Carolina Agricultural and Mechanical College as the state institution for the preparation of white engineers but had met opposition when it applied for funding under the Morrill Act. This piece of legislation declared that states "in which a distinction of race and color are made in the admission of students could qualify for federal aid only upon providing a proportionate share of such finds for the training of Negro youth."

This stipulation, rather than the wish to educate young blacks, lies at the base of the inauguration of the effort and final acceptance of the idea of the college. The college was begun hastily and for the first two years was sited on the campus of Shaw University in Raleigh, North Carolina. Two years later it was moved to Greensboro and assumed its present name in 1915.

North Carolina A&T was accredited by the State Department of Public Instruction in 1927 making it possible for graduates to receive a teaching certificate and to qualify for further study. But there were no plans to start an engineering department at the school. Numerous requests for funding were met with usual denials. Among the standard

denials that were often used were there are no funds for the equipment or teaching personnel, there is too much opposition by organized labor to the inclusion of such courses in publicly funded black institutions, to invest in black schools of engineering would be a waste of resources since there were very few positions in the field that would be available to blacks.

With heavy investments in technical courses, math, laboratory sciences, and associated subjects, the basic necessities for the establishment of an engineering curriculum were present with or without additional state funding. With this, the school put into place a program and began to graduate engineers in 1939. This date is significant since, their accreditation by the Association of Collegiate Schools of Architecture would not come for more than a decade.

North Carolina A&T, like Howard University's School of Engineering, was a non-school as far as the college directories were concerned. During the thirties and well into the forties, no black school of engineering south of Washington, D.C. was listed.

It is easy to regard this institution as only providing increased access for blacks and to ignore the other advantages that it brought. Often lost is the financial and geographical leverage that this school offered its interested students. First, as late as 1939, the tuition was decidedly

lower than those of surrounding schools. Howard's was a moderate $150.00 per year while A&T boasted a tuition rate of only $37.00 per year (Hurt, 1939, p. 327). Yet this rate of tuition proved exorbitant, at times, since the two schools appealed to entirely different clientele. Howard drew was from a more urban, more economically able strata of black society while the North Carolina school drew from a poorer, more rural population.

Add to this the fact that the North Carolina school was in the Deep South and the access problem, in terms of distance traveled, was lessened. This meant that in addition to all other advantages, black children could point their talents toward a goal with greater assurance that their hopes and aspirations would reach fruition. This school also provided a wholesome on-campus social life, a rare phenomenon for any black engineering student. There is little wonder that, to this day, this school continues to produce a significant percentage of all black engineers.

Howard University, North Carolina Agricultural and Technical College, and Hampton Institute, all southern schools, were the first black schools to produce engineers. Each school can boast of its unique contributions. Howard, that their program predates fifty per cent of all engineering programs in America and that their graduates account for a significant percentage of all black engineers in America and the world.

Hampton can boast of the many black architects and architectural firms in which their graduates are involved and that their graduates are part of the effort to design and build a new south. The North Carolina school, proud of its historical contributions, can now be viewed as the school that produces the most black engineers.

Today much of the hardship that accompanied these advances are forgotten or, like many other facts, have been submerged. Fortunately, there are those who can tell young black students of their struggles in an effort to inspire those students to meet today's challenge and, as they did, overcome it. Many such stories can be found and in the following chapter, three will be presented. Two were chosen because of the alma maters of the subjects, Hampton and North Carolina Agricultural and Technmical College. The third because his feats of excellence are a five decade success story; the kind most black students may never hear.

CHAPTER V

THREE BLACK ENGINEERS

This chapter is devoted to three men who overcame institutional obstacles to become contributing members of the engineering and technological fields. The story of each is an interesting comment on the opportunities that existed during the first half of the twentieth century for blacks who wished to be a part of the technological world. If taken separately, they show the perseverance of three individuals who were determined to find a contributing role in this society. But when we consider that these must have been men of exceptional perseverance, we must also wonder about the number of would be contributors who refused to humiliated by society's denials.

The three men are Gordon Grady, Archie Alexander, and Henry Livas. Grady's research played a role in the stabilization of heat in the first moon orbiter. Alexander was the first nationally acclaimed black civil engineer to win high praise for his work throughout the nation. Livas formed the first architectural firm in the southern United States, a firm that still exists.

These stories are most atypical because they tell of black engineers who were able to overcome the many barriers of their society. These stories are atypical because they tell of black success. More often than not, blacks wishing to participate in the technologies were dissuaded.

Gordon Grady, Engineer

Gordon Grady is important because he typifies the many
blacks who overcame the denials of a segregated society. His
story is the story of an individual assuming an ever-
expanding role throughout his professional career.

In a long and thorough conversation with me, Mr. Grady
relived the days immediately following his graduation from
college, presenting them in the light of the new racial co-
existence today. Grady was a 1934 public school product of
West Southern Pines High School, North Carolina. The fact
that he had attended school in North Carolina meant that he
knew of the options at North Carolina Agricultural and
Technical College, and that he could stay within his home
state to attend college. This, plus the very low tuition,
made the North Carolina school his first and only choice.
Grady arrived at the school with insufficient funds but was
granted a scholarship that required he work as kitchen help
throughout his school career.

Gordon Grady graduated in 1940 with a Bachelor of
Science degree in electrical engineering. He was among the
first students to graduate from this school with such a
degree; A&T, as it is affectionately called, was an almost
forgotten engineering school in 1940. As a hedge against the
realities of the work place, he took the necessary courses
for a North Carolina teaching certificate.

The engineering positions that may have been available to white graduates of other schools were not open, in many cases, to graduates of black institutions, especially in the South. As a result, Gordon Grady went home to Southern Pines to teach math, physics, and chemistry in his former high school.

After three years in the public school system of his hometown, Grady took advantage of the war and the need for skilled workmen to look for other employment. His next job took him to Norfolk, Virginia, the Norfolk Navy Yard.

For three years Gordon Grady worked at the Norfolk installation for as a third class electrician with little hope of advancement, in spite of his preparation. If there was to be any solace gathered from this three year sojourn, it was that his pay went from $85.00 per month as a North Carolina school teacher to $72.00 per week as a navy yard electrician. Concurrently, he taught Marine Electricity to many of the trainees and helpers from the navy yard in a vocational school program in Norfolk.

