It is a pleasure to comment on Fritz Machlup's provocative essay on higher education. Sometimes in arguments about educational matters it is necessary to pull one's punches because the opponent is not used to vigorous intellectual give-and-take. Since this certainly is not the case for Professor Machlup, I shall state my critical arguments about his essay in unvarnished form. In one way or another, I disagree with almost everything he has to say. My task is to try and say why, and at the same time to express my conviction of the importance of the issues he raises and the respect I hold for his defense of his position.

My essay is organized under arguments of distinct kinds. I begin with the semantic argument and end with the moral and social argument. When I speak of the argument, I do not mean that there is a single argument but rather a cluster of arguments that can be loosely classified together.

THE SEMANTIC ARGUMENT

Machlup begins his essay with attention to the use of the word "universal" and with what he considers to be the corrupt usage found in much of the educational literature. In retort, I find his way with words far from clean or precise. He says in his first paragraph that he is "a stickler for clean definitions and uncorrupted word meanings . . ." Not
only am I a stickler, but I am also a theorist of definitions. One of the first theoretical points I make is that the whole discussion is in an area in which we can scarcely expect exact definitions, precise concepts, and pure meanings to carry the day. An important aspect of intellectual discussion is to recognize when it is being conducted on soggy ground and when it is on something as firm as rock. Necessarily, the discussion of universal higher education is on soggy ground, and we shall not be able to begin or end with precise definitions and logically tight concepts.

There is, it seems to me, a commonsense meaning of “universal education.” It is not one we have to strain over; it is reflected in our present society by the very large percentage of students who graduate from high school and go on to college. We thus can talk not only about universal elementary education but also about universal secondary education and universal higher education. We do not mean something deep and significant by the phrase “universal higher education” but just that a large percentage of the appropriate age group continues some form of formal education beyond high school. I do not think, for example, that in terms of Machlup’s distinctions he would want to say that we do not have universal secondary education in this country because less than 75 per cent of the appropriate age group graduates from high school. I shall pass over the problem of defining “universal.” What he has to say about the universal quantifier “all” is easily expanded upon in terms of standard logical usage. The real issue seems to center on what he has to say about the definition of “higher,” and not about the definition of “universal,” in the phrase “universal higher education.”

A little later in his paper he says that he defines higher education as “the education of scholars and scientists . . .” When, a couple of paragraphs after this, he refers to “my own definition of higher education as the education of actual and potential scholars” [emphasis added], any sensitive user of words knows that we are on treacherous ground. In the first statement there is no mention of potential scholars, and in the second there is a distinction between actual and potential scholars.

If we take the first definition literally, it is clear that it is a bizarre definition used only by him—or at least by a very small number of people. While I have in mind just the ordinary sense of words, I also have something more in mind than just the vagueness and trickiness of his characterization. Even if we assume that he intends the second definition to apply not just to scholars but also to potential scholars, I think the condition is neither necessary nor sufficient for what he wants to mean. For example, under any definition of potential scholars that does not make the whole matter circular, we can, I am sure, find courses generally regarded as necessary for advanced scholarship or scientific work in a given field; however, these courses may also be taken by students who do not so advance and who at the time of taking the courses have no intention of so advancing. Also, we can find scholars or scientists in the field who did not take all of these courses.

On the other hand, what proportion of students in a course would need to be potential scholars to make it fall properly within the definition of higher education? Let us go along with Machlup’s idea but for schematic purposes try to make it more precise. He may disagree with the exact way in which I have made it precise, but the rough and ready assignment of numbers to things is a habit of economists with which he will not be too unsympathetic.

Let us suppose for purposes of illustration that a course given in what we ordinarily call “higher education”—that is, in a college or university—is called a course in higher education a la Machlup, if and only if at least 50 per cent of the students in that course go on to some form of graduate or professional school. At Stanford in recent years more than 80 per cent of the men and about 50 to 60 per cent of the women graduates have done just this. Under the definition we have given, this means that a high percentage of the total undergraduate courses at Stanford are courses in higher education a la Machlup, because they are taken mainly by potential scholars.

The nonsense of this definition is evident, however, if we consider that a similar course—let us say a course in ordinary differential equations given at a state college—is not a course in higher education a la Machlup because, under our definition, the percentage of potential scholars is less than 50 per cent—say 35 per cent. Yet, without any doubt, the top 10 per cent of the students taking the course at the state college are clearly better than the bottom 15 per cent at Stanford.

