

IASs: Science and Society

The Growth of Institutes for Advanced Study

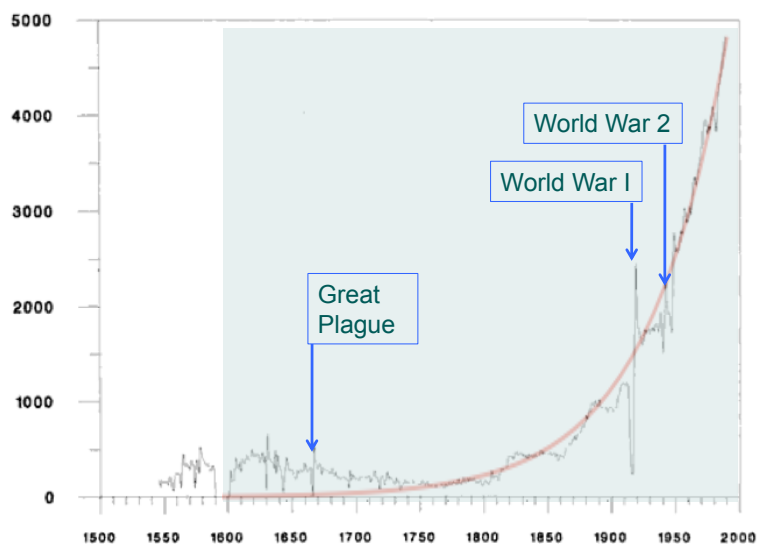
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Introduction

THE NUMBER and variety of institutes and centers for advanced study have been increasing greatly in recent years, reflecting not only their acknowledged success, but also, perhaps, the changing environment in universities around the world. They have been described as being part of a third, postmodern stage of university development, following on the medieval and modern stages; they have also been seen as a reaction to an international crisis in the university system.

Both of these ideas were there at the inception of institutes for advanced study. In this talk, I want to discuss why institutes are being founded at an increasing rate, starting with the motivations that led to the founding of the first such institute, the Institute for Advanced Study in Princeton, New Jersey, just over 80 years ago, and proceeding to possible reasons for the accelerating growth in their numbers, and finally some discussion of their common features and variations in form.

To set the context, let me illustrate by considering the last four and half centuries of the development of Cambridge University as reflected in the number of students joining the university each year (matriculating) from 1544 to 1989. You can see the history of the country reflected in this Graph 1: the First World War, a prominent feature because the university emptied out into the trenches; the Second World War, less dramatic because students stayed at the university but did two-year shortened degrees; and, for example, the Great Plague of 1665-1666, when the university evacuated (Newton discovered the laws of motion, gravity, optics and the calculus sitting at home in Woolsthorpe in Lincolnshire). But the really dominant feature is that the graph grows exponentially from the beginning of the 19th century, i.e. from about the beginning of the industrial revolution, doubling every 40 years approximately.



Graph 1 - Enrollment at the University of Cambridge 1544-1989

From their origins in the eleventh and twelfth centuries until the nineteenth century, the first degrees at universities were liberal arts courses, followed for some by postgraduate study for qualifications in the ancient professions: law, theology and medicine. In the nineteenth century, the modern disciplines crystallized, and specialized courses for bachelor's degrees developed and became dominant.

Origin of Institutes for Advanced Study

Institutes for advanced study are concerned with research rather than teaching. They are partly characterized by the absence of undergraduates or, often, even graduate students. There have long been institutions without students. All Souls College in Oxford, founded in the fifteenth century, has never really had students; its Fellows originally devoted themselves to saying prayers for the souls of their founders and benefactors, and advanced study for the ancient professions. The Collège de France, in Paris, originally founded in the sixteenth century, has no students, but its motto is *Docet omnia*, "it teaches everything", and its Professors are required to give lectures which are open to all who wish to attend.

Over the last hundred years or so, All Souls has become more like the now conventional model of an institute for advanced study, focused on research and, in recent decades, with a program of visiting fellows drawn from around the world. These changes, after several centuries when not so much changed, reflect and result from the development of Oxford University into a modern research university over the last 150 years.