During the forties, Grady held several jobs, all related to his area of expertise, but none that gave him the title of engineer with the associated responsibilities. He worked at Radio Corporation of America (RCA) in Camden, New Jersey, as a technician, then at ITE Circuit Breaker Company as a technician. Each meant an increase in pay, but never an increase in the scope of responsibility. He then worked for

several small companies that needed an engineer in order to become eligible for certain government contracts. Most of these assignments were those of a high grade technician but the experience and exposure greatly improved his practical engineering knowledge. The assignments covered areas in electrical, mechanical and chemical engineering.

In 1951, in response to a want-ad announcing openings for engineers, Grady applied for an opening at the Honeywell plant in Philadelphia. In his phone conversation with the personnel manager he assumed the job would be his since his experience dovetailed with the job requirements. However, when he arrived for the interview there were other job applicants seated in the waiting room. Soon the personnel manager came out to page Mr. Gordon Grady, engineering applicant. As he eyed the roomful of men it became increasingly obvious that the applicant he sought was the lone black man in the group. In the interview that followed, Grady was told that a young man had come in "just a moment ago" with qualifications that exceeded his and that that young man-not Grady-would be given the job.

The personnel office was glass-fronted, allowing a person passing in the hall to look into the office. As Grady left this appointment he looked back with disgust at the personnel manager, and as he did so, he saw his resume thrown into the trash can. This was 1951, this man had an engineering degree, this was Philadelphia. While at RCA,

Grady was fortunate to find a manager that believed he was qualified to be hired as an engineer. He arranged interviews for him in various departments and fortunately one manager in test engineering accepted him for an engineering position. Unfortunately, he was denied the position because the remaining engineers threatened to walk out if he was hired into their area.

These two episodes point out more clearly than do statistics the difficulties that blacks faced seeking entry into this field. It may also help to explain the high level of frustration common among black college trained people during this time period. That feeling of complete frustration and impotency remains a great part of the black legacy to this day.

It would be fourteen years after graduating from an engineering program before Gordon Grady would be hired as an engineer. In 1954 Gordon Grady was hired as an electronic engineer at the United States Naval Material Center in Philadelphia as an electronic engineer. By then he was thirty-eight years old, married, and terribly disillusioned by the treatment he had received at the hands of his countrymen. From 1954 to 1962, Grady turned all of his collected abilities toward proving that as a black engineer his contributions could and should be as significant and as valued as any employee's at this naval installation.

As a result of his dogged determination, he rose through the ranks from electronic engineer in 1954 to electronic scientist and then in 1959 to Supervisor, Research Engineer. This job and the manner in which he was to target his talents did more to restore his self-respect and lost hope than any of the many events that were to follow.

In 1955, a year after the Brown vs. Board of Education case, Gordon Grady, once a student at the prestigious Moore Graduate School of Engineering reentered the University of Pennsylvania as a graduate student, again in the engineering department. Three years later, in 1958, he graduated with a Master's Degree in electrical engineering. His success at the University of Pennsylvania came at the same time as his success at the Naval Air Material Center. By 1958, Grady, with little help from others, rebuilt his professional life.

Looking only at his entry into the Moore School of Engineering at the University of Pennsylvania, it seems reasonable to ask, "On what basis was he allowc Company, his professional life would have been a success, but his involvement with the Institute of Environmental Science demonstrates the overall commitment with which Grady approached his profession. The Institute is a professional society of engineers, scientists, and educators dedicated to the researching, simulating, testing, and teaching of the environments of the earth and space, for the betterment of

mankind and the advancement of industry, education, and science. There were twenty-six chapters throughout the country when Grady joined in 1962 while working in King of Prussia, Pennsylvania.

From 1962 to 1969, Grady served with distinction as a member of the Mid-Atlantic chapter of this organization. He received commendations from the national office in 1965-1966, the same year that his status rose from member to senior member, a year prior to his appointment to fill and unexpired term as chapter director.

The following year he was voted in by the membership and served a full term. Undoubtedly, this sounds much like the story of any interested professional working with his peers, hidden is the tremendous burden that Grady carried as one of less than ten black members of this organization that numbered more than 1,600.

When he represented his chapter at the 1966-67 Annual Technical meeting in St. Louis as a panel member, he saw no other black participant. It is easy to forget that this was 1967 and black engineers with less certainty of their identities and self worth were having their own problems adjusting to the overwhelmingly white work place. Grady was beyond that. When he transferred to the Boston chapter in 1970, he became the Local Publicity Chairperson for the chapter. In 1971, he became the National Publicity Chairman, in 1973 he was voted Vice President of the Boston Chapter and

in 1974 he received two honors: he was voted the President of the Boston Chapter of the Institute of Environmental Sciences, as well as a National Director.

Beyond 1974, he worked as a national officer of the organization. First as the Vice President of Region I and then as Vice President - Membership. In 1980, his senior membership status was that of "Fellow". In 1982, two years before his retirement, his status was change to `Retired Fellow' with life membership. Surely, if any man made a mockery of the system that had deprived both him and other blacks form reaching their full potentials, Gordon Grady is such a man.

In situations like this the question invariably arises, "What might he have accomplished had there been no barriers?" That question is best answered by observing those who have had the opportunities without the restrictions. That blacks have not made the volume of contributions their racial presence in this society might suggest, says more about the world in which they labored than it does about their abilities in the fields of technology. Gordon Grady is now at peace with his accomplishments and his life work, but there are those who graduated a year or two after him, from colleges no longer remembered, who never reached Philadelphia or Lynn, Massachusetts. For them and for those who were discouraged long before they started, the country continues to pay a price.

Archie Alexander, Alexander The Great

Archie Alexander is important to all students of engineering. His work changed the face of the nation's capitol, his accomplishments changed the nation's view of black technological contributions and his memory can serve to inspire generations of engineers to come.

Much of Alexander's work came at a time when blacks needed a true contributor to lend meaning to their efforts. And though through the forties black engineering hopefuls were provided with new opportunities, it was Alexander who made a nation examine its conscience and its policies.

