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MASS EXCELLENCE: THE MAKING OF MODERN PENN STATE

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## Abstract

Penn State's current status as the seventh largest employer in the Commonwealth of Pennsylvania, not to mention its largest provider of degrees annually, can be traced back to decisions that were made more than six decades ago, during the years following World War II. As higher education changed nationwide with pivotal documents like *Higher Education for American Democracy*; *Science, the Endless Frontier*; and the *Harvard Report for General Education* shaping a new dialogue, plus legislation like the GI Bill providing new funding, Penn State also underwent tremendous changes during that period. The development of Penn State during the postwar period was the result of many factors, but it was personified by one man whose career had, arguably, a greater effect on the institution than any other: Dr. Eric Walker. Coming to Penn State from Harvard after the war, Walker brought a great deal of government research work with him in the form of what would soon be called the Ordnance Research Laboratory and Garfield Water Tunnel. Walker also got to know Penn State President Milton S. Eisenhower rather well working underneath him for nearly a decade; Eisenhower had been part of the Truman Commission, which composed *Higher Education for American Democracy* under the leadership of George Zook, US Commission of Education and former Penn State professor of history. All of these experiences contributed to Walker's thinking when he became President in 1956 – he wanted mass excellence, quantity and quality. During Walker's time as Penn State's president, research expenditures grew 500% from \$7 million dollars in 1956 to nearly \$37 million dollars in 1970. The quantity of education provided grew as well – total enrollments across the Commonwealth grew 300% from 16,000 to 48,000 over the same period. Walker was one of Penn State's foremost leaders along the road to mass excellence, and for that reason he can be largely viewed as the architect of Penn State today.

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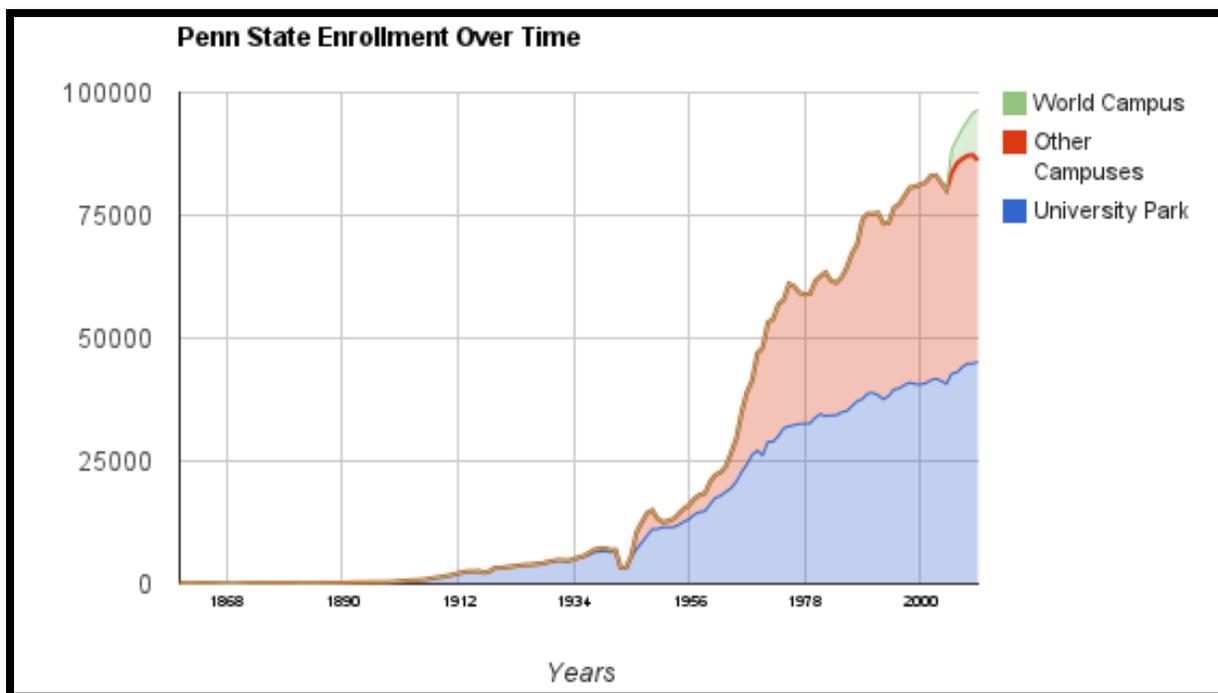
The staff of Onward State, numbering in the dozens over the years, has been a movable feast through my stint in Happy Valley. I have gotten to meet so many wonderful people and, what's more, we've been able to work together on something that was, for at least a time, really special. I will be forever grateful for that.

## Preface

From research expenditures to applications, Penn State is a superlative institution. Our brand is national, our reach global — this fame has grown to an even greater magnitude in the past year with the Jerry Sandusky child sexual abuse scandal and the death of longtime Penn State head football coach Joe Paterno. But, sad as those two episodes were, this historical moment at Penn State will in the long-run serve to help the community recall our roots, values, and heritage as it seeks to move forward. It is with this sentiment in mind that I have attempted the present research. Defining who “we are” for the public needs to be a process rooted in a history deeper than that of the football program. Such a statement should challenge only our intellect, not our pride. We have long known that ours was an important institution for the Commonwealth of Pennsylvania and, at times, the Nation, but it has not always been for the same reasons. Penn State’s identity has been far less constant than we might assume. Like any other brand, the institution has gone through various stages of growth since the school’s founding as the Farmer’s High School in 1855, and both Penn State and the Nation’s values in general have changed over that period. Yet one period stands out more than any other for having shaped Penn State’s modern identity. Until now, the two-decade span following the end of World War II had been the most pivotal moment in the school’s history, with nearly every area of institution’s operations experiencing tremendous change (plus a few that were new entirely). The period of Penn State’s most significant growth begins with World War II but, as with most history, the roots of those beginnings lie even earlier. An overview of the events that led up to this period of extreme growth and an inventory of the long-term effects those developments brought on to the university will serve to help contemporary readers get a better sense of the historical Penn State.

## Introduction

Penn State today is the seventh largest employer in the Commonwealth of Pennsylvania.<sup>1</sup> The university has 19 undergraduate campuses across the state, with approximately 100,000 total students (including the online World Campus). As illustrated in the graph below, this growth appears to break out into three major plateaus – the growth of University Park through World War II, the growth of the Commonwealth campuses through the end of the millennium, and the growth of World Campus in the decade since.<sup>2</sup> Our research enterprise, too, has grown considerably over the past sesquicentennial; today research dollars top \$805 annually, with nearly a quarter of that coming from the Department of Defense alone.<sup>3</sup> In total, research compromises a quarter of Penn State’s overall budget.<sup>4</sup> Each one of these facts makes up an essential part of Penn State’s identity today, but timeless they are not. The inception of a full-



<sup>1</sup> Center for Workforce Information & Analysis, *Q2 2011: Pennsylvania Employers with 500+ Employees* (2011), 1.

<sup>2</sup> "Historical Comparison of Enrollment," *Penn State University Fact Book*, <http://www.budget.psu.edu/Factbook/studentdynamic/HistoricalComparisonOfEnrollment.aspx?YearCode=2011&FBPlusIndc=N> (accessed April 7, 2012).

<sup>3</sup> Penn State Research, *Annual Report of Research Activity* (2011).

<sup>4</sup> University Budget Office, *Total Operating Budget 2010-2011* (July, 2011).

fledged Penn State research enterprise, the development of the Commonwealth Campus system, and the quick growth of them both can be traced back, in large part, to the life of Penn State's 12th president, Eric A. Walker. Walker formally accepted his appointment to the position in a 1956 inaugural address, in which he laid out the situation higher education faced at the time: "an explosion of knowledge and population, a burst of technological and economic advance, the outbreak of ideological conflict and the uproot of old political and cultural patterns on a worldwide scale, and an unparalleled demand by Americans for more and better education." The aggregate represented to Walker a crisis that would require Penn State to "effect something that approaches an educational miracle within the next few years."<sup>5</sup>

What Walker called an educational miracle then he would also call the challenge of mass excellence in the same speech, saying that Penn State "must strive for quality and quantity."<sup>6</sup> Though never formally defined, an anecdote he offered in his memoir *Now It's My Turn* offers some key insight into the man and what motivated him as he entered the Penn State presidency. As he was preparing to take the office – likely on one of his regular trips to Washington, DC – Bush offered the following advice: "Let me tell you, young fellow, there are three ways to build a famous university. You can put together a distinguished faculty, as they are doing at Stanford. You can build a lot of buildings, as they are at Illinois. Or you can get an unbeaten football team like Michigan State's." According to Walker, his response was the he very well intended to do all three.<sup>7</sup> On all three, he did ultimately deliver what could be legitimately called something that approaches an educational miracle. Over his tenure, he oversaw the construction of 140 buildings for the university, with more than a quarter of them at Commonwealth Campuses.<sup>8</sup> As chronicled in Rip Engle's famous *Road to Number One*, Walker was also an advocate of the football team:

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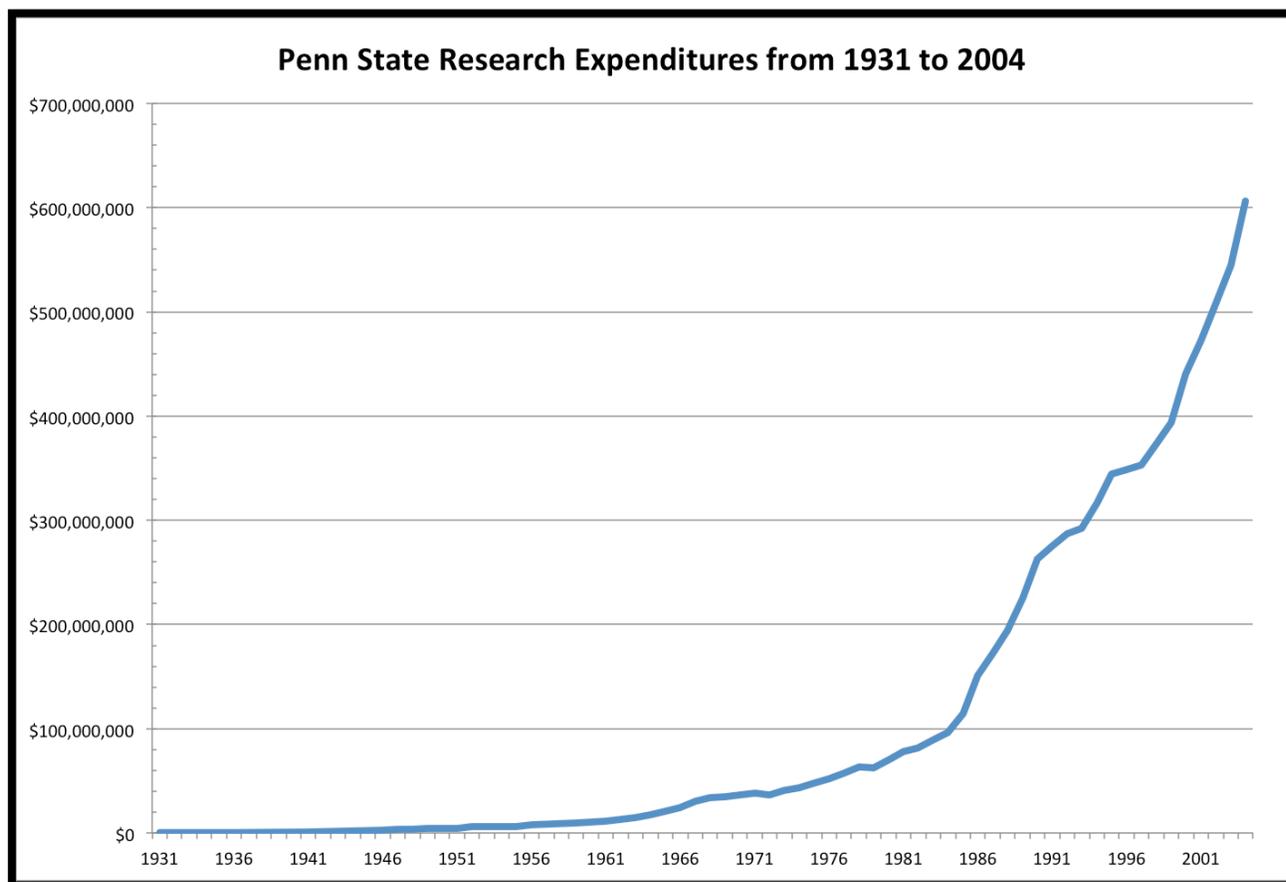
<sup>5</sup> Penn State, *Walker Retrospective*, 5.