It is easy to respond that such exact, extensive definitions referring to percentages are not what is meant in talking about potential scholars. But if percentages, or something similar, are not adopted then we are left with a large and woolly area known for its pitfalls and difficulties. Vagaries of definition, verification, and identification involved in the concept of potential are too many to go into here. I must emphasize that there is not a serious characterization of higher education different from the ordinary one in Machlup’s paper. He gives a brief and breezy definition that cannot be taken seriously. It is idiosyncratic, but mainly he does not use it. From henceforth it will be quite satisfactory to use “higher education” to mean formal academic education beyond high school, not only at elite private colleges and universities but also at state and community colleges. In view of the
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fact that more than 80 per cent of students in higher education, as I have defined it, are in public institutions, most of what I have to say will be concerned with publicly financed education and not with the private sector.

These matters of definition, however, are not the end of our semantic difficulties. Immediately after the recast definition, Machlup gives a list of six qualities he regards as essential for scholarship. With the exception of creativity, they read like a Ben Franklin list of qualities needed to get ahead in the world. There seems to be nothing special about them that is different for higher education, especially because intelligence is the one of the six that Machlup is least concerned to push.

My point is that these six qualities are banal; they could easily be defended as essential for most constructive activities. On the other hand, their definition is as difficult as the notion of potential scholar. I do not see how a serious discussion can proceed if we must deal with concepts like those of ambition and diligence. What does it mean, for example, to say that a student is diligent? What empirical studies have been made of this concept? Who is a reliable judge of diligence? Who is to define the term so that it has any operational sense? The same problems arise for the other concepts as well, with the possible exception of intelligence.

The thrust of my semantic remarks is that I find the methodological framework within which Machlup wishes to conduct the discussion unsatisfactory, and the terms of discourse are vague and loose.

THE ARGUMENT ABOUT THE FACTS

Arguments about facts can be as hard as rock or as soft as ground after a spring thaw. The evidence, for example, is decisive that more than one million people live in New York City. The kind of evidence we would expect for the proposition that men are now living on the moon should be just as decisive. Arguments about education or any other major facet of our society are not of this character, so that many arguments about higher education will necessarily revolve around matters of emphasis and selection of facts, as well as problems of inference from agreed-upon evidence to conclusion.

For me, the three most salient features of Western civilization have been the development of (partially) democratic institutions, the development of formal educational institutions, and the development of scientific concepts and theories. Holding such a view of the pervasive quality of education in our civilization, I find it hard to accept any simple summary of the facts in support of it or to agree on the facts that show how it should be limited. Much of the emphasis and selection in Machlup's discussion is unsympathetic to my own view of education, and, therefore, I want to comment upon a number of his particular arguments.

The first cluster of facts I want to deal with concerns who attended universities in the past and why. Machlup's examples of Oxford and the University of Berlin and his remarks about present-day community colleges suggest that widely different clientele attending for quite varied purposes have characterized different institutions at different times. In broad terms, it seems to me that the empirical facts do not support this idea. I think we can agree that until recently—and, by recently, I mean until post-World War II—higher education in the sense of formal academic education beyond high school was education for the sons and daughters, but especially the sons, of the wealthy. This was true in Alexandria in 200 B.C., it was true in Renaissance England at Oxford and Cambridge in the sixteenth century, and, although I do not have explicit data in front of me, I believe it was true at the University of Berlin in 1870. Of course, it is characteristic that the expansion of education downward in society is to be found in broad terms across the centuries. The selectivity at Oxford in the sixteenth century was not the same as the selectivity in terms of wealth in the nineteenth century at the University of Berlin. However, to put it in technical terms—and I would be interested in Machlup's response on this particular point—my conjecture is that if we did a regression analysis on admission or attendance in the cases I have mentioned, and if we introduced as independent variables the intelligence of the student and the income of the father, then income of the father rather than intelligence would be the more important predictor of attendance.