There are many stories that must be told to convey the true mood of the time and the story of Archie Alexander is certainly one of those. It is particularly important if one is to examine both the promise and the frustration of this decade. The information for the Archie Alexander story has come from an article in the Palimpset, the journal of the Iowa State Historical Department/Office of the State Historical Society 1985.

In the annals of black engineering, there is one little known and seldom told story that illustrates up the capacity and commitment of one man who overcame tremendous odds to excel in his field. Born in Ottumwa, Iowa, Archie Alphonso Alexander grew to manhood in a state where only a handful of black citizens resided. He attended the schools in his home state and entered the University of Iowa in 1908. "Alexander

the Great," as he was known by football fans of that era, graduated in 1912 after spending his tenure as the lone black in the University's school of engineering.

He entered a world in which his chances of success were minimal. He had been warned by the Dean of the engineering school that, "a Negro could not hope to succeed as an engineer." Upon his graduation, the city of Des Moines turned down his application for employment, and he was forced to accept a twenty-five cent per hour laborer's job with the Marsh Engineering Company of Des Moines. Two years later, he left Marsh to establish his own company. He was then making $70.00 per week.

While working at Marsh, he met a white engineer named George F. Higbee and in 1917 they formed a partnership. He changed the name of his firm from A.A. Alexander to Alexander and Higbee. The partnership endured and prospered until the death of Higbee in 1925. For the next four years, Alexander continued the business alone. It was during this period that he received several large contracts for construction projects from his alma mater. They included the new heating plant, built in 1924, the new power plant, built in 1926, and the remarkable Under-the-Iowa River tunnel system, built in 1928.

Then in 1929, Maurice A. Repass, another white engineer and former classmate, joined the firm and once again the firm was renamed, this time Alexander and Repass. Prior to coming to the firm, Repass had served as an instructor in the

Department of Hydraulics and Mechanics at Iowa. The firm continued to prosper and by 1930 the company had offices in Des Moines and Washington, D.C.

Alexander was a heavy contributor to the efforts of the Republican party and as a result was "well connected" in terms of political muscle when bidding for state wide or federal contracts. Over the years, the firm bid on and won contracts in all 48 states. By 1950, they had over three hundred major projects to their credit, many of them completed during the forties. Perhaps the most prominent were those completed in the nation's capital, the Tidal Basin Bridge and Seawall, the K Street elevated highway and underpass from Key Bridge to 27th Street, and the Whitehurst Freeway along the Potomac River which carried the traffic around Georgetown.

But custom was not to be forgotten and Washington, D.C. was not about to abandon its long held racist flavor simply because a black contractor was in town. The city demanded that the toilet facilities be segregated. In an effort to evade the rule, Alexander labeled the facilities skilled and non-skilled, rather than black and white. In the end it had the same effect since in his crew of 200 workmen, only five of the skilled workers were black. It is ironic that Alexander, one of the nation's leading structural engineers,

could not hire skilled black workmen in the nation's capital.
Union restrictions and the relentless union stand against
black membership during the forties meant that, regardless of
their persuasion, contractors were forced to adhere to the
union hiring policy.

At age sixty-four, a prominent Republican for many
years, Alexander was appointed Governor of the Virgin
Islands, only the second black to hold such a position.
Alexander's story is a rare one but one that far too often is
submerged. His success could have served as an inspiration
for decades of black engineering hopefuls but few ever knew
of his immense accomplishments. On January 4, 1958,
Alexander died leaving portions of his wealth to his alma
mater,the University of Iowa, Tuskeegee Institute, and Howard
University for engineering scholarships.

> "Thus passed Archie Alphonso Alexander of Ottumwa
> and Des Moines, a man who, in not heeding the
> advice of his college President, made the most of
> his education" (Wynes, 1958,p. 79-86).

Henry L. Livas

Another black architect who could serve as a role model
for any young person interested in one of the technologies
was Henry L. Livas. Henry Livas was born at the time when
the outlook for black Americans interested in the
technologies was extremely bleak. In spite of those limited
opportunities, Henry Livas persevered to become a force in
the technologies of the day. He is included because he

demonstrates the unwillingness of many blacks to succumb to the racist climate of pre-1950 America.

Livas was educated in the public schools of Paris, Kentucky. In 1931 Livas left his hometown to attend Hampton Institute. Henry Livas graduated from Hampton in 1935 from a building construction curriculum. That curriculum included such classes as principles of architecture, strength of materials, architectural drawing, plans and working drawings, structural design, applied mechanics and physics. Hampton did not begin its engineering sequence until 1942, but many of the courses were in place during the years of Livas' attendance.

Shortly after graduation, Livas applied, sight unseen, for a position with the Ford Motor Company of Detroit, Michigan. His resume had won him the job, but upon his arrival he was refused the position. Livas was black, the position was intended for a white applicant.

Undaunted, Livas went back to Virginia to find work as a draftsman with the Union Realty & Insurance Company and the Michael Baker Company, where he worked until 1942. In 1942 he enrolled at Wayne State University but after one semester Livas was unable to continue. In 1945 he was awarded a graduate stipend scholarship at Penn State University. He graduated in 1945 with a master's degree in Architectural Engineering.

Equipped with the necessary credentials, Henry Livas now began a two pronged career as both a commercial architect and a teacher. As a commercial architect Henry Livas became the first black licensed architect in the state of Virginia and founding in 1948, the firm of Livas and Associates in. It, too, was the first black architectural firm in that state. The firm was headquartered in Hampton, Virginia with additional offices in Norfolk. Throughout his career, Livas was noted for the encouragement and guidance he gave to his students. As a result, all of the "associates" in his firm were his former students.

As a teacher of young aspirants he served as the director of Mechanical Arts at Arkansas Agricultural, Mechanical, and Normal College and then returned to his alma mater, Hampton, as a professor of Architecture and Architectural Engineering. Livas taught and worked as an architect for more than thirty years. He was licensed in at least six states and the District of Columbia. He planned many churches and office buildings throughout Virginia and North Carolina. He was also instrumental in revamping the face of the Hampton campus. Those building designs for which he is best remembered are The Hampton Roads Boys Club of Newport News, Virginia, the Bay Shore Auditorium, Bay Shore Beach, Virginia, the Tyne Street Baptist Church, Suffolk,

Virginia, Faculty Housing at Langston University, and Community Hospital, in Suffolk, Virginia.

