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## On the Need for Graduate Education

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1964

In the last few years this region has become acutely aware of the need for graduate education. Dr. Jones suggested that I discuss that need, analyze how real it is, and describe what measures are being taken to meet it. Let me begin by showing you some figures with which, I suspect, you are familiar, but which serve to orient our problem. A discussion of doctoral degrees will illustrate the problem. Let's take a look at how the number of doctor's degrees, outside of medicine, have increased over recent years. This chart, Figure 1, illustrates the increasing rate at which doctors are being produced. It is, of course, irregular but matches ~~pretty~~ fairly well to a 7% annual increase. It can be seen here that while there were some 45 Ph.D.'s in 1890 turned out, in 1962 there were 11,800 some odd and this past year just about 14,000. For prediction purposes we might plot this information on semilog so that the 7% shows up as a straight line. And on Figure 2, we see the <sup>result</sup> increase. The two big drops occurred during the wars. Notice that the rate leveled off about 1950 and then began to drop for a few years. These years correspond to the time, seven to eight years before, <sup>when</sup> young men were being inducted into to the army. The rate now is rising at about 10% and is likely to continue this more rapid growth.

These 14,000 doctorates we are talking about are spread across several fields. We can group them into the physical sciences, which cover chemistry and physics, mathematics and engineering, biological sciences; the social sciences, including history and economics, the arts and professions, including literature, languages, law, business

administration, philosophy, fine arts and others; and education. We can imagine, I suppose, that the relative number in these various fields changed over the years. This next chart shows, however, <sup>a</sup> rather surprising stability. The physical sciences continue to dominate at about 30%. Education increased from about 10% to about 15%, this gain coming at the relative expense of the arts and professions. But for the most part the distribution has been steady. <sup>You might also see the change for BA & MA. etc.</sup> We could look in somewhat more detail at the physical sciences. We note that chemistry is staying <sup>fairly</sup> ~~about~~ steady in total production and is therefore relatively less important. <sup>This subject</sup> It has long been the leader but has recently been surpassed by the rapidly increasing field of engineering. Engineering, we might note, is not increasing at the baccalaureate level, but, as I am sure most of you have heard, graduate work <sup>in this field</sup> is becoming a necessity. Physics and mathematics are both increasing sharply. The geo-sciences have recently leveled off, and, I suppose, will remain steady. You might be interested to know that <sup>in</sup> Texas, over the past 40 years, the <sup>greatest number of</sup> ~~most~~ doctoral degrees have gone to education, next to biology, then to chemistry, ~~then~~ followed by psychology, physics, history, English, math, and economics. There have been four times as many degrees given in education <sup>as</sup> than in English. While we are playing these numbers games, you might be surprised to see the <sup>way the</sup> percentage of women doctorates <sup>has</sup> ~~have~~ varied in the fields since 1920. I, at least, was surprised to see that the percentage had dropped in the ~~phy~~ physical sciences, the biological sciences, the social sciences, and the arts and professions. Only <sup>teacher</sup> education has shown a slight increase in relative value. One other

side view might be interesting. The time required between <sup>7</sup>the B.A. and the Ph.D. has slightly increased in the physical sciences, more decidedly so in the arts and in education. Notice that in physics <sup>the time span</sup> ~~it~~ is about 8 years now, in education about 15. Education runs high because of <sup>the</sup> many <sup>candidates</sup> (teachers) who take graduate work only in the summer. Most of the degrees reflect <sup>that there is</sup> a two or three year period after the work is completed before the dissertation is accepted. Many <sup>graduate schools</sup> ~~schools~~ are concerned now with this long time lag, and a greater effort is being made in pushing students through. But certainly students are neglected during their graduate years and allowed to muddle unnecessarily through their research and dissertation. We should <sup>indeed</sup> ~~certainly~~ like to avoid this situation in the programs we pursue here.