Plato put the matter nicely in Protagoras's discussion of classical education in the dialogue of that name (326v). After describing this education Protagoras says, "This is what is done by those who have the means, and those who have the means are the rich; their children begin to go to school soonest and leave off latest." Consider the description, in a more censorious tone, of university students in William Harrison's Description of England, first published in 1577:

Most of them study little other than histories, tables, dice and trifles. ... Besides this, being for the most part either gentlemen or rich men's sons they oft bring the university into much slander. For standing upon their reputation and liberty, they ruffle and roist it out, exceeding in apparel and hunting riotous company, (which draweth them from their books into another trade) and for excuse they are charged with breach of one good order think it sufficient to say that they be gentlemen which grieveth many not a little.1
I am sure that students at the University of Berlin in 1870 were much more serious than Harrison's students of the sixteenth century in England, but selection from families that were not poor was undoubtedly still the case.

I do not mean to suggest by these examples that Machlup advocates the traditional view that institutions of higher learning are mainly meant to educate the children of the wealthy and those who will govern the society, with a small sprinkling of very bright young men (but scarcely any young women) from the other segments of society admitted because of their extraordinary cleverness. Nowhere does he advocate a position of this kind, and I am not suggesting that he does. My point is rather that in describing higher education as something meant for the 10 per cent or 15 per cent of the ablest in the population, he is describing something that has never been and never will be.

Higher education in the past has been extraordinarily selective, mainly in terms of the wealth of parents and the sex of the child. It is one of the best and most important features of our present society that this restrictive selectivity has essentially disappeared. Today, large numbers of young Black men and women are being admitted to college. The most recent figure I have seen is that 6.6 per cent of college enrollment is Black. This compares with an 11 percent Black population in this age group, which indicates that in recent years remarkable progress has been made.

Still another cluster of Machlup's arguments centers around courses, the teaching of language, survey courses in history, laboratory courses in natural sciences, what could or could not be done during secondary school, what should or should not be done in higher education, and so forth. It seems to me that his whole discussion has entered a morass of ill-thought-out distinctions. On the one hand, he wants to talk about the number of courses and the reasons students need broader education to continue their absorption of knowledge from different domains. On the other hand, he talks about only people over forty being genuinely educated in the broader sense, a proposition that I find a priori incredible and unsupported by facts of any kind I know. Now that I am well over forty myself I wish I could agree with him, but I cannot. In terms of education or culture, I do not think my friends or I know more than we did when we were fifteen years younger. We know different things now, we have a certain kind of experience to lean upon, but it is not at all clear that we are not more narrow, less broadly educated, or less interested in a wide range of topics. I find this whole discussion about courses and broader education unpersuasive.

Another cluster of Machlup's remarks centers around the undesirable, compulsory character of school and the presumed fact that adolescents often would prefer not to be in school. Indeed, it would be better, it is implied, to eliminate compulsory provisions beyond the age of fourteen or so. Machlup's assertions about complicated matters of fact and difficult problems of policy are dogmatic and simple in character. He does not deal at any point with the long history of raising the school-leaving age in the United States, in Europe, and more recently in other parts of the world. He does not present any evidence on the relative satisfaction or dissatisfaction of students with school at different ages. For example, my own conjecture is that college sophomores are probably more satisfied with school than thirteen-year-olds are.

Still another kind of fact relevant to the present point is ignored in Machlup's discussion. He writes as if our colleges were mainly populated by older adolescents, but this is far from the case. In the state university system in California, the average age of undergraduates is well above twenty-one. It varies from college to college, but in a school like San Francisco State University the average age is approximately twenty-five or twenty-six. A high proportion of these students have full-time or nearly full-time jobs. Many of them are married with families and certainly are not dependent upon their parents for support. The many remarks about adolescents could not be less apposite to their situation.

Another related set of facts important to the considerations Machlup discusses, or implicitly uses as suppositions, concerns the interest of students in college, their inclination to drop out, their desire to work and not to study, and so forth. The evidence of past studies shows that the pattern of student dropout is very different from our simple ideas about it. A large percentage of college students who drop out at nineteen or twenty or twenty-two apparently reenter college at a later date and continue their education with an unusually high degree of completion of degree requirements. This drive for education is such a deep part of our society, like the demand for democratic institutions or the thrust of modern science, that it is not easy to turn it aside and restrict education beyond high school to a small segment of the population.

One other cluster of remarks I want to comment upon concerns the pecuniary rewards of college. Machlup makes the important point that the data are now different from those used in the much-cited studies of Becker and others, which dealt with a college population that was a much smaller percentage of the age population.