This evolution of the research university can be traced back to Germany

at the beginning of the nineteenth century. In 1810, Wilhelm von Humboldt convinced the King of Prussia to found Berlin University based on Friedrich Schleiermacher's liberal ideas on academic freedom and the importance of seminars, laboratories and research. The object, as Schleiermacher put it, was to make it "second nature for [the students] to view everything from the perspective of scholarship ... and thus acquire the ability to carry out research, to make discoveries."

North American colleges and universities had been founded largely following British models, with strong religious affiliations, following restricted syllabuses and training students as schoolteachers, priests, lawyers, etc. The influence of the modern German university grew from about the middle of the 19th century, as graduate studies developed in American universities and American students, who had studied in Germany, returned to become professors and presidents of United States universities. These included Charles William Eliot, who served as President of Harvard for forty years from 1869 to 1909, and Daniel Coit Gilman, who visited Berlin in the 1850s and returned to Germany in 1875, as he prepared to take office the following year as the founding President of Johns Hopkins in Baltimore, the first American university to be established centered on research and advanced study.

At the beginning of the twentieth century, the great American universities had not yet assumed a leading position in the worlds of science and scholarship. Remedies for the perceived deficiencies in American higher education were being sought. For example, in 1918, the influential Norwegian-American economist, Thorstein Veblen, the man who coined the phrase „conspicuous consumption“, published *The Higher Learning in America*, a sardonic critique of the influence of businessmen and business methods on the university. He argued that the introduction of business principles and methods, "systems of standardization, accountancy, and piecework", into institutions concerned with advanced research leads "toward a perfunctory routine of mediocrity".

Veblen advocated "the installation of a freely endowed central establishment where teachers and students of all nationalities ... may pursue their chosen work as guests of the American academic community", and added "There should also be nothing to hinder the installation of more than one of these houses of refuge and entertainment", a nice term for an institute for advanced study.

Veblen studied at Johns Hopkins in its early days and also at the University of Chicago, another institution whose founding was influenced by the development of the German research university. It was another Johns Hopkins student, Abraham Flexner, who realized the first "house of refuge and entertainment".

Flexner graduated from Johns Hopkins just ten years after its founding. Through his early experience as a schoolmaster in Louisville, Kentucky, and graduate study at Harvard and in Berlin, Flexner became a leading educationalist

and critic of American tertiary education. His view was that the American College, originally founded largely following British models, with strong religious affiliations, following restricted syllabuses, and training students as schoolteachers, priests, lawyers and physicians, was confused as to its purpose. His book *Universities: American, English, German*[9] praised the German universities for their greater emphasis on research, criticized the ancient English universities for being too concerned with the cultivation of gentlemen, and was scathing about American colleges with their focus on undergraduate general education with postgraduate study awkwardly grafted on.

Flexner observed that, in order to fund expansion,
“they have had to be organized as business is organized, which is precisely the type of organization that is inimical to the purposes for which universities exist...; they have been dragged into the marketplace; they have been made to serve scores of purposes – some of them, of course, sound in themselves – which universities cannot serve without abandoning purposes which they and no other institution can serve at all.”

As Flexner was finishing his book, late in 1929, he was approached by Louis and Caroline Bamberger, entrepreneurs who had made a fortune from their department stores, seeking advice on how to establish a medical school in their hometown of Newark, New Jersey. Within a few months, Flexner had convinced them instead to back his dream for the first Institute for Advanced Study,

“not a graduate school training men in the known, and to some extent in the methods of research, but an institute where everyone – Faculty and Members – took for granted what was known and published, and in their individual ways endeavored to advance the frontiers of knowledge”.

Flexner argued for,
“a haven where scholars and scientists [would not be] carried off in the maelstrom of the immediate; ... simple, comfortable, quiet without being monastic or remote; ... afraid of no issue; ... under no pressure from any side which might tend to force its scholars to be prejudiced either for or against any particular solution of the problems under study; ... it should provide the facilities, the tranquility, and the time requisite to fundamental inquiry into the unknown. Its scholars should enjoy complete intellectual liberty and be absolutely free from administrative responsibilities or concerns.”