<sup>6</sup> Michael Bezilla, *Penn State: An Illustrated History* (Pennsylvania State University Press, 1985), 165.

<sup>7</sup> Eric A Walker, *Now It's My Turn: Engineering My Way* (New York, NY: Vantage Press, 1989), 172.

<sup>8</sup> Penn State, *Walker Retrospective*, 29.

he once recognized in a comment to the alumni news that the program (especially bowl games) was not only profitable to the university, but also enjoyed by alumni and other friends; the success of the team during this period (including the epochal appointment of Joe Paterno as head coach) seems to suggest Walker supported his comments to the alumni through his actions as well.<sup>9</sup> And the sheer growth in research done, plus the number of faculty to be recognized for their achievements in science, both qualify his statement that Penn State's faculty would be a distinguished one. The graph below shows the growth of Penn State's research expenditures from 1931 to 2004.<sup>10</sup>



Penn State's march towards mass excellence, with Walker near the front if not leading it, was unique to its regional and historical context, but it was also in many ways typical of public

<sup>9</sup> Ridge Riley, *Road to Number One: A Personal Chronicle of Penn State Football* (Garden City, NY: Doubleday, 1977), 389.

<sup>10</sup> Penn State Research, *Historical Research Expenditures* (2005).

universities during this period. National legislation like the “GI Bill” and the establishment of federal agencies like the National Science Foundation (as designed by Bush in his report, *Science, the Endless Frontier*) changed all of higher education, Penn State included. A similar statement can be made about the Truman Commission report, *Higher Education for American Democracy*; developments in Penn State policy at the time reflected the discussions and recommendations contained in that important document. The period of time from the end of World War II to the mid-1960s marks a period of significant change and rapid growth for most of post-secondary education, but especially Penn State. The management of a university the size of Penn State (even back then, when it was indeed much smaller) is not done by one man alone, but more than any other man, Eric Walker in his time here pushed Penn State towards a position of mass excellence, or at least his conception of it.

## America in Crisis

### *Penn State During the Great Depression*

The growth of Penn State, founded in 1855 as the Farmer's High School and named the state's sole land-grant institution in 1863, has been characterized by several slowly changing aims and philosophies. In many ways, the growth and development of Penn State have been typical for a university of its nature and size; in other ways, the school has been uniquely influenced by the historical, economic, social and political characteristics of the Commonwealth.<sup>11</sup> For our purposes, Penn State's story begins with the advent of the Great Depression. Rural central Pennsylvania would largely escape the bread lines and soup kitchens that economic distress had spawned in more densely populated areas, but the economic duress had wide-ranging effects on the college.<sup>12</sup> The College found it prudent to caution prospective students in the 1931-1932 catalog that "opportunities for earning money about the College and in town... are few in number and are rarely available to new students," thus blocking off a common avenue for students who couldn't otherwise afford higher education.<sup>13</sup> Administrative officials in the spring of 1933 estimated that only one in six seniors could expect to secure employment in their chosen profession over the next year.<sup>14</sup> Yet enrollments remained high throughout the depression, and the college began opening up branch campuses throughout the state to employ teachers left jobless and reach students whose financial circumstances prevented them from traveling far for their education.<sup>15</sup> Through the late 1930s, Penn State continued to grow its physical plant through increased funding from the Commonwealth for maintenance and operations; at the same time, operating costs for non-instructional purposes were kept at a

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<sup>11</sup> K L Holderman, *A Report on the Future Development of New and Expanded Facilities and Programs at the Commonwealth Campuses of the Pennsylvania State University* (Pennsylvania State University, April, 1962), 5.

<sup>12</sup> Bezilla, *Penn State: An Illustrated History*, 150.

<sup>13</sup> *Ibid.*, 151.

<sup>14</sup> *Ibid.*, 151.

<sup>15</sup> *Ibid.*, 153.

minimum to maximize satisfaction of the college's instructional mission.<sup>16</sup> Funding provided by the Federal Emergency Relief Administration, a New Deal stimulus effort, was channeled to students by colleges in exchange for performing certain chores. Penn State utilized FERA student labor in a variety of ways, from lab assistants to Alumni Association interns, and benefitted significantly from the \$93 million distributed nationwide by FERA and its predecessor, the National Youth Administration.<sup>17</sup>

The branch campuses that opened up during this period are interesting because though the Commonwealth Campus system evolved directly out of them, the scope and design of Penn State's campus system today is by no means what President Hetzel (1927-1947) had intended to establish. Though he recognized that there was a demand for Penn State to expand its extension and education efforts at a larger scale across the state, he believed that such a venture could potentially hinder the growth of the nascent junior-college movement.<sup>18</sup> Nonetheless, he eventually responded to the pressure by proceeding with the opening of "freshman centers" in a number of towns in northern, lightly populated communities, such as Sayre, Towanda, Bradford, and Warren.<sup>19</sup> Approved by the trustees and opened in September 1933, these freshman education centers were staffed with instructors who were either unemployed or underemployed teachers.<sup>20</sup> Bezilla points out that as of February 1934, Hetzel is documented as still having hesitations about Penn State's expansion into undergraduate education at other locations: he qualified the success of the experimental freshman campuses by declaring that he didn't believe it would benefit either Penn State or Pennsylvania for the state's land-grant institution to be

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<sup>16</sup> Ibid., 179.

<sup>17</sup> Ibid., 153.

<sup>18</sup> Ibid., 153.

<sup>19</sup> Ibid., 153.

<sup>20</sup> Ibid., 153.

permanently linked to a group of branch campuses.<sup>21</sup> Regardless, that same year he successfully petitioned the Board of Trustees to establish more comprehensive undergraduate education centers in four communities: Sayre-Towanda, Uniontown, Hazleton, and Pottsville.<sup>22</sup> He probably didn't expect that the campuses would be kept to run in perpetuity; he was on record for supporting a public system of junior colleges and had asked the Pennsylvania College Presidents' Association to support recommendation of the aforementioned sites on the assumption that they would themselves be junior colleges that fed into other colleges and universities.<sup>23</sup>

Penn State's interests also expanded in research during this period. In 1926, Penn State had created an industrial research division patterned after a similar organization at the University of Pittsburgh and began entertaining contracts for technical research from small firms and trade associations.<sup>24</sup> Dean Frank C. Whitmore of Chemistry and Physics was one of the college's most vigorous champions of faculty research during this period, and he managed researchers such as Grover C. Chandlee in chemistry and Wheeler P. Davey in physics, who had come from industrial backgrounds to join the School of Chemistry and Physics as some of the first "research professors." Davey had actually been convinced to leave an influential post at General Electric to join the cause at Penn State by Whitmore's predecessor, Dean Gerald Wendt, who advocated the view that the state was expecting its universities to produce not only the men of tomorrow, but the industries of tomorrow too.<sup>25</sup> Expecting significant in research, President Hetzel established a Council on Research with representatives from each major division of the College in 1930, but apparently was unable to reach an operating consensus among them. New staff ranks of

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<sup>21</sup> Ibid., 154.

<sup>22</sup> Ibid., 154.

<sup>23</sup> Ibid., 154.

<sup>24</sup> Ibid., 161.

<sup>25</sup> Ibid., 161.

‘Research Assistant’ and ‘Research Associate’ were approved for manpower that was primarily for research than instructional activities.<sup>26</sup> The trustees created an office for the Assistant to the President in Charge of Research, though President Ralph Hetzel ultimately never appointed an administrator to fill that position before his death.<sup>27</sup> At the time, with a severely limited amount of federal funding available for general investigation, applied research was virtually Penn State’s only option, a fact that Hetzel specified as worrisome should the schools get too dependent on the private sector funding and face public skepticism regarding its dual embracement of public support and industrial research. In 1940, he president and the Council on Research stated a policy that externally-funded research activity should be a “minor feature” of each school’s general research activity, and a corporation to hold patents for commercialization and public uses was created at the same time.<sup>28</sup> Penn State historian Michael Bezilla notes that this did not seem to seriously retard the amount of industrial research undertaken, though the School of the Liberal Arts had always seen difficulty securing government and industrial funding.<sup>29</sup>

Penn State’s physical plant expanded significantly during this period. Pennsylvania Governor George H. Earle, a Democrat, attempted a “Little New Deal” that, like the original, faced lawsuits for unconstitutionality. The General State Administration was ultimately able to start works programs, though, through a \$20 million grant from the Public Works Administration and a \$45 million bond issue.<sup>30</sup> Penn State was able to break ground in 1938 on ten major structures with the \$5 million in building funds granted to it by the GSA, including Pattee Library, Agricultural Engineering, and an extension to Sparks.<sup>31</sup> The next year, an additional undergraduate center was opened in Altoona after Juniata College refused a local Board of

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<sup>26</sup> Board of Trustees, *Report to the Committee on Research* (Pennsylvania State University, May, 1957), 4.

<sup>27</sup> Bezilla, *Penn State: An Illustrated History*, 164.

<sup>28</sup> *Ibid.*, 15.

<sup>29</sup> *Ibid.*, 166.

<sup>30</sup> *Ibid.*, 169.

<sup>31</sup> *Ibid.*, 171.

Education and Chamber of Commerce request to expand the freshman program it was already operating there.<sup>32</sup> Pressures of growth were being felt back in State College, though: with the majority of male students housed in the Borough and the repeal of prohibition, plus more relaxed social regulations, the town saw some significant changes. Alcohol became more of a public health concern, as with a September 1938 riot of approximately 2,000 students who gathered at the corner of College Avenue and Allen Street that escalated into a two-story bonfire that produced “heat so intense that the brick pavement buckled.”<sup>33</sup> Another student rally had been held at Penn State on April 12, 1935, though it was less attended -- 1,500 students gathered in support of “disarmament, anti-imperialism, and a strict policy of neutrality for the United States.” Hetzel didn’t attend, but he directed faculty to allow students who desired so to attend.<sup>34</sup>

## ***World War II***

### *Seeds of Change*

When the Executive Committee of the Board of Trustees met in the fall of 1942 and reviewed how the year’s enrollments were developing, the impact of American mobilization was evident. The minutes note that there was a 173 decrease in male enrollments since the previous year at the same time. Female enrollments were, on the other hand, up 405 over the same period.<sup>35</sup> An additional 131 faculty and staff had also taken leaves of absence or resigned for military service.<sup>36</sup> These variations don’t show the full picture, though; even with the disruption of war, the college was still educating a large number of students. The addition of a summer session further increased the school’s capacity for students. In 1941, the college had 12,268 students; by the next year, it had grown nearly 30% to have 15,684 total enrolled students

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<sup>32</sup> Ibid., 175.