More than half the doctorates <sup>in America</sup> are given in the top 20 institutions. This concentration, however, is less marked now than it has been in the past. This graph showing the percentage given by the top 5, 10, 15, or the top 20 all show a declining percentage, reflecting the increasing importance of the many state schools and a few new private schools. Whereas the top 20 once gave <sup>87% of the doctorates they are responsible for, only</sup> ~~81%~~ in 1920, now <sup>9</sup> ~~about 53% in the top~~ ~~20 schools~~. These top 20 schools have not remained the same. You will notice that Columbia has remained at the top substantially from ~~1920~~ 1925 on, but notice ~~that~~ Chicago, starting at the top in 1920, holding at second for 25 years, then suddenly dropping to 5th, to 10th, to 14th, and, I think, still dropping. Not only the percentage has declined at Chicago, but in recent years the actual number of degrees. We might see the decline of Fordham, falling out of the top 20 in 1930 and <sup>the rise of</sup> ~~the rise of~~ Catholic U., <sup>which</sup> in 1920 stood ~~about~~ 18th, ~~making~~ <sup>producing</sup> about 15 a year, ~~rose~~ <sup>rose</sup> rising to

fall of

14th position in 1940 with 77 per year, then dropped <sup>ing</sup> to 19th, then out of the picture in 1950. In 1961 it <sup>(C. U. turned out doctrine, a figure)</sup> had 83, which put it about 35th in the country. Notre Dame had about half that many, 43. You will notice that in the South the only representative is <sup>tell of which</sup> Texas, <sup>met 17 th</sup> who cracked into 20th position briefly in the 1950's and now is in 23rd position with 156 doctorates.

~~It is the only one from the South~~

We might take a look at the relative production of Ph.D.'s. On this chart we can identify different areas by the shading on the map; squaring it up somewhat, we can see the land areas represented and then the relative population. The baccalaureate degrees produced show a relation to the population, but you will notice that the Texas region, 7, has only about half the relative importance in baccalaureate degrees <sup>much</sup> and a smaller ratio in doctorates. We notice that more than half of our students go away from this region for their doctoral studies and figures indicate <sup>that</sup> they do not come back. The relative values between the population/ ~~size~~ size and the doctoral production size is alarming. We have come to think of the science-oriented industries in our region as bringing in a great number of advanced degrees and, indeed, they do, but they do not nearly compensate for the number of doctorates who leave this region. That is, for every 8 Ph.D.'s that originate from this region, only 6 Ph.D.'s settle down here. If Ph.D.'s have any great value for our economic and social situation, then we must take steps to enlarge area to be at least the ~~ix~~ size of the population area if we are to prosper. Now, as it happens, most students pursue graduate work within 150 miles of their home. If we look at a map of this region,

we see that 150 miles just <sup>reaches</sup> gets to A & M, is somewhat short of Austin, and about the same distance short of Norman. There have been <sup>very</sup> ~~many~~ few doctorates produced in this region. A & M produced 33 in ~~1962~~ 1961, Baylor 13, North Texas 16, TWU 6. Last year we note SMU turned out an economics doctorate, TCU a physicist. Southwest Medical School, over the past decade, has turned out 6 Ph.D.'s, and these eight just about represent the Fort Worth-Dallas production thus far, although there are some 800 doctorates in the two counties.

*light*  
The Chamber of Commerce made a survey of the various institutions in the region, ~~academic~~, financial, and industrial. The estimates <sup>for</sup> ~~needed~~ <sup>needed</sup> of doctoral, or post-doctoral employees <sup>needed</sup> for the ~~five~~ next five years <sup>were</sup> ~~was~~ 1,976 and 2,164 Master's degrees. The Master's degrees do not reflect the actual condition very accurately. Last year SMU turned out 251 Master's degrees, North Texas 308, East Texas something over 300, TCU 87, etc. Most of these degrees are in education and are earned by people who are holding positions and are not on the market for change. SMU produces about 130 Masters and Engineers each year and, again, these people, for the most part, are holding positions, although I can't say they are not in the market for change. But, before we get into the Master's problem, let's take a little more realistic look at the 400 doctorates per year indicated in this survey. In the 150 mile radius we have some 3 million people, about 1/15th of them ~~are~~ of college age, and we are rapidly approaching the time when half of the high school graduates will enter college. If we have 100,000 college students, and, let's say, a 20 to 1 ratio, we would have 5,000 professors. If