He was a member of the American Institute of Architects, of which he had been national president and editor of their journal and a member of the American Society of Engineering Education. He was a member of the Association of Collegiate Schools of Architecture; Sigma Lambda Chi, a honorary building construction fraternity; the Quarter Century Club of Hampton Institute; and the NASA-ASSEE System Design Team Fellowships.

Henry Livas died June 10, 1979, but his reputation as a designer is continued by the firm, The Livas Design Group. The firm continues to influences the face of the Hampton campus. Included in the management are at least three of his former students: William Milligan, Albert Walker and the present head of Hampton's School of Architecture, John Spencer. Livas' son has continued the family technical expertise. He, too, is an engineer.

These stories of black engineering successes are included because these men formed the thread of hope that other black engineering hopefuls held on to between 1930 and 1950. Each, at sometime in his career, suffered tremendous defeats because of racial bigotry, each knew severe job discrimination, and each must have realize very early in their careers that the dream they held was a solitary dream,

not one held by many. In each instance there are powerful
lessons that can be learned.

The first is excellence. Here are three men who strove
for excellence in the in craft. Even in the midst of
America's twentieth century racial climate they excelled.
Perseverance, tenacity, belief in oneself, and in the end ,
the willingness to share their knowledge with those who
followed are all powerful lessons to be gleaned from the
lives of Grady, Livas, and Alexander. Equally important is
the fact that these three men form a continuous chain of
contributions from 1906 to the present and many of those
contributions remain as significant parts of America's whole.

There is also the lessons of confidence that one teaches
when he enters a new region. Each of these men compiled a
great list of firsts for men of color. These are all lessons
that young people, both black and white, must have if they
are to make similar contributions.

CHAPTER VI

CONCLUSIONS AND IMPLICATIONS

Conclusions

The conclusions reached after reviewing the eighty-five year span that this investigation covers reveals a persistent black population striving for representation in the engineering and technological arena of this country. Though there are times when economic peril, migratory disruption, the tyranny of the work place, and racism imperil that striving, the will to succeed prevails.

This recounting uncovers incidents, papers, and converging pressures that served, at times, to inhibit, the progress of black higher education in general and engineering and technological higher education in particular. On other occasions, those same pressures served to stir the black community to action.

Over the eighty-five year span of this research, it is obvious that there is a glaring disparity between the representation of blacks in the American population and the number of black Americans in these specialized areas. This research stands not as an excuse for this disparity, rather, it serves to explain the patterns of American higher education and of the greater society that aided in producing this disparity.

This research leads to the following conclusions.

1. There exists a record of the contributions of black Americans in the areas of engineering, technology, and other improvements in the general welfare of the country. This record is continuous throughout the period covered in this paper. Yet, these contributions are, for the most part, missing from the traditional sources for our understanding of American history, and this practice of overlooking, ignoring, or forgetting these contributions has effectively denied millions of Americans a true sense of their heritage.

2. The engineering profession evolved, during the 19th century, from a trade where apprentices and tinkers could learn on the job to a state where formal training and advanced education were essential to certification. In this process, black Americans were systematically subjected to a number of practices of exclusion from such training and education that effectively prevented them from entering into the engineering and technological field. The consequence of these practices include denying these Americans the status and professional opportunity that their white contemporaries had, while at the same time denying their country the chance to grow and benefit from their intelligence and invention.

3. Institutions of higher education, both north and south, engaged in exclusionary practices: These ranged from a refusal of on-campus housing, exclusion from campus activities and groups, and from academic and professional

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organizations, and a general lack of institutional support, to (particularly in the south) outright refusal of admission.

4. In the south there was an unwillingness in some of the states to provide substantial post secondary technical education throughout this period. The founding of North Carolina Agricultural and Technical College (NCA&T) is an example of the form of this exclusion. NCA&T was founded by the state as a condition for receiving funds for its segregated institution, North Carolina Agricultural and Mechanical University (NCA&M), under the terms of the Morrill Act. NCA&M was an engineering school that assured the state's white students of an engineering education within the state's boundaries; the black school did not become an engineering school until four decades after its founding.

5. Many states in the south employed voucher systems that forced blacks to travel northward to do advanced work in many fields, and particularly for technical educations. The complexity of the voucher system, devised to preserve the segregated status of publicly funded colleges, is interpreted as an attempt to dissuade rather than encourage black participation at all levels of the educational system. This contributed to the paucity of black Americans with appropriate engineering and technological degrees during this period.

6. The apparent manipulation of black leaders by public officials at all levels was another strategy of exclusion and

oppression during this period. Booker T. Washington is cited as an example of this tactic; Washington's acceptance and elevation by men of power gave him leadership among black Americans. At the same time, his conservative position on social issues, especially on the role and form of education for blacks, served to diffuse and even discredit the protests and proposals from other sectors of the black community. This anointment by the powerful served notice that there was a mode of conduct and a level of aspiration that would be rewarded. Conversely, there were modes of conduct and levels of aspiration that would be ignored.

Implications Of This Study

This research covers a period of time that ended forty years ago but the aftershocks of the material are still to be felt throughout the nation, and more especially within the small technologically oriented community of American industry. The implications that one may draw from this exercise are many, but they are determined by the view one takes of the evidence that has been presented. If one sees all of this as a benign confluence of events and if you see no evil intent, then the likelihood is that one will see black Americans as being justly denied the right to full participation in the mainstream of American life. If, on the other hand, you take the position that a concerted effort was made to deny blacks their constitutional guarantees of the

right to life, liberty, and the pursuit of happiness, then the plot that worked with remarkable success has deprived black citizens far beyond the span of this paper.

This second position leads to the belief that the logical extension of this denial was the refusal by the states to provide equal educational facilities for blacks. This denial was all inclusive; it went from the elementary grades through post secondary options. When the courts decreed and the media affirmed that the treatment that blacks received was lawful it was eagerly accepted. The resulting anger and mistrust of these early decisions still divide the races.