This was an idea whose time had come, but it needed someone like Flexner to take it from dream to reality. Named as the Institute’s founding Director, he set out to establish “a free society of scholars and students devoted to the higher training of men and to the advance of knowledge”, recruiting internationally. In the various versions of his essay, *The Usefulness of Useless Knowledge*, Flexner articulated his belief that the advances in knowledge of the highest practical value do not come from objective-driven research but from research driven by intellectual curiosity. To exemplify this, he described James Clerk Maxwell’s work in the 1860s, unifying theories of electricity and magnetism, which led

to the identification of light as an electromagnetic phenomenon and predicted the existence of radio waves, which were first observed by Heinrich Hertz more than twenty years later, and eventually turned to enormous practical use by Guglielmo Marconi, with this invention of wireless telegraphy in 1897.

Flexner set himself the highest standards for his institute and began recruiting the best: Albert Einstein. When Einstein's appointment was announced in 1932, the New York Times said that it was hoped that the Institute at Princeton would set an example that would be followed by the establishment of similar institutions.



THE USEFULNESS OF USELESS KNOWLEDGE

BY ABRAHAM FLEXNER

IT is not a curious fact that in a world steeped in irrational hatreds which threaten civilization itself, men and women—old and young—detach themselves wholly or partly from the angry current of daily life to devote themselves to the cultivation of beauty, to the extension of knowledge, to the cure of disease, to the amelioration of suffering, just as though fanatics were not simultaneously engaged in spreading pain, ugliness, and suffering? The world has always been a sorry and confused sort of place—yet poets and artists and scientists have ignored the factors that would, if attended to, paralyze them. From a practical point of view, intellectual and spiritual life is, on the surface, a useless form of activity, in which men indulge because they procure for themselves greater satisfactions than are otherwise obtainable. In this paper I shall concern myself with the question of the extent to which the pursuit of these useless satisfactions proves unexpectedly the source from which undreamed-of utility is derived.

We hear it said with tiresome iteration that ours is a materialistic age, the main concern of which should be the wider distribution of material goods and worldly opportunities. The justified outcry of those who through no fault of their own are deprived of opportunity and a fair share of worldly goods therefore diverts an increasing number of students from the studies which their fathers pursued to the equally important and no less urgent study of social, economic, and govern-

mental problems. I have no quarrel with this tendency. The world in which we live is the only world about which our senses can testify. Unless it is made a better world, a fairer world, millions will continue to go to their graves silent, saddened, and embittered. I have myself spent many years pleading that our schools should become more acutely aware of the world in which their pupils and students are destined to pass their lives. Now I sometimes wonder whether that current has not become too strong and whether there would be sufficient opportunity for a full life if the world were emptied of some of the useless things that give it spiritual significance; in other words, whether our conception of what is useful may not have become too narrow to be adequate to the roaming and capricious possibilities of the human spirit.

We may look at this question from two points of view: the scientific and the humanistic or spiritual. Let us take the scientific first. I recall a conversation which I had some years ago with Mr. George Eastman on the subject of use. Mr. Eastman, a wise and gentle far-seeing man, gifted with taste in music and art, had been saying to me that he meant to devote his vast fortune to the promotion of education in useful subjects. I ventured to ask him whom he regarded as the most useful worker in science in the world. He replied instantaneously: "Marconi." I surprised him by saying, "Whatever pleasure we

*Facsimile of the 1st
page test
Abraham Flexner.*



Albert Einstein (1879-1955).

Growth of Institutes

The example established by the Institute for Advanced Study was soon emulated. The Dublin Institute for Advanced Studies, was founded by Act of Parliament in 1940; the Center for the Advanced Study of the Behavioral Sciences was established at Stanford University in 1954; the Institut des Hautes Études Scientifiques near Paris, in 1958, and so on.

Writing to the French Government in support of the IHÉS, Robert Oppenheimer, then Director of the Princeton Institute, developed Flexner's reasoning thirty years on:

“With the increasing magnitude, complexity, and busyness of scientific progress in all fields, and with the growth of educational systems which corresponds to a new development in the world's history, university chairs no longer necessarily offer that opportunity for seclusion, and for the most difficult and intensive intellectual effort, which was once their special hallmark. For this reason, places of retreat, which are in effect places for advance, have been brought into being. These serve multiple functions, but basic to them all is an opportunity for much more intensive concentration on study and research than is elsewhere possible. ... For these reasons, ... institutes for advanced study ... will multiply throughout the western world.”