we allow a 25 year life per professor, we have some 200 professors per year needed. If we allow half with Doctor's, half with Master's, we have our 100 per year in each category. This is about the number <sup>in the study mentioned</sup> the survey indicated. Investment firms indicated the need of about 25 doctors a year and manufacturers 125 a year. Research Institutes indicated a need of about 150 a year, which brings us to the <sup>500</sup> 400 per year estimated, but I suspect the research institutes is a temporary need, not one we can count on continuously. None the less I think a figure of 300 Doctorates per year would be conservative for what we are likely to realize. According to the nature of things, 300 Doctorates would indicate about 3,000 Master's degrees, and I suspect this is about <sup>the need</sup> the need in our region for Master's degrees in the near future.

Let's divide these degrees up among five state schools and five private schools. Let the state schools produce 3/4's of these degrees and divide up the remaining degrees among the five private schools. That would give a place such as the University of Dallas 15 Doctor's degrees, 150 Master's degrees per year, a total graduate population of about 300, and, I suspect, that is quite in line with our intentions.

Now let's look briefly at the present graduate programs in the area. Outside of theological schools, there are now five institutions <sup>of medical</sup> giving graduate degrees in our immediate area. They are North Texas, Texas Women's University, in Denton, and Southwestern Mecial School ik Dallas, as state schools, and there are SMU and TCU as private schools. (In addition, there are education only Master's degrees at TWC and Austin College just outside our region. At nearby Commerce, East Texas gives a range of degrees. Doctoral programs are, as yet,

sparse. Southwest Med School has long granted degrees in various biological sciences. SMU has an economics program through the Doctor's, which has produced one graduate, and has ~~an~~ <sup>one program in</sup> Engineering and expects to start one in electrical engineering shortly. TCU has a program in psychology, in English, in Physics, and in mathematics. North Texas has just been given approval to go ahead in physics, mathematics, chemistry, and has already offered a doctorate in education. TWU has been approved in biochemistry and offers some programs in education, including physical education. These are the extent of the non-theological, non-medical programs now in operation. Arlington State and the University of Dallas have both indicated intentions of instituting new programs.



My discussion thus far has been purely quantitative. The appearance has been that it is the degree that is important, not the wisdom which is associated with the degree. It might well be chimpanzies that are educated to the doctorate, as far as all these statistics are concerned. The question remains, why do we need doctor's degrees? And why do we need Master's? Let me begin the answer to that question by proposing a philosophy of education which tends to give meaning to the level of degree sought. The American educational system is designed to produce a literate, communicating citizenry. Literacy is a minimum economic requirement. We fail frequently to realize the problems imposed by an illiterate working class. <sup>Patrick</sup> Mr. Haggerty was describing to me some of the problems <sup>it's</sup> they run into in their Italian plant near Naples. Here education stops at about the fifth grade, and <sup>with</sup> there has been some time <sup>slapsing</sup> between the <sup>cessation</sup> stopping of education and the beginning of work. In their plant all the signs must be made with symbols, not words. Directions cannot be written. We have then the paradoxical situation of one of our most modern <sup>world</sup> industries being manned by workers who are essentially uneducated. Well, perhaps that is the direction <sup>in which</sup> that visual aids tend anyway. Of course we expect more than a minimum in our educational system. In point of fact we devised a system which would prepare people to operate a fairly complex technological society, economically and politically, and to a degree at least, culturally. Or perhaps I should put it -- we replaced the natural folkways of culture by a