<sup>33</sup> Ibid., 182.

<sup>34</sup> Ibid., 184.

<sup>35</sup> Board of Trustees, *Executive Committee Minutes* (Pennsylvania State University, October 2, 1942), 1.

<sup>36</sup> Ibid., 3.

beginning with the summer of 1942 and going through spring of 1943.<sup>37</sup> At the time, the military services were also in negotiations with college officials for the use of dormitory, fraternity, and kitchen facilities. Making it clear that the college would be engaging in at-cost contracts, the report estimated that it could house about 3,100 to 5,500 service men by housing them “barracks style” and switching kitchens to “cafeteria style of service.”<sup>38</sup>

*National Defense Research Council*

Vannevar Bush articulated his ongoing project to form a National Defense Research Committee, and the “spirit with which the task is undertaken,” at an October 1941 address to several professional scientific organizations. The remarks, published in *Science*, note that the organization was intended to be executive in its capacity and civilian in its composition, but only an example of “emergency governmental machinery.”<sup>39</sup> Bush stressed that in order for the NDRC to maintain maximum effectiveness, the independence of the researchers was “essential.”<sup>40</sup> At the time, the NDRC had contracted more than 450 projects with approximately 120 contractors; this was a burden that while not intended to interrupt the already-interrupted affairs of the nation’s universities, a number of physics departments had “nevertheless been put to very great stress.”<sup>41</sup> He estimated there were 2,000 “scientific men” associated in defense research through NDRC contracts, with “an equal number of helpers.”<sup>42</sup> A year into the effort, the NDRC had spent ten million dollars, and Bush said it would have “nearly as much” for the second year, to begin July 1, 1942.<sup>43</sup> Though effort had apparently been made to distribute the scientific work, Bush admitted that in some cases it was “necessary to gather an outstanding group in one place

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<sup>37</sup> Board of Trustees, *Executive Committee Minutes* (Pennsylvania State University, March 26, 1943), 2.

<sup>38</sup> *Ibid.*, 3.

<sup>39</sup> Vannevar Bush, "Science and National Defense," *Science* 94, no. 2451 (1941): 571-574. <http://www.jstor.org/stable/1668015>.

<sup>40</sup> *Ibid.*, 572.

<sup>41</sup> *Ibid.*, 572.

<sup>42</sup> *Ibid.*, 572.

<sup>43</sup> *Ibid.*, 572.

in order to provide the advantages of a concentrated attack.”<sup>44</sup> The NDRC’s efforts were supplemented by the Office of Scientific Research and Development, established by executive order of President Roosevelt in June 1941.<sup>45</sup> Bush was brief in his explanation of the specific content of the OSRD’s efforts, saying only that air superiority and radar were among the areas of interest, but he did offer some insight into the matters which were considered confidential for obvious reasons.<sup>46</sup> (Similarly, personnel were examined with the utmost scrutiny before appointments were made, and only in cases where the person’s loyalty was above suspicion.) The majority of funding from the OSRD was spread among a select number of institutions (MIT received the most with \$116 million, Caltech second with \$83 million, and Harvard third with \$30 million).<sup>47</sup> The tenor of Bush’s conclusion highlights the zeitgeist of the era: he declared a shared belief among all scientists in a “thesis that the power of this country must be increased at once and to the maximum possible extent,” and that, for this reason, historic results would be achieved by the unprecedented and patriotic scientific effort.<sup>48</sup>

Penn State ended the decade of the 1930s larger and leaner, but the situation the college faced in June 1941, as the United States inched closer and closer to war was tense. President Hetzel had explained to the senior class that spring in his commencement address: “I know of no period in the last half century, not even excepting the trying months before the first World War, when more puzzling problems challenged the minds of men. In these circumstances, what is the role of those who are completing the formal process of higher education?”<sup>49</sup> Hetzel admitted he did not know the answer for them, but seems to have at least had a general theory when it came

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<sup>44</sup> Ibid., 572.

<sup>45</sup> Ibid., 573.

<sup>46</sup> Ibid., 574.

<sup>47</sup> Roger L Geiger, *Research & Relevant Knowledge: American Research Universities Since World War II* (New Brunswick, NJ: Transaction Publishers, 2004), 31.

<sup>48</sup> Bush, "Science and National Defense," 574.

<sup>49</sup> Bezilla, *Penn State: An Illustrated History*, 193.

to Penn State. Penn State would play a major role in the Engineering Defense training program, later the Engineering Science and Management Defense Training program, which was designed to help industry fulfill defense orders.<sup>50</sup> With an Army ROTC enrollment larger than any other institution in the northeast, the student body also supported the war effort; the Class of 1942 even put its class gift towards a purchase 20-year defense bonds.<sup>51</sup> Penn State was classified as an essential industry in the months after Pearl Harbor, guaranteeing that it had a constant supply of potentially scarce materials.<sup>52</sup> The ratio of women to men began to increase and by the fall of 1943, coeds were the dominant population (1,764 to 1,150).

Though Penn State received some research funds from Washington during the war, the money was mostly for defense-related training — Penn State instructed more than 1.5 million Americans in defense-related training over the four years of the war.<sup>53</sup> Bezilla highlights three main projects: a special high-altitude lubricant for aircraft engines, a climatometer at the thermal laboratories to test the effect of extreme heat and cold on potential building materials for the military, and a team searching for a solution to the problem of hull cracking in Liberty ships.<sup>54</sup> A ‘Committee on Postwar Problems’ was formed in March 1944 by President Hetzel to explore plans for resuming a normal academic calendar in the fall of 1946, with preference to be given to Penn State students who had interrupted their studies for military service.<sup>55</sup> With demand expected to be far greater than the college was able to meet, the primary limiting factor for enrollments at both the main and branch campuses would continue to be housing availability.<sup>56</sup>

When the Japanese declared surrender on August 14, 1945, “classrooms were deserted,

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<sup>50</sup> Ibid., 195.

<sup>51</sup> Ibid., 198.

<sup>52</sup> Ibid., 199.

<sup>53</sup> Ibid., 203.

<sup>54</sup> Ibid., 202.

<sup>55</sup> Ibid., 204.

<sup>56</sup> Ibid., 205.

committee meetings adjourned in an instant, stores hastily closed.”<sup>57</sup> A parade was declared and the next two days were declared College Holidays too. The rest was needed and deserved. Not only had the university seen tremendous growth despite the extenuating circumstances of the war, but it was about to experience the most rapid twenty year period of expansion it had ever seen.

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<sup>57</sup> Ibid., 203.

## Setting Expectations

### *National Dialogue*

#### *GI Bill*

The Servicemen's Readjustment Act of 1944, commonly known as the GI Bill, was a landmark piece of legislation. The "education of veterans" is covered in the fourth section of the congressional action, and its scope and scale were both unprecedented.<sup>58</sup> Persons who entered the military before the age of 25 and who served from September 16, 1940 through the termination of hostilities in the "present war" (V-J Day was still more than a year away when the act was signed) were given a two-year window in which they could seek up to a year's education on the government's dime, and then contingent on satisfactory completion of the program, could seek further study not to exceed in total the period of eligible time served. There were no restrictions on where in the states such persons took their all-expenses paid education, and a \$50 monthly allowance came standard (with an additional \$25 monthly for married couples).

#### *General Education in a Free Society, 1945*

Produced under the auspices of Harvard University President James B. Conant, the Harvard report serves as a telling predecessor of *Higher Education for American Democracy*. Conant introduces the text by saying that it shows the present status of the American educational system through the eyes of a "group of university professors, scientists, classicists, historians, and philosophers" who would be considering the means by which this "great instrument of American democracy can both shape the future and secure the foundations of our free society."<sup>59</sup>

#### *Science, the Endless Frontier*

As America approached the end of World War II, Vannevar Bush produced a series of

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<sup>58</sup> Servicemen's Readjustment Act of 1944, Public Law 78-346, *U. S. Statues at Large*, Title 2.

<sup>59</sup> Harvard Committee, *General Education in a Free Society: Report* (Harvard University Press, 1945), v.

recommendations on the request of President Roosevelt regarding how the federal government could best support research in science and technology with military applications. The ongoing conflict had emphasized two facts of “supreme importance” to Bush:

- *Powerful new tactics of defense and offense are developed around new weapons created by scientific and engineering research.*
- *War is increasingly total war, in which the armed services must be supplemented by active participation of every element of civilian population.*<sup>60</sup>

He also made central the point that up until that point, there hadn’t been anything resembling a coherent national policy for science, nor was there a governmental body tending to formulating and executing such policy.<sup>61</sup> The implicit argument here – that is, for Big Science – is one that would have been very familiar to Walker during this period, as well; as will be shown, his organization of the Ordnance Research Laboratory was very much in the spirit of Big Science.

The title of Bush’s compendium indicates the higher-level place he saw for science and technology within the American political economy. Like the ‘frontier’ of the American West, science and technology represented the enterprise and intellectual terrain he thought would help America achieve its national goals. Bush believed that progress in basic scientific research was the engine for driving society at large, from improved odds in the battle against disease to an increased capacity for waging war. He argued that achieving two great American goals – to secure a high level of employment and to maintain a position of world leadership – were only possible through the continuous and substantial flow of new scientific knowledge.<sup>62</sup> It was for this reason that he thought the federal government should accept the new responsibilities for “promoting the flow of new scientific knowledge and the development of scientific talent in our

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<sup>60</sup> Vannevar Bush, *Science, the Endless Frontier* (Washington, DC: U.S. Government Printing Office, 1945), 17.

<sup>61</sup> *Ibid.*, 12.

<sup>62</sup> *Ibid.*, 22.

youth.”<sup>63</sup> Before describing the agency in detail, Bush noted that his vision would only be possible through legislation. He advised that though early action was imperative, the language should be drafted with great care.<sup>64</sup> Bush noted five basic principles that he thought must underlie the Government’s program supporting basic science research to prevent undermining the very knowledge production it sought to foster: (1) the program must have the ability to offer long-rang funding; (2) the agency should be civilian-run and merit-based; (3) the agency should not operate any laboratories of its own; (4) details regarding execution of sponsored research should be left to the institutions themselves; and (5) the agency must be responsible only to the President and the Congress in its distribution of funds.<sup>65</sup>

Bush designed a system for state-supported research and development of military-related sciences and technologies that reconciled the disconnect between the incentives of academic institutions, corporations, and the government, differences that had undermined the efficacy of earlier programs with the same goal. The challenge he solved was figuring out a way for the federal government to interface with universities, which were both uniquely qualified by tradition and their special characteristics to carry on basic research but also unwilling to accept standard purchase orders from the government for their work. Universities, he said, were institutions where scientists could work in an atmosphere without the adverse pressures of “convention, prejudice, or commercial necessity”, but with the benefits of solidarity, security, and personal academic freedom.<sup>66</sup>

The key to America’s rapid mobilization of university scientists and engineers was the introduction of the contract to the research and development fold. Contracts carry responsibility but not subservience, in Bush’s opinion, and through their use, the federal government could

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<sup>63</sup> Ibid., 21.