A number of scholars and scientists from abroad, who had been Members at the Princeton Institute, went on to found institutes in their home countries. An example is provided by the Institute for Advanced Study in Jerusalem, founded by Aryeh Dvoretzky in 1975, after he had visited the Princeton Institute some years earlier. He wrote:

“An institute for advanced study in Israel will fulfill a long-acknowledged need for an appropriate setting to encourage scientific and academic leadership, along with promoting the highest standard of research. The proliferation of universities in Israel, along with the overall trend toward mass higher education, has heightened the need for an Institute here in Israel. The inspiration and achievement of these institutes are essential for strengthening and advancing Israel's scientific and academic landscape.”

Robert Oppenheimer's words were prescient. The great growth in the number of institutes for advanced study, particularly in the last couple of decades, all around the world, is a powerful testimony to their perceived value. Now there are literally hundreds of institutions around the world calling themselves “institutes for advanced study (or studies)”, fulfilling Oppenheimer's prophecy.

Three years ago the *London Times Higher Education Supplement* asked whether “the „institutes of advanced study “being set up across the UK were simply research hotels where academics can enjoy precious thinking time or evidence of a fundamental shift in cutting-edge research”.

So what are the reasons for this phenomenon? Some of the reasons have

been given in some of the observations I have quoted during this talk. I think the essential ones were articulated by Flexner when he set out his farsighted vision in 1930: the opportunity to pursue curiosity-driven research, without regard to short-term objectives; and freedom from the administrative and teaching pressures of the modern university.

Flexner's arguments tended to favor a separation of fundamental research from what he termed the "charms and diversions" of undergraduate teaching, at least in the context of his time and place, that few of us would agree with as a general proposition. But the growth of mass tertiary education, the great expansion of the university system, good and necessary in itself, has led to the maelstrom of the immediate, as Flexner described it, being an all too familiar sensation in academia. And this expansion inevitably entails much greater expenditure, often of public funds, and with this naturally comes demands from government and others for greater accountability, which in any case is the spirit of the age.

It is the form that this accountability and associated audit consciousness takes that is the problem. The view is quite often taken that if you are giving away public money you had better know what it is going to be used for and precisely how it is going to be used; and then you should check up afterwards that it has been used exactly in the way that was specified, that the defined objectives have been realized. The problem is that such requirements are inimical to research into truly fundamental questions: if you have to say what you are going to do, how you are going to do it, and when it is going to be finished, before you start, you are unlikely to be doing truly original research.

The sheer busyness of the modern university has increased dramatically since Robert Oppenheimer referred to it fifty years ago. Universities have become addicted to growth – for example, judged by the number of students matriculating, Cambridge University has doubled in population every forty years since about 1800. That is an average growth rate of just under two percent per year; not too drastic, you might think, but it means that the university is now in some sense thirty-two times bigger than it was two hundred years ago. So now the philosophy in universities has become: you grow or you die. But the biological truth is that you grow *and* you die and, as a general rule, the faster you grow, the sooner you die.