more formal appreciation of artifacts. This development showed up in our sports, as well as in our music, painting, literature, and drama. Education through the high school was designed to satisfy this requirement. College work was professional training for the most part, although there <sup>have</sup> ~~was~~ always the liberal arts schools for the elite. That situation has changed. Both the demands and the possibilities of our economic system ~~have~~ placed an increasing importance upon college-level studies. About 1/4 of the high school graduates now go on to college and that figure is likely to rise to about 1/2. That change has been accompanied by a shifting of the professional interests to graduate work, as it was all along in law and in medicine, and I think we can now begin to define the degrees more precisely than in the past. The Bachelor's degree is the general liberal arts award, which we expect now from a large segment of our citizenry. We have all seen, I think, the changes in our society which have engendered this shift. I recall a quarter of a century ago, when I was married, that the knick-knacks which came as wedding presents were for the most part ~~monstrous~~ monstrosities which we hid in the back of closets. They were the product of a commercial society whose aesthetic tastes <sup>was</sup> were poorly developed. Today the most casual gift is likely to be well designed. There is, I think, no reason to go into all the ramifications of these changes, but I think we have no difficulty in recognizing that the society for which we are preparing citizens today is quite different from a quarter of a century ago. There is a certain level of cultivated tastes that is expected of the educated person. I have spoken from time to time of the new synthesis

<sup>arising</sup>  
~~arriving~~ in our society. This wide-spread, widely shared appreciation for works of the human imagination is one marked evidence of this new synthesis. <sup>The first graduate program</sup> The professional work, then, goes to the graduate years. And I think we can specify the Master's degree as <sup>a</sup> ~~the~~ mark of ~~payment for~~ professional competence. In a way, the Master's degree replaces much of the apprenticeship formerly expected of the Bachelor when he entered the professional world. In any case I think we can accept as a guiding criterion for Master's level work the attainment of the skills appropriate to a profession. These skills are based on a fair understanding of the fundamentals, this understanding having been <sup>attained</sup> ~~obtained~~ in the baccalaureate years, and of course, the understanding of fundamentals ~~deepen~~ deepens during this time of additional study. <sup>but</sup> The aim for Master's level work is proficiency, and I suspect that generally this period will come to occupy more than a year which is the formal requirement for the degree. In actuality <sup>often</sup> Master's degrees do take longer and many professional programs, such as the Business Programs at Harvard and other places, are designed deliberately to cover 18 to ~~20~~ months.

The Doctoral degree is a philosophic degree. Too often, perhaps, the doctoral degree is thought of as a super Master's degree, as <sup>involving</sup> simply greater and greater proficiency. I propose that <sup>this concept</sup> ~~that~~ is a <sup>based on</sup> ~~based on~~ <sup>a</sup> misapprehension of what the degree intends. We expect the Doctor's degree to be an evidence of wisdom, of responsibility for the shaping of that discipline and the enhancement of a profession. It we accept then these three levels of ~~graduate work~~ of higher education is there

<sup>once, several years ago,</sup>  
 a need for doctor's degrees in business? I recall that when a student  
 of mine asked me, "where do I go to get a Ph.D. for business?" I replied  
 somewhat stiffly that Ph.D.'s were not intended for business. Now I  
 think that I was wrong in that sentiment. We do need men of a philo-  
 sophic, reflective turn of mind, which the Ph.D. represents, in critical  
 positions in industry for it is <sup>such</sup> ~~these~~ men who will alter the structures  
 of society and build it into a world which you and I will find  
 satisfying. These men will have doctoral degrees in engineering, as  
 well as in science, in business management, as well as in economics,  
 in journalism, as well as in English, but the years of study beyond the  
 Master's <sup>should not be given to end techniques</sup> ~~are not~~ mere crafts, <sup>they should be spent in</sup> but ~~are~~ profound and penetrating analyses  
 of society and of the discipline which their profession represents.