<sup>64</sup> Ibid., 24.

<sup>65</sup> Ibid., 32.

<sup>66</sup> Ibid., 19.

intelligently place agreements for research in the best possible places.<sup>67</sup> The contract presented a form of partnership between government and academic much more satisfying to all parties involved than the mass hiring/drafting of scientists into the military relied on during World War I. Bush had advocated for the use of contracts by the new and more powerful agency so that the country could mobilize science in its national defense. He noted that the difference between grants and contracts was that the former implied paternalism and control, whereas the latter could only be made between independent and responsible bodies or individuals.<sup>68</sup>

The OSRD was intended to have placed a great amount of power in Bush and his peers among the scientific elite; however, Bush himself emerged disappointed with two main aspects of the organization's development. He would later express regret about the partnerships uncontrolled expansion and the lack of civilian oversight.<sup>69</sup> The OSRD ultimately spent \$430 million on weapons and research development during the war, and it played a role in many key technical breakthroughs, such as in nuclear engineering and acoustics/radar.<sup>70</sup> Though these efforts were crucial in the eventual Allied victory, the strategy spawned a legacy of public-private arrangements that centralized management of R&D in Washington while leaving execution to private contractors.<sup>71</sup> This culture hits its apex with the Korean War in the early 1950s, but it has left behind a military-industrial-academic culture that continues to affect American life today.<sup>72</sup>

The United States' wartime mobilization left behind a military-industrial-academic

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<sup>67</sup> L Owens, "The Counterproductive Management of Science in the Second World War: Vannevar Bush and the Office of Scientific Research and Development," *Business History Review* 68, no. 04 (1994): 515-576.

<sup>68</sup> Bush, *Science, the Endless Frontier*, 32.

<sup>69</sup> Owens, "The Counterproductive Management of Science in the Second World War: Vannevar Bush and the Office of Scientific Research and Development," 516.

<sup>70</sup> Stuart W Leslie, *The Cold War and American Science the military-Industrial-Academic complex at MIT and Stanford*, Web (New York, NY: Columbia University Press, 1993), 7.

<sup>71</sup> Owens, "The Counterproductive Management of Science in the Second World War: Vannevar Bush and the Office of Scientific Research and Development," 516.

<sup>72</sup> Leslie, *The Cold War and American Science the Military-Industrial-Academic Complex at MIT and Stanford*, 8.

complex that changed America in a number of ways. The infusion of funds into American universities through the Office of Naval Research, which absorbed the majority of military research after the wartime institutions were shut down, sustained scientific research during a critical transitional period, but its dollars ultimately lay in projects that included “the probability of ultimate usefulness to the Navy.”<sup>73</sup> The potential upsides of this funding strategy were laid out by Vannevar Bush during World War II, well before he realized the wartime system could be sustained past victory in the then-current conflict. To him, the war had emphasized three facts of supreme importance to national security: New science and engineering inspires new tactics of defense and offense; the competitive time element is crucial; and that war was increasingly a total affair.<sup>74</sup> For a few years between the closure of OSRD in 1945 and the establishment of the National Science Foundation in 1950, the ONR was the federal government’s only general science agency. The ONR had been organized by a group of young Naval reserve officers known as the “Bird Dogs” because of their ability to ferret out solutions to problems between the OSRD and the Navy’s materials bureau.<sup>75</sup> That said, Vice Admiral Harold G. Bowen, founder of the ONR, and Vannevar Bush had a famously standoffish relationship.<sup>76</sup> The agency supported American science when no other part of the federal government did, and it was the vehicle that the Atomic Energy Commission initially used to manage its support of university based research.<sup>77</sup>

The culture of the Cold War sustained the conditions created by WWII well past the armistice, but the long-term costs weren’t discernible until decades later. It wasn’t until after the war, as noted above, that Bush became concerned with the military-industrial-academic culture’s

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<sup>73</sup> Geiger, *Research & Relevant Knowledge: American Research Universities Since World War II*, 42.

<sup>74</sup> Bush, *Science, the Endless Frontier*, 24.

<sup>75</sup> Harvey M Sapolsky, *Science and the Navy: The History of the Office of Naval Research* (Princeton, NJ: Princeton University Press, 1990), 12.

<sup>76</sup> *Ibid.*, 12.

<sup>77</sup> *Ibid.*, 37.

rampant growth. During the war, he expected the additional grants and contracts available would help assure a constantly improving quality at every level of scientific activity.<sup>78</sup> What Bush hadn't predicted was that the tri-combination of the federal government, higher education, and free enterprise would not only alter their relationships and interdependencies, but the individual components. The costs of sustaining this socioeconomic system have to be reckoned both "in dollars and in sense."<sup>79</sup> Not only has the federal budget been grown unnecessarily massive by military spending, but "Big Science" also diminished our capacity to comprehend and manipulate the world for other than military needs.<sup>80</sup> The university no longer had faculty and students as its only constituents; suddenly the federal government and, soon enough, corporate entities innumerable were able to sponsor research for one special interest topic or another while the public interest took a backseat to generating more and more revenue. Postwar universities became premier sites of knowledge production, integrating them more deeply into the American political economy as jobs became increasingly geared towards knowledge workers.

*Higher Education for American Democracy, 1947*

President Truman formally wrote to the Presidential Commission on Higher Education on July 13, 1945 with the charge to investigate the "functions of higher education in our democracy and of the means by which they can best be performed." The Commission, a group of whom Truman referred to as "outstanding civic and educational" leaders, was also given some suggested topics, and it included two people with significant Penn State connections. George Zook, who chaired the Commission, had formerly been a Penn State history professor; Milton S. Eisenhower, who at the time held the presidency of Kansas State University, would later come to take the same position at Penn State. The Truman Commission was asked to look into the

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<sup>78</sup> Bush, *Science, the Endless Frontier*, 24.

<sup>79</sup> Leslie, *The Cold War and American Science the Military-Industrial-Academic Complex at MIT and Stanford*, 9.

<sup>80</sup> *Ibid.*, 9.

following areas: increasing educational opportunities and curricula (particularly in international affairs and “social understanding”); “the desirability of establishing a series of intermediate technical institutes”; and the financial structure of higher education with “particular reference to the requirements for the rapid expansion of physical facilities.” The Truman Commission report, submitted on December 11, 1947, ended up being broken a number of chapters each addressing the issues of higher education from a different angle. The writing can also be classified as generally having served one of three purposes: informing the readers about the situation, describing potential solutions, and recommending how those solutions could be implemented.

In the language used throughout the Truman Commission report, the authors were generally sympathetic to the challenges facing the colleges and universities they were discussing. The preface notes that many of the institutions had begun a process of internal assessment prior to World War II, and many had been dissatisfied with their accomplishments, “significant though these have been.”<sup>81</sup> In describing the challenges America faced with higher education over the decades ahead, the Commission offered several reasons why there was an “increasingly need for such education” in society.<sup>82</sup> For one, they said science and technology “altered the interpersonal and intergroup relations of Americans in their work, in their play, and in their duties as citizens.” National security issues also came into play, with recognitions that World War II marked a “fundamental shift in the orientation of American foreign policy” and that the coming atomic age, “with its ambivalent promise of tremendous good or tremendous evil for mankind,” would expand the responsibilities of higher education for ensuring the self-protection of our democracy.<sup>83</sup> Educational attainment reached record levels leading up to World War II, but the Commission reported that progress was “still substantially below what is necessary either

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<sup>81</sup> G F Zook, *Higher Education for American Democracy* (U.S. Government Print Office, 1947), 1.

<sup>82</sup> *Ibid.*, 2.

<sup>83</sup> *Ibid.*, 2.

for effective individual living or for the welfare of our society.”<sup>84</sup>

The report called for colleges and universities to adopt a much larger role in American society than they had previously. Education is put up with the law of the land as one of the two great instruments by which a democratic society establishes, maintains, and protects its equality among different persons and groups.<sup>85</sup> The role of education in society, especially higher education, was seen as “that of critic and leader as well as servant; its task is not merely to meet the demands of the present but to alter those demands if necessary, so as to keep them always suited to democratic ideals.”<sup>86</sup> The college and university were also said to support democratic ideals by putting students in a democratic environment, and not “an authoritarian atmosphere.”<sup>87</sup> Providing equal opportunity to the kind and amount of education for both sexes and all groups was also a major focus of the committee’s report. They acknowledged that at the time educational opportunity depended “not on their own abilities, but on the family or community into which they happened to be born or, worse still, on the color of their skin or the religion of their parents.”<sup>88</sup> The stakes, in the eyes of the Commission, could not be higher; they wrote that “in a real sense the future of our civilization depends on the direction education takes, not just in the distant future, but in the days immediately ahead.”<sup>89</sup>

The Truman Commission report described its solution by first going over the purposes it saw for general education, the graduate school, and community colleges. The purposes of general education can be seen in the table to follow. The graduate school had three major tasks, according to the report: 1) to continue basic research and training of research personnel; 2) to

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<sup>84</sup> Ibid., 25.

<sup>85</sup> Ibid., 5.

<sup>86</sup> Ibid., 6.

<sup>87</sup> Ibid., 14.

<sup>88</sup> Ibid., 27.

<sup>89</sup> Ibid., 7.

train experts for nonacademic fields; and 3) to train teachers for all levels of higher education.<sup>90</sup>

The Commission also saw a particular need for increasing science education at the undergraduate and graduate levels.<sup>91</sup> Community colleges were to play a major part, ultimately, in higher education not only for the individual, but also for the communities in which they were placed.

#### **Goals and Purposes of General Education**

To develop a code of ethics consistent with democratic ideals

To participate as an informed and responsible citizen

To recognize the interdependence of the world and personal responsibility for fostering international understanding and peace

To understand the natural world and apply scientific thought to life

To understand the ideas of others and to express one's own effectively

To attain a satisfactory emotional and social adjustment

To maintain and improve his own and the community's health (phys ed)

To understand artistic and cultural expressions

To acquire the knowledge and attitudes basic to a satisfying family life

To choose a vocation that will satisfy and fulfill

To think critically

To develop a code of ethics consistent with democratic ideals

The Commission recommended that these community colleges be public and free, and offer

“courses in general education both terminal and having transfer value, vocational courses suitably related to local needs, and adult education programs of varied character.”<sup>92</sup> In fact, the Commission thought that there should be no tuition or fees for the thirteenth and fourteenth school years regardless of whether they were offered by a community, junior, or traditional college.<sup>93</sup>

The Commission outlined a vision for federal support of higher education that was quite aggressive. The ideal support, they recommended, would be a combination of grants and fellowships administered through some central organization, which would make specialized and piecemeal program “unnecessary and unwise.”<sup>94</sup> They suggested that a national program of Federal scholarships be formed to provide need-based grants-in-aid for at least 20 percent of all

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<sup>90</sup> Ibid., 88.