Again, I find the argument too simple. In 1870, for example, only about 2 per cent of seventeen-year-olds graduated from high school. Using Machlup's line of argument, one could very well say that the pecuniary rewards of graduating from high school have continued to
decrease because such a high percentage of students graduate from high school, and therefore, we make a mistake in encouraging such a high portion of the population to complete high school. Of course, this is a mistaken argument. There is fairly good evidence that completion of high school continues to be enormously rewarding in the labor market and for just the opposite kind of reason to that cited by Machlup. Namely, it has become a necessary condition of employment in a wide range of occupations.

It is no longer a positive accomplishment to have graduated from high school; rather, it is a negative factor not to have. Having graduated from high school is not a strong argument for obtaining a given position, because almost all the competition will also have high-school diplomas. It does mean, however, that the argument for graduating from high school is stronger than ever because of the difficulty of obtaining any kind of employment if one has not graduated from high school. In all likelihood something of a similar sort has already begun to happen with a college education. I am not really impressed by Machlup's interviews with the managers of computer centers; I would like to be persuaded, but only by much more explicit data than those available.

A good deal more could be said about this point, but I must pass over Machlup's comments on unskilled labor and its employability and turn to some other arguments I consider important. I cannot resist noting, however, that much of Machlup's central discussion about the pecuniary rewards of higher education is surely meant to be about higher education in my sense of formal academic education beyond high school, and not about higher education in his sense. Since most of the students he writes about are not engaged in higher education in his sense, it is strictly irrelevant to the announced title and definition of his topic, but as I indicated earlier, it is just the unworkability of his definition that forces him back to the simple standard definition I have used. Also, to deepen the analysis, I wish to reiterate that the considerations he raises about the rewards of a college education should be applied also to a high-school education, and even perhaps to functional literacy. All of what he says about a college education in terms of certification and polishing seems to hold for a high-school education—and the same distinctions seem in order—but I find it hard to believe that he is also against universal high-school education.

One final remark about the facts. It seems to me that anyone who wishes to restrict access to something as important as higher education must be doubly sure of his facts, and the arguments must be based on the best detailed evidence that can be found. The thing I find most disturbing in Machlup's whole position is his cavalier way with the facts. In areas where there are facts, either of a psychological kind—as in the case of students' attitudes, beliefs, and habits—or in the case of historical trends and conditions, Machlup makes no discriminating use of what facts are available. We are given rather broad and not very interesting generalities about diligence or perseverance or the character of young people after puberty. In none of these areas do I have any faith that his generalizations are correct. (I apologize for not being able to make my own argument on these matters in proper detail. It is my conviction that it can be done, and I hope to do so on another occasion.)

THE MORAL AND SOCIAL ARGUMENT

One of the most important single changes in the culture and civilization of the world in the past two hundred years is the universal clamor for education. Two hundred years ago, or even a hundred years ago, in most parts of the world only a very small percentage of the population could expect to achieve functional literacy. The poor everywhere had no serious thought of their children's achieving a significant level of education beyond what they themselves had, bad as it was. The change on these matters is one of the most radical things that has happened to the human race in its entire history. Machlup seems to take no account of this, and perhaps we disagree on its profound significance. For me, signs of this significance are to be found everywhere. In the United States today, class distinctions of speech and dress have almost disappeared. Education is certainly one of the prime reasons for this leveling effect. As has been pointed out by many people, a very high percentage of adults in the United States identify themselves as middle class. Only a small number regard themselves as rich and only a very small number, as poor. Not only the sons of lawyers and bankers but also the sons and daughters of plumbers and taxicab drivers expect to go to college, and do so.

According to the Historical Statistics of the United States, in 1870 just 57 per cent of the population five to seventeen years old were enrolled in public schools; only 2 per cent of the seventeen-year-olds were high-school graduates; 20 per cent of the population were estimated to be illiterate, and of the nonwhite population 79.9 per cent were. Arguments over the exact numbers and the correct estimates can be mounted, but the basic facts are undeniable. The change from American society in 1870 to the present is a change dominated by one overwhelming fact: the great increase in the education of the majority of the population. The desire, and indeed the demand, for education at all levels of our society is recognized by everyone. The demand is uni-
versal; the satisfaction of that demand is approaching universality. I have cited already the remarkable rise in the number of Black students in college, even since 1968. That trend will continue and, in my judgment, certainly should.