Whether one takes the first or second view of the events or any of the many positions that lie between the poles, the legacy of this period has meant that substantial ground has been lost in the technological marketplace by not only black citizens but the country as a whole. In the last thirty-five years attempts have been made to correct the damages done, but the effort has come at a time when most of the educationally oppressed have lost faith in the system. Consequently, the task has been made even more formidable by the long neglect.

We now face a time when no contribution to the general welfare can be shunned, for we are slipping from our national leadership position in the world of technology. Add to that the great influx of foreign immigrants of every hue and

dialect and we see that the need to promote tolerance is more critical now than ever. As Americans, we are a people for whom intolerance has been a way of life, and now we are forced, by numbers and a fear of economic failure, to adopt a new and radically different policy toward other peoples and races.

The demographics of American society, more than the generosity of love and charity, are driving this new wave of acceptance. It is the industrialist, more than the religious community that has awakened this new sense of fair play. It now preaches a sermon of plurality and coexistence.

As mentioned in the conclusions, the threat of and participation in two wars was not enough to break the barriers to equal higher education. The potential loss of leadership and revenues appear to have superior persuasive powers.

As a result, colleges and universities have become more accepting of students who do not fit the established mold and who are quite different from their customary alumni. Programs in areas of greatest national need are now commonplace on campuses throughout the country. This is true in every region of the country. Programs in engineering with overt overtures to black students can be found as readily in Florida as in New York.

It is reasonable to assume that there would have been no change in attitude had our position of leadership not been threatened or if our ability to prosper had continued. Black Americans see this as clearly as their white fellow citizens and though they are beginning to respond to the opportunities, they approach these opportunities with full knowledge that theirs is something less than a full welcome. The years of segregation and educational denial have left a national market that must employ them, skeptical of their ability to produce the same quality of work as their white co-worker.

If one is searching for the downside of the new liberalism, it is to be found in the inability of some citizens to abandon the long cultivated view of the black American. It is difficult to abandon those deeply held stereotypes of the "shiftless lout" who now claims to be the equal of white engineers. It is equally difficult for many black Americans to accept this new opportunity because they, too, have come to believe that they would be over stepping their bounds if they were to compete with whites for traditional "white" jobs. In this manner the country as a whole suffers from the early mismanagement of its educational and social obligations to a segment of its population.

There is no evidence that additional technical input would not have been of benefit to America, the South, or the individual enterprises. Truly, the eighty five year span of

this investigation shows that there was never an overabundance of engineers or technical expertise. This was a time when America could have used the inventiveness of all of its citizens, but the educational plan of the nation excluded a large segment of the population, thereby limiting the volume of black input and the number of those blacks who had access to the system. It is fair to say that any contributions from blacks was unwanted.

For Americans, starting with Thomas Jefferson, who over the years have come to know and respect the relationship between democracy, citizenship, and popular education, this is a story of institutional tyranny. Jefferson argued before the Virginia Legislature in 1787 for the provision of a popular education system that offered entry level education to every white child of the Commonwealth and then the opportunity for the brightest male students to go on as far as their talents would allow including college opportunities. This, if enacted, would have meant that 40 per cent of the state's juvenile population, the children of slaves were not accounted for (Anderson, 1988, p. 1) Jefferson's plea was both sexist and racist, but in 1787, he was able to hold his audience and attempt to make his case.

This story begins nearly a hundred years later and tells of many of the same people being denied the basic rights of a democracy. It is obvious that there exists this bond between education and citizenship and that any abridgement of the

first means that one's participation in the second, the democratic process, is severely limited.

As we look back with the advantage of time and the wisdom wrought of the struggle, it is easy to see that the policies and practices of the late nineteenth and early twentieth centuries were poorly formulated. The blame for those policies can be placed at many doors but placing of blame should now become secondary to finding a remedy for the problem. I believe that the climb toward equal technological and engineering education has begun but the distance that we must go in search of parity means that this will be a long and arduous task to accomplish.

APPENDIX A
DIAMOND SCOPE, JOURNAL OF HOWARD UNIVERSITY SCHOOL OF ENGINEERING, FALL, 1985

Diamond Scope

75 Years of Engineering Education Excellence

SCHOOL OF ENGINEERING   HOWARD UNIVERSITY   Fall '85

A Prologue

A little more than 50 years ago, facing a climate of economic austerity, many colleges and universities were dismantling their engineering curricula. Nowhere were these pressures felt more strongly than at Howard, when in 1933, the Howard University Board of Trustees approved a recommendation abolishing courses in Architecture, Electrical, Civil and Mechanical Engineering at the end of the 1933-34 academic year.

Dr. Lewis King Downing, then head of the Department of Architecture and Engineering under the auspices of the School of Applied Sciences, quickly dispatched a letter to Dr. Mordecai Johnson, president of Howard University, to protest this edict. The first point in Downing's letter was the fact that this divestiture would result in best, in negligible savings to the University.

This argument, however, was only the tip of the iceberg. Fiscal loss could never touch the heart of the matter. And Dean Downing knew the heart of the matter with a certainty. What Downing hoped to maintain had a greater value than could be monetarily assigned — what he was defending was the conservation of the future of many individuals, and even, as he saw it, the future of an entire people. In his letter he stated, "Education today must be direct, compact, and, while never brief, should be very practical to be of future value. Law, Engineering, Medicine and Architecture are consistent with this principle. No race of people in America is more economically barred than the Negro." He declared that there was a "much needed development among our race of a greater appreciation for technical work and its services to man in the establishment of a people upon a sound economic basis." Nor did he limit his vision — his appeal was turned. "No person of reasonable intelligence and judgement can discount the work of the engineer and architect in present-day civilization... the work of the scientist comes first...

Inspiration begets boldness. Downing's vision for the future of blacks in engineering and architectural professions gave him the audacity not only to argue for continuation of these programs, but to assert that their significance warranted the creation of a separate School of Engineering and Architecture."

To Downing's voice was added that of William P. Cannady, president of the Howard University Engineering Society, who, in a measured but impassioned letter to the Trustees, wrote that "the complete loss in the final analysis will be greater than any immediate saving." The fight to retain engineering programs was joined by the National Technical Association. Mr. John A. Lankford of the national NTA forwarded to the H.U. administration the findings of a NTA committee which strongly recommended continuing these programs, citing the fact that "during the past 21 years... the race has been educated to the possibilities of these professions... industrial leaders have learned of the technical capabilities of the Negro..." and questioning, "Is it good business to throw away such an investment that has proved successful?"