<sup>91</sup> Ibid., 94.

<sup>92</sup> Ibid., 69.

<sup>93</sup> Ibid., 22.

<sup>94</sup> Ibid., 49.

undergraduate, non-veteran students.<sup>95</sup> Capping the total amount available per undergraduate to \$800 annually, the Commission suggested that each State could establish a representative scholarship commission to administer funds granted to it by the Federal government for this purpose.<sup>96, 97</sup> Milton S. Eisenhower, the future President of Penn State who was then holding the same position at Kansas State, wrote a dissenting footnote from the proposal for State administration of scholarships because he thought they weren't intended to change distribution of students between regions and institution types, the money should be prorated among colleges and universities and then administered by them on the basis of individual need and ability.<sup>98</sup> The money was to be divided in both proposals by two factors of equal weight: the number of high-school graduates in State in relation to the country and the proportion of 18-21 year old people in relation to the total 18-21 population.<sup>99</sup> In general, the Commission urged institutions to act as "pioneering agents of leadership against discrimination," for example through the removal of all questions pertaining to religion, color, and national or racial origin from application forms.<sup>100,101</sup>

A major theme of the document was how higher education would be able to meet the expected increase in demand over the coming decades. A variety of ideas were presented, the majority of which we know today in one form or another. For instance, the Commission declared, "that documentary and educational films could become instruments of great power cannot be doubted."<sup>102</sup> Penn State, Rutgers, Iowa, and Vassar are also cited as having already developed effective technical aids for their own use.<sup>103</sup> Penn State's acumen with video instruction would arise again when the Commonwealth Campus system was being developed.

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<sup>95</sup> Ibid., 52.

<sup>96</sup> Ibid., 54-55.

<sup>97</sup> Ibid., 67.

<sup>98</sup> Ibid., 54.

<sup>99</sup> Ibid., 55.

<sup>100</sup> Ibid., 27.

<sup>101</sup> Ibid., 38.

<sup>102</sup> Ibid., 98.

<sup>103</sup> Ibid., 99.

The special potential of educational films as a “virtually untapped means of expanding the processes for adult education in all fields” was lauded by the Truman Commission as well.<sup>104</sup> Resident centers were mentioned, but not highlighted by the report. According to a 1947 study made for the Commission by the Association of Land-Grant Colleges and Universities, there were approximately 115,000 persons enrolled in 195 resident centers at the time. 180 of the 195 centers were planned on a permanent basis.<sup>105</sup> A greater emphasis was put on the ‘community college,’ which was to be the primary means of meeting the demands for adult education. The Commission noted that they also believed traditional colleges and universities could also become community colleges by integrating extension teaching into the regular faculty load.<sup>106</sup> To this end, the Commission’s charge to the colleges was that they should prepare students “to live a rich and satisfying life, part of which involves earning a living,” and that therefore their educational programs must integrate the general and vocational aspects into a single effort.<sup>107</sup> The inefficiencies in adult education at the time, specifically technical training, was evidence to the Commission that the institutions which had previously managed that learning needed to be more adequately supervised, and get more integrated into the general higher education system.<sup>108</sup>

The Commission also discussed in general how the balance between State and Federal power could be maintained while still providing reform and oversight to higher education as needed. The question of whether America could afford to so drastically expand the number of students it provided higher education was also answered: “unequivocally” yes. The Commission said that the nation could afford to spend at least 1.19% of gross national product on higher

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<sup>104</sup> Ibid., 65.

<sup>105</sup> Ibid., 62.

<sup>106</sup> Ibid., 2.

<sup>107</sup> Ibid., 6, Volume 3

<sup>108</sup> Ibid., 64.

education.<sup>109</sup> The President’s Commission also saw substantial increases that could be made in organized appeals made by colleges and universities for gifts and grants that could be obtained for endowment, as well as for immediate expenditure.<sup>110</sup> The Commission also recommended that institutions be given tax exemption to assist and encourage higher education.<sup>111</sup> These were mostly federal policies meant to empower the institutions, but the Commission was clear in saying that the “primary responsibility for education in this country rests with the states.”<sup>112</sup> The Commission saw an expanded role for state-run education, too; they recommended that the public school system be extended through the fourteenth year and that community college systems (including resident centers) be planned “on a State-wide basis and administered in such a way as to avoid expensive duplication and to provide training for each vocation somewhere.”<sup>113</sup> According to the report, the federal government had three main interests in higher education: maintenance of the highest practicable standard of education; maintenance of certain special education programs subsidized and partially administered by the federal government; and making the “rich educational resources of the federal government” available to all qualified persons.<sup>114</sup> The Commission’s greatest recommend to the federal government in this regard was the establishment of the United States Office of Education with a commensurate amount of financial support and a Secretary of Education in the President’s Cabinet.<sup>115</sup>

### ***Local Implications***

#### *Governor Leader Report*

Pennsylvania Governor George Leader formed a state commission on higher education

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<sup>109</sup> Ibid., 26, Volume 4

<sup>110</sup> Ibid., 32, Volume 4

<sup>111</sup> Ibid., 41, Volume 4

<sup>112</sup> Ibid., 2, Volume 3

<sup>113</sup> Ibid., 7, Volume 3

<sup>114</sup> Ibid., 40, Volume 3

<sup>115</sup> Ibid., 41, Volume 3

(which included Lawrence E. Dennis, Penn State's Vice President for Academic Affairs, as vice chairman) with the charge to survey, analyze and appraise existing or proposed programs of instructions (in Pennsylvania colleges and universities) and State assistance to such programs." Throughout the report, Penn State is treated uniquely as the "land-grant institution of the Commonwealth," as opposed to one of the three "state-aided institutions."<sup>116</sup> The report included the then-commonplace position that the nation was facing "ever-mounting enrollments" in higher education with an "impending tidal wave of students" ahead due to steadily rising birth rates and a growing proportion of eligible youth who wish to attend college.<sup>117</sup> The latter was apparently due to the increase in high school graduation rates, a favorable economy, and the demand for college-trained personnel.<sup>118</sup> The report also discussed extension and expanding capacity generally. For instance, the concept of branch campuses is endorsed by way of a 1949 Minnesota report that stated 1 out of 4 young people to live within 10 miles of a college attended college the first year after they graduated, whereas for those who lived more than 25 miles away from a college, the ratio was 1 out 7.

### *Penn State*

Following the end of World War II, Penn State experienced what historian Michael Bezilla qualifies as a "massive surge" in enrollment with demand fueled by the GI Bill.<sup>119</sup> The college responded with temporary housing and, wherever possible, facilitated housing downtown. Trailers were set up on the grassy hillside above East College Avenue and east of Shortlidge Road (where the current Pollock and South Halls are). Prefabricated units paid for by the federal government were outfitted with utility connections by the College and put on dirt

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<sup>116</sup> Pennsylvania Commission on Higher Education, *Higher Education in the Commonwealth: Report of the Governor's Commission on Higher Education* (Harrisburg, PA: Pennsylvania Governor's Commission on Higher Education, 1957), 46.

<sup>117</sup> *Ibid.*, 1.

<sup>118</sup> *Ibid.*, 16.

<sup>119</sup> Bezilla, *Penn State: An Illustrated History*, 209.

streets. An area called “Windercrest” housed 267 married veterans for \$25 monthly; another called “Pollock Circle” housed an impressive 840 unmarried veterans in fourteen single story units.<sup>120</sup> The permanent dorms continued to be occupied by women, with an additional two structures authorized in June 1944 (Simmons and McElwain Halls). In evaluating potential students, the college was authorized to admit only upperclassmen students to the State College campus – freshmen applicants, including veterans, were to be educated for a year or two at a State Teachers College or another undergraduate center first. Priorities were given to applicants as follows: 1a) those who are veterans, 1b) those assigned to war work in lieu of military service, 1c) those who were classified 4-F and entered into war work, 2) PA vets who made good records while enrolled in the Army Specialized Training Program, V-12 Navy College Training Program, or similar service programs in other colleges, to which they were assigned without choice, 3) PA vets who made good records in other colleges prior to entering service, and who now wish to continue their college course in a curriculum not available at the institution first attended; and 4) other male applicants.<sup>121</sup> Penn State submitted its application for funding under the GI Bill on October 5, 1945, requesting funding for numerous shop, lab, and classroom buildings, plus a library, recreation building, and dining hall.<sup>122</sup> The Alumni Association also offered its assistance in securing buildings through gifts, but the university’s fundraising efforts were not yet at the point of reaching fruition.<sup>123</sup>

Even as the student body was replaced mainly with veterans and the small town of State College struggled to keep up with the quickly expanding needs of Penn State, life at the college continued as normal. The contract to Henry Varnum Poor for the famous land-grant frescos was consummated in 1947, proof of a commitment to the school’s legacy also reflected in the c aping

<sup>120</sup> Board of Trustees, *Executive Committee Minutes* (Pennsylvania State University, May 10, 1946), 2.

<sup>121</sup> *Ibid.*, 9.

<sup>122</sup> Board of Trustees, *Executive Committee Minutes* (Pennsylvania State University, October 5, 1945), 2.

<sup>123</sup> Board of Trustees, *Executive Committee Minutes* (Pennsylvania State University, October 6, 1944), 7.

of each class at a maximum of 5% out-of-state students.<sup>124</sup> As the post-war economy was beginning to pick up, the Penn State Club of New York City submitted a petition in favor of establishing a School of Business Administration.<sup>125</sup> And in February 1947, a Borough-College Coordinating Committee was created to explore the shortage of faculty housing downtown. (By later that year, 76 faculty-housing units would be under construction.<sup>126</sup>) Heightened demand in faculty housing was also spurred by more factors than just the GI Bill and increased enrollment. The post-war period was more important for the new research facilities and other physical plant additions than new dormitories, per se. At Penn State, the singular example of this is the Ordnance Research Laboratory (now Applied Research Laboratory). And to tell the story of the ORL, first we must introduce Eric Walker.

#### *Ordnance Research Laboratory*

When the Navy heard that Walker was leaving Harvard to lead Penn State's Electrical Engineering department, they approached him and asked if he would put together a small group of people to work on torpedo research at Penn State.<sup>127</sup> As the plan grew, it reached the point where it needed trustee support, so in January 1945 Walker and Dean Harry Hammond (who had been shaken to find out what scale the lab would actually be) visited President Hetzel one evening with the Navy's Admiral Parker, originally from Bellefonte. After Parker told Hetzel that the Navy's "just got to have this and we just cannot afford not to have it," Pen State acquiesced. The Navy would build a large laboratory in which contract research from the Bureau of Ordnance would be done, with additional operating and maintenance fees paid to the College annually. The ORL was established as a department of the School of Engineering, thus giving

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<sup>124</sup> Board of Trustees, *Executive Committee Minutes* (Pennsylvania State University, June 9, 1947), 12.

<sup>125</sup> *Ibid.*, 13.

<sup>126</sup> Board of Trustees, *Executive Committee Minutes* (Pennsylvania State University, September 5, 1947), 2.

<sup>127</sup> Bezilla, *Penn State: An Illustrated History*, 212.