I agree with Machlup that it is important to know to what extent the expectation of pecuniary rewards plays a significant role in this phenomenal demand for education, including the unprecedented demand for higher education. Based on the kind of commitments our society has made over the past two decades — independent of any questions of differentiated pecuniary rewards — it seems evident that the utility of higher education is exceedingly high. I do not think the problem of estimating this utility (in the sense of providing an approximate measurement) is at all impossible, even if I do not accept an economic argument about utility as a conclusive argument for or against universal higher education.

We cannot expect over the next hundred years the same percentage changes that occurred between 1870 and the present, but I do think there are two important considerations that argue for a continued expansion of higher education, both in terms of the percentage of the population that it reaches and the number of years that it is offered.

The first argument concerns the viability of an informed and educationally sophisticated body of citizens. It was the despair of John Stuart Mill in the nineteenth century that he did not see how a democratic society could work when the majority of its citizens were badly educated. I am sure that it would be an immeasurable relief to him to find a hundred years later that Britain, as well as this country, has a proportion of citizens educated to a level that was hardly thought possible in his time.

I hope to persuade someone to undertake an empirical study of the content of newspapers a hundred years ago to compare the level of intellectual and scientific sophistication of the facts presented and the data organized for public discussion with the level today. It is my impression that the increase in quantitative information — the presentation of statistical data, the analysis of budgets in quantitative terms, the careful citation of employment rates and gross national products, the percentage of voters inclined in a given direction, and so forth — is increasing sophistication and the political and intellectual horizons of our citizens at a rapid rate. This can happen because we have laid the base in education. If we went back, as Machlup on occasion seems to advocate, to a nation of fourteen-year-old school-leavers we could scarcely expect to continue this development of an informed citizenry. I do not suggest that I am overly sanguine about what the man in the street knows about international trade (a subject, for example, on which Fritz Machlup is an expert), but I do maintain that there is no comparison between the fund of general information on policies and the economy available to American citizens now, compared with that of a hundred years ago.

Education is not required for a stable society, but it is required for a stable democratic one. The most perfect example perhaps of a stable elitist society is Alexandria from its founding by Alexander the Great in 331 B.C. to its capture by the Arabs in 642. In terms of its contributions to the history of science and culture, Alexandria is the first city of the world. No other city matches its record of dominating the culture, and especially the science, of the world for almost a thousand years. The educated society of Alexandria was elitist with a vengeance. Even the language, Greek, was not spoken by most of the population. The society's intellectual accomplishments, ranging from mathematics to grammar to literary criticism, were of the first order, but it is not the sort of society any of us would want to see today or in the future. To me there is great hope in thinking that we are moving toward a society in which all citizens can understand and appreciate an increasingly greater number of central political and social issues.

Finally, I come to a development that is already of great importance — and surely one that will be of even greater significance — but that is not mentioned by Machlup. This is the subject of population control. It seems inevitable that we will soon be taking drastic measures to control the growth of population, and, as we do so, the effects on education throughout the world will be profound. The immediate effect upon education in this country will be a decrease in the percentage of the population attending schools or colleges as they are now constituted. The population will become older, on the average; the numbers of students moving through educational institutions will not increase but will perhaps show a gradual absolute decrease. The matter of numbers and their impact on the total cost of education is one of the leavening influences in what would otherwise appear to be a pessimistic picture of future educational costs.

A second and more profound consideration, one that will take longer to have an impact, is what effect the control of population growth will have on the average level of education and intellectual attainment. I have already cited the surprisingly high percentage of undergraduates at Stanford who go on to some form of graduate or professional school. I see no reason not to believe that these percentages will continue to increase for all parts of the college population.

I shall indeed be bold and close by saying that in my judgment Fritz Machlup's gravest error is in looking backward rather than forward. I can envision a society, a hundred years from now, the majority of
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whose citizens are at the level, at least, of its mediocre scholars today. I can imagine a society that, in a hundred years, will be composed mainly of citizens who are the equal of Machlup’s “well-read or learned friends.” I see a society based not just on equal opportunity but upon equal opportunity realized, a society in which science and culture are held in esteem and made part of a better life by nearly all. To change my vision of what can be—and indeed of what probably will be—will take far stronger arguments than I have yet heard.

NOTES