As we know, Engineering and Architecture not only won a reprieve from extinction, but Dean Downing's faith was validated — in 1934 the School of Engineering and Architecture was established as a separate school in recognition of the distinct importance of these professions.

Thus, a little more than 25 years later, in 1960, Downing appointed a committee chaired by Howard H. Mackey to plan for the 50th anniversary of the school that was almost abolished. The committee included Stephen S. Davis, Addison E. Richmond, Walter T. Daniels, Ernest R. Welch, James Webster, Darnley E. Howard, Leon Brown, Leroy J.H. Brown, Arthur F. Moore, Jr., James Overby, and Frederick E. Wilkinson. On the occasion of the 50th anniversary, however, on June 5, 1961, plaques were presented to the following faculty members for distinguished service: Lewis K. Downing (Civil-40)

(Architecture-40 years), Darnley Howard (Mechanical-35 years), Ernest R. Welch (Electrical-35 years) and Addison E. Richmond (Civil-30 years). Mr. F.D. Wilkinson, administrative assistant, was honored for writing the history of the school, *Fifty Years of Engineering and Architecture at Howard University*.

The gift of time has wrought many changes in the School, including new degree programs and expanded research activities. And, of course, the challenge of preserving the School's historical mission, has passed to another generation. Among our retired faculty, those who still inspire us with their interest in the school's welfare are professors emeritus Walter T. Daniels, Addison E. Richmond, James Webster, Francis Steele, and Raymond Jones. Death has also diminished our ranks — we remember with affection the gifts of those who enriched the school, Lewis K. Downing, Stephen S. Davis, Priscilla S. Gray, Ernest R. Welch, Clifton B. Samuels, William Taylor and Lee J. Purnell.

Dean M. Lucius Walker, has rightly stated that "we owe a debt of gratitude to the School's pioneers through whose lifelong commitment, the School survived many perilous moments in its history." Thanks to their faith, persistence, and vision, we are now observing our Diamond Jubilee and can plan to leave a legacy for those who will celebrate the centennial of Engineering Education at Howard University in the year 2000.

AN INFORMATION SHEET FROM L.K. DOWNING OF HOWARD UNIVERSITY TO GEORGE DAVIS, HAMPTON INSTITUTE FEBRUARY 28, 1944

HAMPTON INSTITUTE
HAMPTON, VIRGINIA

To: Howard University   February 28, 1944

Gentlemen:

Please furnish us with the following information:

DEPARTMENT	VALUE OF LAB. EQUIP.	OTHER EQUIP. SUCH AS PHYSICS, CHEM., ETC.	VALUE OF BUILDINGS	OTHER ITEMS	ENROLL-MENT
Architecture	$5,800.00				17
Civil Engineering	15,600.00				28
Electrical Eng.	22,100.00				37
Mechanical Eng.	28,900.00				41
Physics		$22,200.00			
Chemistry		208,000.00			
Mathematics		1,660.00			
Engineering & Arch. Building			$25,000.00		
Thirkield (Part)			10,400.00		
Clarke E. (Part)			23,370.00		

L. K. Downing
Howard University

NORTHWESTERN UNIVERSITY

March 10, 1944

Mr. George A. Davis, Acting Director,
Division of Trades and Industries
Hampton Institute
Hampton, Virginia

Dear Mr. Davis:

I am pleased to answer your inquiry of February 28. The cost of laboratory equipment in the several departments of the Institute is approximately as follows:

General Equipment	$280,000
Chemistry	250,000
Chemical Engineering	60,000
Civil Engineering	125,000
Electrical Engineering	130,000
Mechanical Engineering	120,000
Physics.	200,000
	$1,165,000

The cost of the building housing these departments, which includes such equipment as chemistry tables, power plant, and other attached apparatus, is $4,500,000. The normal enrollment in each department is as follows:

Civil Engineering	100 - 150
Mechanical Engineering	200 - 250
Chemical Engineering	200 - 250
Electrical Engineering	150 - 200

Chemistry, which includes 300 engineers, has a normal total enrollment of 500. Physics, which also includes about 300 engineers, has a normal enrollment of 700. The average yearly expense of teaching an engineering student is approximately $600.

Yours sincerely,

Ovid W. Eshbach
Dean

O.W.E:MC

APPENDIX D
"CONSIDERATIONS AND RECOMMENDATIONS FOR THE FUTURE
CURRICULUM FOR TRADES AND INDUSTRIES AT HAMPTON
INSTITUTE", BY P.V. JEWELL

CONSIDERATION AND RECOMMENDATIONS FOR THE FUTURE

CURRICULUM FOR TRADES AND INDUSTRIES

AT HAMPTON INSTITUTE

by

P. V. Jewell
Professor of Engineering
Tennessee A & I State College
Nashville, Tennessee

(This correspondence has been retyped because of the poor quality
of the copies provided)

CONSIDERATIONS AND RECOMMENDATIONS FOR THE FUTURE
CURRICULUM FOR TRADES AND INDUSTRIES
AT HAMPTON INSTITUTE

I. CONSIDERATIONS
      The history, reputation and resource of Hampton
Institute are good. The history and reputation are such that
Hampton Institute should expect an increase in enrollment in male
students as soon as the war emergency is over. The financial
reputation of Hampton Institute is apparently of fine shape, but
there is no evidence in sight of immediate large gifts which
could suggest any injudicious program of development for the
department of trades and industries. The past and present
programs seem to imply that the division of trades and industries
is well equipped to train students for craft occupations in the
technical institute level as well as for certain elementary trade
levels. In general it may be said, based on the judgement of Mr.
Tulberry that certain facilities and equipment at Hampton compare
favorably with those at other technical institutes as well as
Wentworth Institute.