Walker oversight of its operations.<sup>128</sup> The contract, signed March 19, 1945, was \$1.3 million total, with \$252,340 of that going toward a 24,000 ft<sup>2</sup> lab building to be constructed by Henry E. Baton Inc. of Philadelphia. The Lab building would be equipped by the Navy, with a significant portion of the apparatus coming from Harvard.<sup>129</sup>

The water tunnel was, on the other hand, mostly a new creation for Penn State, even if its operations had previously been replicated by its predecessor at Harvard. Built along Route 322 north of College Avenue, the Garfield Water Tunnel was used to test torpedoes and other underwater devices in the same manner as a wind tunnel might test a missile. Design of the tunnel came after two years of study by the ORL, with the final contours verified by a 1/8-scale model of the experimental water tunnel. The actual tunnel's test section was 48 inches in diameter and 14 feet long, permitting models more than 8 inches in diameter and 8 feet in length. The velocity of the water reached speeds greater than 60 feet per second (41 mph), circulating about 100,000 gallons of water every 18 seconds. The water was circulated by a 95 inch diameter variable pitch impeller built by S. Morgan Smith Company, and was driven by a 1750 horsepower wound-rotor induction motor by Allis-Chalmers Manufacturing Company. The nozzles and other brass fittings were made by Baldwin Locomotive Works. The tunnel circuit made from mild-steel plate from the Pittsburgh-Des Moines Steel Company, which assembled and erected it. A plexiglass window at the top provided viewing access, with an adjacent hatch allowing models to be exchanged from the top of the tunnel.<sup>130</sup>

Walker, like Bush, was innovative in how he structured the organization to best promote research. As he put it in an article for the *Journal of Applied Physics*, "this new Laboratory represents an attempt to meet the problem of providing research for the Navy in a slightly

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<sup>128</sup> Eric A Walker, "Ordnance Research Laboratory," *Journal of Applied Physics* 18, no. 3 (1947): doi:10.1063/1.1697647.

<sup>129</sup> Board of Trustees, Executive Committee Minutes (Pennsylvania State University, March 30, 1945), 2.

<sup>130</sup> R B Power, "The Experimental Water Tunnel at the Pennsylvania State College," *Ordnance Research Laboratory* (1948).

different way.”<sup>131</sup> The Laboratory was organized “horizontally and vertically.” There were five major scientific sections: Acoustics, Electronics, Applied Mechanics, Hydro- and Aerodynamics, and Mathematics.<sup>132</sup> The sections could also be further subdivided – for instance, Electronics was divided into a research division, a development division, and a production division.<sup>133</sup> Granted, fields like mathematics didn’t lend themselves to this type of organization. The work in most projects was broken into two phases: construction and testing. Walker explained in the article that “one of the inviolable principles of operation is that the group which tests a device must be the same group which designed and supervised its assembly at the home laboratory.”<sup>134</sup> This field-testing would be done using ORL-operated facilities in a number of locations: Fort Lauderdale, FL (later Key West); Newport, RI; and Black Moshannon State Park, PA. A core group of four or five men would service the station with project groups being sent there for periods of a few days to several months for design testing.<sup>135</sup> The ORL, in many ways, resembles the product groups of modern technology companies – indeed, this is likely no coincidence. As Walker concluded, “Ultimately, the product of the Laboratory will be gadgets or weapons, together with complete sets of prints by which they may be constructed, and the maintenance and instruction manuals which are necessary for their use.”<sup>136</sup> By 1949-50, the Lab’s annual expenditures exceeded \$1.4 million, making up a significant portion of the federal government’s total \$50 million a year spent on non-agricultural research at all institutions of higher education.<sup>137</sup> These abilities were further expanded when, under Walker’s leadership once again, the College moved in March 1953 to construct a nuclear s building on campus.<sup>138</sup> The

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<sup>131</sup> Walker, "Ordnance Research Laboratory," 263.

<sup>132</sup> *Ibid.*, 264.

<sup>133</sup> *Ibid.*, 265.

<sup>134</sup> *Ibid.*, 265.

<sup>135</sup> *Ibid.*, 265.

<sup>136</sup> *Ibid.*, 266.

<sup>137</sup> Bezilla, *Penn State: An Illustrated History*, 214.

<sup>138</sup> Board of Trustees, Executive Committee Minutes (Pennsylvania State University, March 27, 1953), 2.

groundbreaking ceremony for the reactor was held in advance of Penn State's Centennial, and it features prominently in promotional video for the college from that period found in the University Archives. In 1954, the Navy also successfully contracted with Penn State for the addition of a second floor to the ORL facilities.<sup>139</sup> In an interview conducted decades later, Walker said that the ORL staff had brought additional benefits to the university by teaching in fields like physics, electrical engineering, and mechanical engineering, not to mention the graduate students who took positions in the labs. Walker also noted that the ORL historically accounted for some 80% of the College of Engineering's total research expenditures.<sup>140</sup>

Hetzel died unexpectedly in October 1947, leaving Board of Trustees President James Milholland to take over. Roger Deike acted as chair of the replacement committee, which as of December 1949 had reduced its initial list of 98 candidates to just 10. In addition to weighing their business acumen, Deike also saw to it that additional sources were consulted – one member of the committee, Roger W. Rowland, went to DC to interview George F. Zook, the U.S. Commissioner of Education who had formerly been a Penn State history professor. Together they discussed the qualifications of the 10 candidates left.<sup>141</sup> Ultimately the search committee focused their efforts on Milton S. Eisenhower, who had previously served on the Truman Commission with Zook. Eisenhower, the younger brother of military hero General Dwight D. Eisenhower, formally assumed the position on July 1, 1950. At the time Penn State students were receiving a \$600 tuition for just \$220 in academic fees – as Bezilla declared, reform to the colleges programs was needed.<sup>142</sup> Shortly after Eisenhower took office, he held a special meeting about enrollments falling short of expectations (due to the graduation of veterans and “the result of the international situation”) and it was voted to expand the amount of out-of-state

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<sup>139</sup> Board of Trustees, Executive Committee Minutes (Pennsylvania State University, October 8, 1954), 2.

<sup>140</sup> "Interview with Dr. Eric A. Walker" (University Archives, June 8, 1980).

<sup>141</sup> Board of Trustees, Special Meeting Minutes (Pennsylvania State University, December 3, 1949), 2.

<sup>142</sup> Bezilla, *Penn State: An Illustrated History*, 235.

undergraduates enrolled twofold to 10% of total enrollment.<sup>143</sup> The financial situation at the time was exacerbated by “a smaller enrollment in the undergraduate centers” and absent revenues from a cancelled football game with the University of Pittsburgh.<sup>144</sup>

Eisenhower’s most visible achievement occurred in 1953, when he successfully petition to have the school’s name changed to the Pennsylvania State University. The campus would additionally be served by its own post office with a name of the university’s choice if they would supply only heat, electricity, and water.<sup>145</sup> Later that year the Associated Press and Western Union informed university officials that once a post office had been established, the name would be acceptable as the official address and source of news releases for the institution.<sup>146</sup>

Eisenhower also benefitted immensely from his deputy Eric Walker. For instance, Walker presented to the Board of Trustees about a Department of Defense project called Project PLATFO on behalf of Eisenhower in the spring of 1955 (the project involved an intensive summer brainstorming session with the best minds in America on the topic of ‘what can we do about the ICBM?’).<sup>147</sup> Walker, at the time, was at the helm of the College of Engineering, a position he had taken after a year spent serving as the Executive Secretary of the Research and Development Board of the Department of National Defense, which he had accepted on the request of the Director of the Board to reorganize its research operations.<sup>148</sup> Under his leadership, research activity at the Ordnance Research Laboratory hit an all-time high of \$2 million in 1953-54, comprising 2/3 of total engineering research that year.<sup>149</sup> Eisenhower was sure to report to the Board that year that Walker had been offered the presidency of a lading technical institute,

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<sup>143</sup> Board of Trustees, Executive Committee Minutes (Pennsylvania State University, October 4, 1950), 1.

<sup>144</sup> Board of Trustees, Executive Committee Minutes (Pennsylvania State University, December 1, 1950), 2.

<sup>145</sup> Board of Trustees, Executive Committee Minutes (Pennsylvania State University, June 4, 1954), 1.

<sup>146</sup> Board of Trustees, Executive Committee Minutes (Pennsylvania State University, December 3, 1954), 2.

<sup>147</sup> Board of Trustees, *Executive Committee Minutes* (Pennsylvania State University, March 24, 1955), 3.

<sup>148</sup> Board of Trustees, *Executive Committee Minutes* (Pennsylvania State University, June 9, 1950), 18.

<sup>149</sup> Michael Bezilla, *Engineering Education at Penn State: A Century in the Landgrant Tradition* (University Park, PA: Pennsylvania State University Press, 1981), 163.

but decided to turn it down.<sup>150</sup> Walker was then promoted into the new role of vice president for research right before Eisenhower was off to Washington to work for his brother, the President of the United States.

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<sup>150</sup> Board of Trustees, *Executive Committee Minutes* (Pennsylvania State University, October 8, 1954), 1.

## **A New Normal**

### ***Penn State Expands***

Walker brought to Penn State a new enthusiasm, and vision, for growth. Having been in the heart of Big Science during World War II, he brought the philosophy epitomized by Vannevar Bush (a personal friend of his) to Penn State in the 1940s with the arrival of the Ordnance Research Laboratory on campus. At Penn State, he worked underneath Milton Eisenhower, who had been part of the Truman Commission with another Penn State professor (by that point emeritus), George Zook. All these experiences can be assumed to have shaped how he entered his office in Old Main for the first time as president in 1956. At Penn State alone, he had served in a variety of offices – from being the department head of Electrical Engineering to the director of the Ordnance Research Laboratory and dean of the College of Engineering and Architecture, with a short few months as the first-ever Vice President for Research.<sup>151</sup> Yet he was also deeply attuned to the growing sense that American universities had a special responsibility to the American nation, specifically its ongoing defense and security. In his autobiography, Walker said that his goal as both department head, dean, and, later, president, was to balance the needs of the university with those of his country.<sup>152</sup>

Walker saw the university's research enterprise as the central vehicle for serving the American interest through providing science and engineering that would allow for new tactics of defense. At the Seventy-Fourth Annual Meeting of the American Association of Land-Grant Colleges and State Universities in November 1960, Walker spoke at length to the audience about how American universities took lessons from the German universities (which Walker quoted Thomas Huxley as being among “the most intensely cultivated and most productive intellectual

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<sup>151</sup> Penn State, *Walker Retrospective*, 7.

<sup>152</sup> Walker, *Now It's My Turn: Engineering My Way*, 151.

corporates the world has ever seen”) to increase their research productivity.<sup>153</sup> Walker recognized that the federal government was the “principal purchaser,” or “chief patron,” of research in America – for that reason, he says that he rejects those (like Dr. Charles Kidd of the National Institutes of Health whose words were used to introduce the stereotype) who advance the chief question facing higher education as “Can the Government get what it needs from the universities without distorting and controlling them?” Rather, Walker said the most important thing to be answered was, “How can the government get what it needs without distorting and controlling the universities?”<sup>154</sup> In the government’s recent patronage of research, Walker declared, “both the government and the universities have been well served.”<sup>155</sup>

When Walker arrived at Penn State in the latter half of the 1940s, his initial reaction was that Penn State suffered from being in “the worst of two worlds” with few well-off alumni and shrinking state support.<sup>156</sup> In 1952 the Penn State Foundation was established to “help solicit, receive, and administer funds from private donors to foster the educational objectives of the College.”<sup>157</sup> But apparently the Foundation’s success was in short supply at first – Walker commissioned a firm out of New York City in 1959 to consult on how the university would be able to “take better advantage” of its fundraising potential.<sup>158</sup> The consultants found three major issues of concern: 1) Penn State’s alumni remained “unappreciative and inactive”; 2) the State was “equally unappreciative”; and 3) internally, faculty members held up “essential adjustments.”<sup>159</sup> The graph of donations to the Alumni Fund operated by the Penn State Foundation from its inception in 1953 to the time of the report illustrates how fundraising had

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<sup>153</sup> Eric A Walker, "Reorganization for Progress," *American Association of Land-Grant Colleges and State Universities 74th Annual Meeting* (Washington, DC, November 16, 1960), 1.