Of the 300 doctorates, which I said this region needs to produce,  
 then, something like 100 a year should be in engineering and business  
 fields, the other 200 <sup>should be</sup> ~~are~~ spread across the ~~fields~~ disciplines with  
 some concentration for the scientific, as it always has been.

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Economics	-	2	-	-	2 (1) 1
English	53	108	69	59	54
French	11	-	1	-	1
German	-	11	1	-	-
Spanish	-	13	11	23	22
Security	-	2	-	1	2
Social	4	-	-	3	-
History	21	3	21	21	56
Math	32	64	58	110	49
Philosophy	-	2	1	-	1
Psychology	66	47	713	-5	23
Religion	138	124	94	105	127
Sociology	-	15	11	11	-
Speech	-	3	-	1	11
Art	11	-	3	-	11
Chem	11	1	-	-	27
Gen	6	3	1	7	42
Phys	-	7	1	2	65
Music	13	6	12	16	21
Teach Ed.	28	30	18	11	13
Engineering					
Aero Space	4	13	18	15	10
Civil	3	5	15	18	14
Electrical	14	34	57	40	27
Industrial	1	5	3	2	2
Mechanical	18	32	18	24	21
Nuclear	11	9	16	13	6
Bus Adm					
Accounting	7	6	8	6	6
Finance	1	1	2	3	7
Management	16	14	11	15	9
Marketing	6	3	7	6	4
Exec Adm	1	-	20	16	3

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Texas Commission on Higher Education

HEAD-COUNT ENROLLMENT  
Nineteen Fully State-Supported Academic Institutions in Texas  
Fall Semesters, 1952-1962 <sup>1/</sup>

Institution	1952	1953	1954	1955	1956	1957	1958	1959
University of Texas	12,772	14,003	16,000	17,521	18,156	16,985	17,792	18,442
Texas Western College	2,334	2,898	3,478	3,891	3,839	3,578	3,614	3,711
A. and M. College of Texas	6,277	6,198	6,258	6,834	7,200	7,469	7,077	7,091
Arlington State College	1,258	1,596	2,205	3,121	4,083	4,774	4,990	6,439
Tarleton State College	663	709	753	778	959	1,072	1,078	1,013
Prairie View A. and M. College	2,491	2,538	2,576	2,743	2,579	2,491	2,492	2,461
Texas Technological College	5,160	5,418	6,257	7,156	8,055	8,564	8,768	8,866
North Texas State University	4,422	4,563	4,937	5,509	6,177	6,212	6,779	7,023
Lamar State College of Technology	2,504	3,080	4,090	4,554	5,302	5,556	5,748	5,848
Texas College of Arts and Industries	1,928	2,102	2,280	2,440	2,669	2,784	2,872	2,962
Texas Woman's University	1,767	1,610	1,781	2,002	2,224	2,313	2,362	2,481
Texas Southern University	2,065	2,452	2,780	2,985	2,927	2,701	2,835	3,014
Midwestern University <sup>2/</sup>	1,235	1,287	1,308	1,350	1,530	1,402	1,384	1,502
East Texas State College	1,816	1,772	1,887	2,187	2,200	2,404	2,601	2,801
Sam Houston State Teachers College	1,603	1,785	2,008	2,313	2,822	3,100	3,466	4,002
Southwest Texas State College	1,562	1,597	1,816	2,118	2,258	2,265	2,278	2,418
West Texas State College	2,019	2,186	2,240	2,588	2,968	2,925	3,198	3,181
Stephen F. Austin State College	1,217	1,153	1,356	1,696	1,757	1,846	2,017	1,968
Sul Ross State College	<u>541</u>	<u>634</u>	<u>772</u>	<u>867</u>	<u>779</u>	<u>874</u>	<u>968</u>	<u>923</u>
Total	53,634	57,581	64,782	72,653	78,484	79,315	82,319	86,146

<sup>1/</sup> As of October 15 through 1958, as of Twelfth Class Day since 1959  
<sup>2/</sup> Not a fully State-supported institution prior to 1961