      The trend in trades and in industries, if a short
period of twenty years may be termed a trend, seem to imply that
the outstanding workman must be well equipped with a higher
backlog of related knowledge. It was quoted considerably that
Hampton Institute might concern itself with the development of
outstanding trade and industrial workers rather than casual
competitive training, hitting through the usual skill bracket.
The trends in industrial education also seem to carry an
increased emphasis on technical education. Industrial education
now includes skill programs and problems in economics and is
woven with certain distributive occupations. If Hampton
Institute is to keep abreast of such a trend, it is suggested
that the curriculum be so constructed as to form some plan for
the teaching industries and economics which will be prerequisite
to job handling and advancement if not a prerequisite to job
getting in a tight labor market.

      It seems to be the consensus of opinion the training of
Negro youth in the field of industrial education in the area
which Hampton serves is still deficient. It is expected that
congress will eventually pass the bill for aid to vocational
education. With this in view it appears unwise to act in program
formulating with precipitate action. Even with $100,000,000.00
or thereabouts to be spent in the United States the actual
amount devoted to the southern area is small and the expected
proportion in any state to be devoted to Negroes will certainly
not be above the ratio of that population to the total population
even at best. My experience suggests that the states will apply·
that "trickle" to the lowest level of industrial training. Its
ultimate application will probably be in industrial arts and

introductory trade training. This will leave the field of vocational technical education, entrepreneurs of small enterprises, junior engineering, modern building, construction, maritime engineering and so forth unprovided for. Tuskegee will certainly go in heavily for aviation. Hampton might lead in maritime training. Contrary to the opinion of the majority of the group which was writing the report to you, I feel that it would be injudicious to expand Hampton's heritage for a moss of pottage--competition with the federal-state vocational work by lowering standards of instruction or admission. A critical study of admission requirements to colleges in the area which Hampton Institute serves would probably show less than six elective units out of fifteen or sixteen admission units. It is recommended that Hampton determine what these basic ten requirements are for her whole institution. Then do not waive them for any student. The vocational technical department might waive a total of not more than one half the electives or even all the electives for special cases. Regardless of entrance requirements i would question the judiciousness of spreading all over the field of industrial training.

Apprenticeship training for Negroes in the broad field of trade and industries is limited in its availability. It does appear to me that the Alumni Association of Hampton Institute with its diversified experiences and accomplishments might well afford to attack the program of providing some apprenticeship training either with the craft industries which they have created or with the industry of which they are a part. The program of American Labor Unions must be investigated for the division of trades and industries at Hampton Institute. The curriculum must be expanded to give functional training and experience in the labor unions. This suggests that a person skilled in labor programs be added to the staff to give vocational guidance along that line. Said person should understand from the inside all the implications of Labor and interpret the main point of view as it will be unfolded in Schellenback's program. Negro youth must be warned of the aids and abuses of union activities. All too often minority groups clutch at promises made on emotion rather than reason.

II. RECOMMENDATIONS

1. For a four year period no specific offerings should be eliminated from the present program of the division of trades and industries. However, during the four year period every offering must be thoroughly scrutinized, each job must be analyzed, and the curriculum re-organized to meet changes made necessary by change of time. It is my judgement that these courses be so planned as to require of any given students the substantial equivalent of a high school education. This does not necessarily mean that a diploma will be required but it does suggest that the students will be tested and advised concerning his qualifications in many areas of training. Each student should meet all requirements for freshmen but not necessarily all elective

2. It is recommended that the building trade courses require more knowledge of certain metals and new materials and methods. Trade requirements should be revised to include an increased amount of fundamental economics, more emphasis must be placed on quantity surveys and skills for handling men. These areas have been Hampton's outstanding contribution for over four decades.

3. It is recommended that Hampton consider very seriously entering into the field of naval-maritime work during this episode of the world war. Negroes have been readmitted for the first time to the navy significantly in about one hundred years. It is my belief that the American Merchant Marine may also find some use for Negro youth. A study of the same might prove of value. If Hampton is going to meet the needs of students on her campus it might be well to study for a while the preparation of some workers in the field of general engineering after the pattern of Swarthmore College.

4. It is my belief that the states will improve training in the area of industrial arts and vocational education at the lowest level. I believe that Hampton might well afford to step up its requirements for admission to the higher level properly in the terms of the job she proposes to do. If the states ever increase their elementary requirements and do a thorough job at the lowest level it might not seem the better part of judgement for the institute to enter into direct competition. It might be a useful purpose of Hampton Institute to broaden its pattern for requirements and understanding of its industrial students so that the trade and industrial teachers might be in a position to train skilled workers who can also live in a twentieth community with some skill.

5. Like Charles Elliott, I believe in the value in education of the life career motive. Among poorer people this may produce strain. I would recommend that for the very entering day of the students some training in the life career of the student be provided. However, I also know that in living in the twentieth century there are certain general requirements which are common to all young people regardless of their field of employment. As early as possible I should like to see this common field of knowledge instituted for all students and have specialized programs intensified progressively. The function of guidance should be to view and review guidance in order that proper emphasis may be placed on those aspects of the general guidance that are general. This suggests that such subjects as freshman English, freshman mathematics and freshman science be hauled before a board of critical review. These courses should be studied in light of their end objectives in the applied field also. All too often the usual mathematics or science teacher however well prepared in the so-called "pure field" is not equipped unaided to serve the needs of the applied field of students. There is no question of principles but frequently due

to limited experience the usual mathematics or science teacher provides insufficient emphasis in certain areas that are the very "lifeblood of success" in some technical areas of gainful employment.

We further recommend that the whole program of guidance be hauled before a critical board of review. The usually academically trained guidance expert is very well equipped to do group or rationalized program of a statistical nature in an excellent manner. But all too frequently in the field of "pure" guidance a highly trained specialist may be quite unaware of the occupational requirements of articulated mental, digital and technical skills that are prerequisite to satisfactory job performance and living satisfaction of industrial and technical workers. Such a specialist acting alone can hardly interpret the meanings of test data for areas in which he has no experience at all as a normal human employee. It must be borne in mind that test data that have served the army and the navy have been geared to the surety of success for the army and the navy. There is no attempt of their desires to satisfy individual aptitudes, and needs. They have proceeded on the assumption that the screen reject rather than that the screen be used as an educational device. It thus seems imperative that the vocational aspect of guidance be placed in the guidance program for the Trade-Industrial-Engineering program if guidance is to meet the needs of the afore-mentioned division of instruction. The articulating person must be informed of jobs and needs of the occupations and must use the usual guidance technician to provide him with the data he needs for interpretation and counseling individuals. The proposed technical industrial coordinator should be able to articulate the testers with the jobs if guidance is to become functional rather than statistical. To this end actual training and experience within industry appear more important than formalized "credit getting."