<sup>154</sup> *Ibid.*, 4.

<sup>155</sup> *Ibid.*, 9.

<sup>156</sup> Walker, *Now It's My Turn: Engineering My Way*, 154.

<sup>157</sup> Board of Trustees, *Executive Committee Minutes* (Pennsylvania State University, March 28, 1952), 4.

<sup>158</sup> "A Summary Report on the Philanthropic Fund-raising Potential of the Pennsylvania State University," *Kersting, Brown, & co., Incorporated* (1959).

<sup>159</sup> *Ibid.*, 2.

fallen sharply. As for the function of philanthropy, the committee offered that philanthropic money was the only type of funding that could provide for, in Walker's words, "nearly all the finer things which make the difference between just a place where classes are held and a fine university."<sup>160</sup> To further improve the school's economic situation, Walker also implemented an early form of institutional assessment with his management mantra "sound planning based on solid information." His project to get each of the University's more than seventy departments to undertake a process of self-evaluation, consultation, planning, and tracking can be seen as a predecessor of the recent Penn State Core Council.<sup>161</sup>

Walker also found the restrictions on undergraduate instruction responsibilities to be severe for research faculty, thus creating a problem for him as an administrator.<sup>162</sup> In general, Walker had been frustrated with the military's inefficient handling of the defense build-up.<sup>163</sup> However, as the Ordnance Research Laboratory began to complete contracts and generate more work with the federal government, and the institution's successful bid to be the first institution of higher education to incorporate a nuclear reactor into its physical plant, both helped shift his spirits during his time in State College.<sup>164</sup> It was also under President Walker's watch that Penn State first moved into the emerging field of computers. A \$17,000 grant from the National Science Foundation and \$25,000 of university funds were used to build PENNSTAC, an electronic digital computer based on plans donated to Penn State by General Electric.<sup>165</sup>

Through the end of the 1950s, the frameworks necessary for expansion were laid for the Commonwealth Campus system too. The promise of mass excellence led Walker and Penn State to pursue the statewide Commonwealth Campus system in earnest. The forces, which made such

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<sup>160</sup> Ibid., 7.

<sup>161</sup> Penn State, *Walker Retrospective*, 17.

<sup>162</sup> Bezilla, *Engineering Education at Penn State: A Century in the Land-grant Tradition*, 164.

<sup>163</sup> Walker, *Now It's My Turn: Engineering My Way*, 155.

<sup>164</sup> Ibid., 169.

<sup>165</sup> Bezilla, *Engineering Education at Penn State: A Century in the Land-grant Tradition*, 186.

expansion possible, have been delineated in brief already. With a larger percentage of a growing American population wanting higher education, the demand seemed unquenchable. Not to mention new technologies that offered the promise of a technological panacea – for instance, the statement in a 1956 Board of Trustees Long Rang Development Committee report where expectations to use closed-circuit television as a way to supply the centers with “the teaching skills of some of the best professors on campus” were shared with the full governing body.<sup>166</sup> In that vein, he established a Division of Instructional Services that was charged with conducting general research on teaching methods and preparing technical aids for faculty use, including “pioneering work” on using CCTV for educational content.<sup>167</sup> The university also began operating an educational television station (WPSX-TV) that reached homes and classrooms in twenty-nine Pennsylvania counties with the content.<sup>168</sup> “Constantly concerned that the rapid growth of Penn State would tend to impersonalize the institution,” Walker established steps to see that each student was treated as an individual, such as the Preregistration Counseling Program, the predecessor of today’s FTCAP.<sup>169</sup> This program was said to have been largely responsible for Penn State achieving a dropout rate among the lowest in the nation.<sup>170</sup>

The revolution in academic research, combined with the massive leaps in access and affordability, created an underlying dynamic that would end with a far-reaching transformation in American higher education.<sup>171</sup> By the end of the 1950s, Penn State’s research enterprise had developed the processes, which would propel it forward for the foreseeable future. But the university’s campus extension system was still very much under-developed. As it became evident that unlimited growth in enrollments would create many serious problems for State

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<sup>166</sup> Board of Trustees, *Executive Committee Minutes* (Pennsylvania State University, October 12, 1956), 18.

<sup>167</sup> Penn State, *Walker Retrospective*, 24-25.

<sup>168</sup> *Ibid.*, 35.

<sup>169</sup> *Ibid.*, 22.

<sup>170</sup> *Ibid.*, 31.

<sup>171</sup> Geiger, *Research & Relevant Knowledge: American Research Universities Since World War II*, 215.

College, Walker initiated around this time a comprehensive study of Penn State's existing off-campus centers in order to determine "how they would most effectively contribute to the overall development of the university."<sup>172</sup> To that end, in 1957, the Board of Trustees voted to formally explore "the ways and means for integrating the university's several Center's with the main campus in meeting the expanding demand for the University's services."<sup>173</sup> The thought was that if money could be found to upgrade the centers into full branch campuses, they could alleviate space constraints at University Park, while placing the students "on a pleasant and well-designed campus, with competent faculty, adequate buildings and equipment, and proper facilities for athletics and social programs – each one a credits to its community, to the university, and to the commonwealth."<sup>174</sup> As exclaimed in a trustees report on the history and background of general extension, the university seemed "to be literally on the threshold of a vast new era of service."<sup>175</sup>

The university planned the Commonwealth Campus system to handle immediate and significant growth in demand for undergraduate and, to a lesser extent, graduate education across the state. The period between 1957, when the trustees and president formally moved to explore expansion, and 1962, when the university's landmark report on the "future development of new and expanded facilities and programs at the Commonwealth Campuses" was published, contained a fair bit of visible action regarding policy that, in retrospect, can be seen to have prepared the way for the ensuing period of rapid growth. For instance, in 1958 the university differentiated 'Extension' activities and the Baccalaureate degree work we now typical associate with Commonwealth Campuses. Community acceptance of the expanded Penn State branch campus was also, at least officially, the first limiting factor in the decision-making process. It was formally declared that any expansion "must always be done with careful regard to other

<sup>172</sup> Penn State, *Walker Retrospective*, 13.

<sup>173</sup> Board of Trustees, General Policies Regarding Extension (Pennsylvania State University, July 29, 1958), 1.

<sup>174</sup> Penn State, *Walker Retrospective*, 14.

<sup>175</sup> Board of Trustees, Executive Committee Minutes (Pennsylvania State University, July 27, 1957), 3.

educational institutions and to avoid the duplication of educational services.”<sup>176</sup>

The university outlined its formal plan for growth of the commonwealth campuses in a report prepared by K. L. Holderman, the then-coordinator of the system, in April 1962. At the time, 44 of Pennsylvania’s 67 counties were home to one of the 125 institutions located in the state, plus a branch campus maintained by both Temple University and the University of Pittsburgh each.<sup>177</sup> Holderman stated that the report was “the genesis of Penn State’s proposal that it attempt to accommodate a total of 35,000 students by 1970 – 25,000 out of which would be at University Park and 10,000 at the Commonwealth Campuses.”<sup>178</sup> Holderman expected that the expansion would require a minimum of \$1,250,000 in new annual operating money (to cover the difference between expected total cost and expected tuition).<sup>179</sup> At the time, Penn State enrolled approximately 23,000 students total – 18,000 at University Park and 5,000 at other locations.<sup>180</sup> When Walker retired, in 1970, Penn State’s actual enrollment would be 48,000 – 26,000 at University Park and 22,000 at other locations.<sup>181</sup>

### ***The Multiversity***

Colleges and universities have always been at once a part of society and a sanctuary outside of it.<sup>182</sup> But in the past 60 years, the distinction between the two has become increasingly difficult to make. In the wake of World War II, higher education increasingly became a national affair, one in which each individual institution found itself responding to a greater number of “publics” than they had ever before. Clark Kerr, the first Chancellor of the University of

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<sup>176</sup> Board of Trustees, General Policies Regarding Extension, 3-4.

<sup>177</sup> K L Holderman, *A Report on the Future Development of New and Expanded Facilities and Programs at the Commonwealth Campuses of the Pennsylvania State University* (Pennsylvania State University, April, 1962), 9.

<sup>178</sup> *Ibid.*, 5.

<sup>179</sup> *Ibid.*, 14.

<sup>180</sup> "Historical Comparison of Enrollment," *Penn State University Fact Book*,

<http://www.budget.psu.edu/Factbook/studentdynamic/HistoricalComparisonOfEnrollment.aspx?YearCode=2011&FBPlusIndc=N> (accessed April 7, 2012).

<sup>181</sup> *Ibid.*

<sup>182</sup> Geiger, *Research & Relevant Knowledge: American Research Universities Since World War II*, 8.

California Berkeley and the twelfth President of the University of California System, was the first to seriously expand on the idea of the “multiversity,” but it has taken root practically, if not consciously, at nearly all post-secondary institutions in America. Kerr was the first prominent public figure to describe how the postwar university was in fact going to be the product or broader forces then pushing the nation from an industrial to a post-industrial society, where expert knowledge, not labor or raw materials, were the essential components for economic wellbeing.<sup>183</sup> Research activity, for one, served as a tool for economic development at both a local and national level, and so, for that reason, academic knowledge generation has become firmly embedded within the political economy.<sup>184</sup> The effects of this shift have been multiple, ranging from the introduction of new fields of study such as nuclear engineering and Russian studies, which bore direct impact on the nation’s geopolitical interests, to the growth of industrial research and the newfound need for scientists and schools to be “academic entrepreneurs,” constantly promoting themselves and their work to potential patrons.<sup>185</sup> Additionally, as STEM professionals replaced teachers as the country’s largest professional group following the 1940s, academics in corresponding fields saw their compensation increase relative to colleagues in humanities and social sciences.<sup>186</sup>

The rise of the multiversity was also stimulated by the increases in demand for higher education that the Truman Report had predicted a decade before. In 1955, Kerr wrote an article titled “Just Ahead... Berkeley’s Greatest Permanent Growth,” that outlined four of the main reasons that it, in particular, was growing rapidly at that period. All but one were also applicable to Penn State during the 1950s. The first reason he offered was most obvious – the quick rise in

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<sup>183</sup> R S Lowen, *Creating the Cold War University: The Transformation of Stanford* (University of California Press, 1997), 2.

<sup>184</sup> A S Metcalfe, "Theorizing Research Policy: A Framework for Higher Education," *Higher Education* (2008): 241-275.

<sup>185</sup> Lowen, *Creating the Cold War University: The Transformation of Stanford*, 3.

<sup>186</sup> Bentley Glass, "The Academic Scientist, 1940-1960," in *American Higher Education Transformed, 1940-2005: Documenting the National Discourse*, ed. Wilson Smith and Thomas Bender (Baltimore, MD: JHU Press, 2008), 27.

the birth rate through the 1940s and beyond. This trend had national implications, and its general impact at Penn State is described elsewhere in this article. Kerr also said that the increasing demand for college education was having a major effect on the growth of institutions like Berkeley. One of the four reasons Kerr gave was particular to the west coast; he noted that “the great war and postwar migration” had placed California’s population second in the nation. Finally, he suggested that private colleges and universities, “facing the impending flood of students,” tended not to plan enrollment increases to any great extent. Kerr said that despite all these factors accelerating Berkeley’s growth, it was his goal to still maintain a campus atmosphere for the students such as alumni “will remember from their own student days.”<sup>187</sup>

The multiversity, inasmuch as it represented a new paradigm for institutions of higher education, also represented a new set of potential problems. Robert Paul Wolff in *The Idea of the University* tackles Kerr’s theory, calling it a “complete failure” in not recognizing the “sharp distinction between the concepts of effective or market demand and human or social need.” Wolff claims the failure to distinguish between the two concepts was “a perfect expression of liberal ideology.”<sup>188</sup> Wolff takes the university to fault for its beguilement of the public through this oversight; he says what Kerr calls the multiversity’s responsiveness to national needs is “nothing more than its tendency to adjust itself to effective demand in the for of government grants, scholarship programs, corporate or alumni under-writing, and so forth.”<sup>189</sup> Wolff thought that the advent of the multiversity put into jeopardy the tradition of universities as being the only institutions “rich enough, powerful enough, possessed of sufficient moral and intellectual

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<sup>187</sup> Clark Kerr, "Just Ahead... Berkeley's Greatest Permanent Growth," in *American Higher Education Transformed, 1940-2005: Documenting the National Discourse*, ed. Wilson Smith and Thomas Bender (Baltimore, MD: JHU Press, 2008), 90.

<sup>188</sup> Robert Paul Wolff, "The Ideal of the University," in *American Higher Education Transformed, 1940-2005: Documenting the National Discourse*, ed. Wilson Smith and Thomas Bender (Baltimore, MD: JHU Press, 2008), 52.

<sup>189</sup> *Ibid.*, 52.

authority to cry Nay, Nay, when every other voice says Yea, Yea.”<sup>190</sup> Kerr’s vision of the university posed a threat to what Wolff saw as an essential conservative role of higher education.<sup>191</sup>

William F. Buckley discussed similar threats to the traditional conservative elements of higher education in his seminal 1951 work *God and Man at Yale*. Wrote the year after he had graduated, Buckley’s thesis was that academics were “cannily” donning the “protective cloak of research to include his activities a *teacher*, thereby insuring to himself license in the laboratory, which is right and proper, and license in the classroom, which is wrong and improper.”<sup>192</sup> Contrary to the view of many in higher education who see scholarship and teaching as deeply related, Buckley argues they are so only “by convenience, by tradition, and by economic exigency.”<sup>193</sup> Buckley argued that academics were using this sleight-of-hand to advance a liberal ideology and, as the title of the book suggests, a turning away from traditional conservative and religious values. Buckley was not commenting on the amount of funding for federal research as such, but rather how the values associated with traditional scholarship, so critical to research as described by Bush in *Science, the Endless Frontier*, were being applied within the institution to an activity (teaching) on which it had no relation. The vastly expanded research efforts of a typical “multiversity” also affected the nature of undergraduate education in other ways, according to at least some contemporary critics who argued that federal research programs reduced the time that senior university faculty can devote to undergraduates, and therefore attenuated the personal aspects of undergraduate education (an effect made more pronounced by

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<sup>190</sup> Ibid., 52.

<sup>191</sup> Ibid., 53.

<sup>192</sup> William F. Buckley, "God and Man at Yale," in *American Higher Education Transformed, 1940-2005: Documenting the National Discourse*, ed. Wilson Smith and Thomas Bender (Baltimore, MD: JHU Press, 2008), 37.

<sup>193</sup> Ibid., 37.

enrollment growth).<sup>194</sup>

Through the 1950s, federal government support of higher education was sustained, further enabling the rapid growth of colleges and universities. The Korean War GI Bill (officially known as the Veterans' Readjustment Assistance Act of 1952) extended educational benefits to veterans who had served in the Korean War beginning June 27, 1950. Veterans were entitled to a period of education one and a half times the duration of active service, an increase from the one to one ratio of the initial GI Bill. Another major change was that the money wouldn't be directed to the institutions providing the education; rather, veterans would be instructed to pay for it and other expenses with a \$110 per month allowance (or \$135 per month with one dependent and \$160 per month with more than one dependent). The only direct fees to the post-secondary schools were \$1.50 per veteran monthly to assist in defraying costs of reports and certifications. By the start of the school year that fall, already 100 Korean War veterans had been interviewed for admittance to Penn State.<sup>195</sup>

The National Defense Education Act, signed into law in 1958, was a piece Cold War legislation meant to address the sense, warranted or not, that American science was falling behind its Soviet counterpart – a sense made manifest in many Americans by the success of the Soviet's Sputnik satellite. The Act created a number of new programs related to higher education. Low-interest loans were authorized for students who wished to teach in elementary or secondary schools and students whose background “indicates a superior capacity or preparation in science, mathematics, or a modern foreign language.”<sup>196</sup> An additional \$70 million annually from 1959 to 1962 was directed towards state educational agencies for the acquisition of equipment suitable for use in providing education in science, mathematics, or modern foreign

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<sup>194</sup> Harold Orlans, "The Effects of Federal Programs on Higher Education," in *American Higher Education Transformed, 1940-2005: Documenting the National Discourse*, ed. Wilson Smith and Thomas Bender (Baltimore, MD: JHU Press, 2008), 402-403.

<sup>195</sup> Marshall O Donley, "Student Inflow Expected to Fill All Dormitories," *The Daily Collegian* (1952): 1.

<sup>196</sup> National Defense Education Act of 1958, Public Law 85-864, U. S. Statues at Large, Title 2, § 204.

language.<sup>197</sup> Thousands of fellowships in graduate programs that would prepare future college professors were also funded.<sup>198</sup> The government offered to fund “Language and Area Centers” for emerging powers at not more than 50 percent of the total cost. The act also authorized travel stipends for language study.<sup>199</sup>

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<sup>197</sup> Ibid., Title III, § 301.

<sup>198</sup> Ibid., Title IV, § 403.

<sup>199</sup> Ibid., Title VI, § 601,

## Conclusion

By most measures, Penn State satisfies Kerr's concept of the multiversity. What's more, this concept is very similar in character to our own Eric Walker's idea of "mass excellence" – Penn State provides both quality and quantity in most everything that it does. Penn State's growth under Walker's leadership has been outlined above. His leadership of Penn State's 500% growth in research expenditures and 300% growth in enrollments over his 14-year tenure was performed with the same attention to detail as he had his engineering work before. State appropriations also grew substantially during this period as well, expanding from \$25 to \$70 million over the period as the sparkline to the right shows: .<sup>200</sup> Yet this expansion into mass education was by no means universally applauded. In an opinion piece titled "Education for All is Education for None," Douglas Bush argued that state universities were "admitting all who choose to walk in the front door and then, with much trouble and expense, trying to get rid of some through the back door."<sup>201</sup> Perhaps that hints at a reason why Walker spent time working on improving the first-year experience, such as by creating the FTCAP-predecessor mentioned earlier. John Gardner in "Excellence: Can We Be Equal and Excellent Too?," questioned the notion of providing truly quality education at scale from a different angle than Bush. Gardner acknowledged that the "notion that so-called quality education and so-called mass education are mutually exclusive is woefully out of date."<sup>202</sup> Gardner explained that he didn't have an issue with allowing "average" students into college, but he thought that too many of them – "average or brilliant" – were being allowed to float through college without truly gaining an education.<sup>203</sup>

Back in 1945, the members of the Truman Commission offered a once-off remark that

<sup>200</sup> State Appropriation History, *Penn State University Factbook*, July, 2012.

<sup>201</sup> Douglas Bush, "Education for All Is Education for None," in *American Higher Education Transformed, 1940-2005: Documenting the National Discourse*, ed. Wilson Smith and Thomas Bender (Baltimore, MD: JHU Press, 2008), 91.

<sup>202</sup> John Gardner, "Can We Be Equal and Excellent Too?," in *American Higher Education Transformed, 1940-2005: Documenting the National Discourse*, ed. Wilson Smith and Thomas Bender (Baltimore, MD: JHU Press, 2008), 92

<sup>203</sup> *Ibid.*, 94.

seems relevant to the growth Penn State would see over the following few decades: “The megalomania of some of our state and municipal universities must give way to decentralization.”<sup>204</sup> On the contrary to the report’s behest, the development of the Commonwealth Campus system represents an effort to centralize Penn State’s position as the greatest provider of quality undergraduate and graduate education at scale in Pennsylvania. That’s not even to mention the university’s stewardship of a \$50 million donation from the Milton S. Hershey Foundation to establish the Penn State Milton S. Hershey Medical Center in 1963. With a deep background in “Big Science,” Walker had been instrumental in making Penn State an asset to the federal government, specifically the military, in its research and development of new science and technology. Through his presidency of the university, Walker took that relevance to the federal government and attempted to put Penn State in a position of service for the state government as well; he apparently subscribed to Kerr’s theory of the multiversity to the extent that Penn State certainly gained a considerable number of new constituencies during Walker’s reign. Walker had achieved “something of an educational miracle,” as he set out to. Penn State could safely be said as achieving mass excellence – in its mission to the state, the mass excellence that mattered was the massive increase and enrollments; in its mission to the country, mass excellence was found in the cutting-edge science practiced by the Ordnance Research Laboratory and an increasing number of other units on-campus.

Mass excellence in research and education both have put Penn State in a class near by itself – the combination of a statewide campus network and a world-class research university is unique -- and undoubtedly the combination has presented equally unusual challenges and opportunities, tensions and synergies, for more than a half-century. But a *fait accompli* does not necessarily connote a positive institutional development. This is a fact we must keep always in

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<sup>204</sup> Zook, 22, Volume 3

mind whenever working with institutions, whether government, religion, education, or otherwise, which can develop unhealthy tendencies towards self-preservation. Penn State grew tremendously during that period – the continuing success of the football program didn't hurt in the accretion of prestige, either – and so, as the university began the 21<sup>st</sup> century, its local, regional, and national stature was greater than ever. Yet the university now faces crises more treacherous than any in its 157-year history. Penn State changed significantly during Walker's reign, and as the university looks to move forward in a difficult economic and legislative environment, objective scrutiny of our current operations is extremely timely. The development of the Commonwealth Campus system, the fostering of deep relationships with the Department of Defense, and other changes that mark the transition from the "Pennsylvania State College" to the "Pennsylvania State University" have brought many visible benefits to the institution and those associated with it. Yet their history, purposes, and actualities must always be considered in the full in order to make the best possible choices regarding tough decisions the university might need to make going forward. As Walker put it, he executed the duties of his office with "sound planning based on solid information." Given the situation Penn State faces now, we had better heed the direction he set.

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