Respectfully submitted,
/a/per
P.V. Jewell
Professor in Engineering

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APPENDIX E
A LETTER FROM RALPH WINSLOW OF RENSSELAER POLYTECHNIC INSTITUTE TO GEORGE DAVIS OF HAMPTON INSTITUTE, MARCH 11, 1944

RENSSELAER POLYTECHNIC INSTITUTE
DEPARTMENT OF ARCHITECTURE
TROY, NEW YORK

March 11, 1944

Mr. George W. Davis
Acting Director
Division of Trades and Industries
Hampton Institute
Hampton, Virginia

Dear Mr. Davis:

I am enclosing herewith the best answer that I can give you to the questions you raised in your letter of February 28.

On the mimeographed sheet, which you enclosed with your letter, I have listed the principle engineering departments and the enrollment in each of these for the year 1940, which was a typical year. As you know, our present enrollment under the war training program has little significance. In addition to the students listed on this sheet, there are others in the departments of Biology, Physics, and Chemistry, graduate students and special students in whom you would be less interested. Our total enrollment is normally around 1500.

Although I should like very much to help you in every way and would be glad to set down detailed figures for the other columns on your sheet, I find it impossible to break down our total figures in such a way as to assess parts of them against the various departments. The total value of our buildings is very close to $5,500.000, and the value of laboratory equipment is about $2,500,000. There is, however, no building on the campus used exclusively by one department, and most of the equipment is used by at least two and sometimes more departments.

However, I should like to make a suggestion which by-passes the details and comes down to the essential nature of the thing that you seem to have in mind. You state in your letter that you would like to have this information so that you can determine approximate costs of engineering courses if, in the future, you find it necessary (or desirable) to change the character of your instruction from the trade school level to that of the technical institution or engineering college. This statement of yours is really the entire story underlying your desire for information, and it is this goal that I should like to talk about.

Continued, next page

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First of all, I believe that you are wise and entirely sound
in considering this possible change. Furthermore, I think
that you should proceed with it to the best of your ability,
as soon as conditions, particularly your financial status,
warrant. Having decided upon this step in principle, the
most difficult task is now one of how to implement it. You
are obviously confronted with the problem of deciding on
which departments would draw the most students and would cost
the least to establish and maintain in terms of building and
equipment. I am afraid that this approach is a very diffi-
cult one and not altogether a wise one. I trust that you
will not object to a practical suggestion which may help you
to arrive at your goal more easily.

There are many liberal arts schools in this country and com-
paratively few schools of engineering. The trend of modern
civilization, accelerated by the impact of the war, has
enhanced the importance of the engineering schools, and some
of the liberal arts schools have felt seriously pinched.
These liberal arts schools are tending to change their curri-
cula in order to make them more scientific and technical in
nature. It is not, however, the intention of these schools
to convert their status to that of technical schools. In
many cases, these schools are modifying their curricula so
as to provide students with pre-technical training of three
years length. At the end of this time, the student goes to
a technical school, already established with its buildings
and expensive equipment, and there he graduates in his chosen
engineering or scientific field and receives degrees from
both institutions. In order to accomplish this, an arrange-
ment is made between the two schools concerned. The
Rensselaer Polytechnic Institute has such an arrangement with
Trinity College. The Massachusetts Institute of Technology
has a similar arrangement with Williams and Rutgers.

Now, after this long preamble, I come to my suggestion.
Your institution is not a liberal arts school of collegiate
standing. Nevertheless, I think that your position is some-
what the same with regard to the technical schools; the only
difference being that, if you entered upon such a plan, you
would not be able to grant a degree from your own institution,
and your students would receive degrees only from the techni-
cal school in which they finished.

I enclose, on a separate sheet, the Trinity College curri-
culum for this plan. Obviously, the student completes his
education at much less expense than would otherwise be the
case.

Appendix E continued

The advantages of this plan for the Hampton Institute are
many. You will be given an opportunity of building up stronger
courses in the basic sciences. You will be able to select
some of these students as they go through your hands and to
arrange to take them back on your faculty as instructors when
they have received their advanced training. You will be
slowly adding such pieces of laboratory equipment as will be
desirable for the teaching of chemistry and physics, and you
will be changing the character of your institution in the
direction which you now seem to have in mind. You will not
be required to go to any very great expense immediately in
trying to establish a full-blown department. Finally, when
this plan has been in operation for a number of years, you
will be in a much better position to take the final step;
that is, to establish one or two engineering departments,
since your equipment, curricula, and staff will then be ready
for such a development.

As a matter of fact, this is exactly what Trinity College
hopes to do. They have stated frankly that they will, if
it seems feasible, ultimately offer complete engineering
courses, leading to engineering degrees.

I regret very much not being able to give you the type of
information you ask for in your letter, but I hope that
you will find this material of some interest to you.

I wish you great success in your undertaking.

                              Sincerely yours,

                              Ralph E. Winslow

                              Ralph E. Winslow
                              Head of the Department

rew:sdo
Enclosures (2)

The work at Trinity College under the proposed plan would follow the curriculum below:

FIRST YEAR

English	English
Chemistry	Chemistry
Physics	Physics I
Mathematics	Mathematics
Engineering 1 (Engineering Drawing)	Engineering 2 (Descriptive Geometry)

SECOND YEAR

Mathematics	Mathematics
Physics II (Mechanics & Heat)	Physics II (Electricity)
Engineering 3 (Engineering Materials)	Engineering 8 (Thermo. & Heat Power)
2 Electives	2 Electives

THIRD YEAR

Engineering 7 (Appl. Mechanics, Mechanisms & Elem. Machine Design	Engineering 7
Engineering 10 (Physics 4)(Elements of Electrical Engineering)	Engineering 10
3 Electives	3 Electives

The electives suggested cover courses in History, English, Economics, Modern Language, Psychology, Philosophy. Some would be used to satisfy Trinity's degree requirements.

Appendix E continued

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