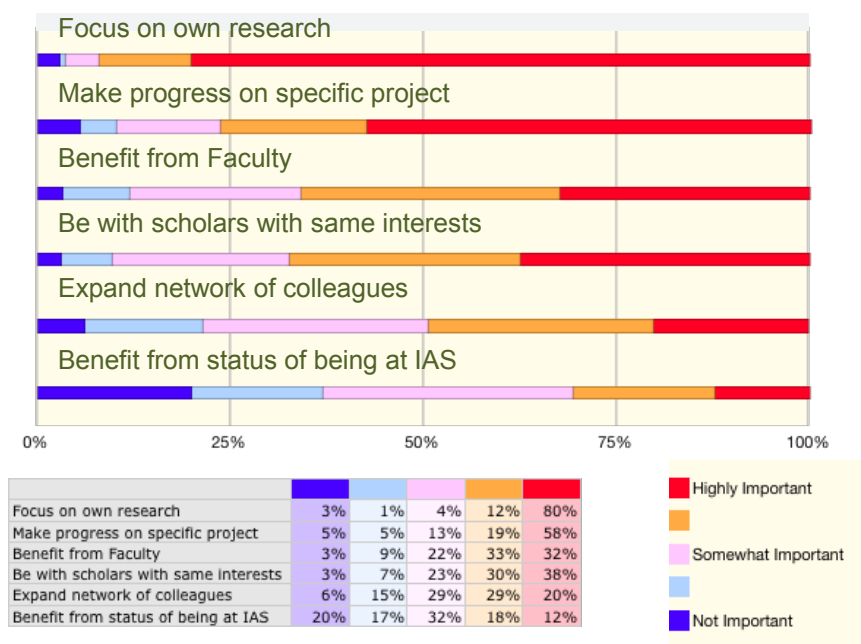
Apart from the loss of institutional continuity, which may have its good and bad points, and of collegiality, the continual emphasis on institutional development (which I confess I have spent a fair amount of my time on) means that the organization units, the university departments, that resulted from the university reforms of the nineteenth and first part of the twentieth century, have become embedded within universities, as the frameworks for the power structures, financial and otherwise. They have become bailiwicks for professorial barons expanding or defending their territory and so often are concerned with

cooperation rather than collaboration, not least between cognate disciplines. In universities lacking a collegiate structure, academics from disciplines may not come across one another, except when fighting for resources on university committees.

In this context, the Institute for Advanced Study, envisaged by Flexner, provides a sanctuary from the maelstrom, where, in general, one is not disturbed by the noise of an empire being built and where success is not judged precipitately or oppressively, where research is driven by intellectual curiosity towards the discovery of what could not even have been conceived in advance, rather than towards precisely defined, predetermined objectives. Of course, one begins a research project with an interesting idea, but it is a real disappointment if one does not end up doing something more exciting than that original objective.

The Taxonomy of Institutes for Advanced Study

This chart from a recent survey shows what objectives Members of the Princeton Institute had for their stays (Graph 2). A period spent at the Institute as a Member is often a life-changing experience: young postdoctoral fellows meet the contemporaries who, with them, will be leading figures in their field in the future; more senior Members, freed from duties of administration and teaching, have the time and freedom to initiate new lines of research. A stay at the Institute impacts not just the Member, but often also his or her students and colleagues. Everything is done to enable the Members to concentrate on research, so there are no excuses.



Graph 2 - Main objectives of the scholars of IEs

The term “institute for advanced study” is now used very widely. What features do such institutions share and how do they differ? In practice it seems that they all have a fellowship program for visiting members, focused on research rather than teaching, and they cross disciplinary boundaries. But they vary in other important aspects: range of subjects covered; degree of constitutional independence (governance); degree of financial independence; presence or not of permanent Faculty; extent to which research is structured around programs or themes; amount of freedom given to Members or Fellows in choice of research topic; provision of residential accommodation; demography of Members or Fellows (nationality, age, etc.).

In the case of the Princeton Institute, there are four Schools: Mathematics; Natural Sciences; Historical Studies; and Social Science. It is independent of any university or other institution. Seventy to eighty percent of core activity is financed from the Institute’s own endowment. It has a strong and distinguished permanent Faculty. Mathematics and Social Science orient their work around themes to some extent; the others not. Members are given complete freedom in choice of research direction. Nearly all Members live on campus in Institute housing. Sixty percent come from outside the USA; and their age distribution differs by School.

Most institutes combine strong international connections, bringing leading academics from around the world both as long-term members and as visitors, with strong local connections. For these reasons, many leading universities have established their own institutes for advanced study, as statements of aspirations to the highest standards in research and of international status and as a means of giving temporary respite from the pressure of university life for senior academics.

Ironically, the process of assessment of universities in the UK and the excellence initiative in Germany have led to many universities establishing institutes, both as self-assessments of excellence and to provide havens from the assessment process for favored academics. Around the world there has been a growth in “University-Based Institutes for Advanced Study” (UBIAS). Recently there was a conference in Germany of about thirty-two of them and they are doubling in number about every eight years, though I doubt that this will continue. However, an institute for advanced study established within a university will inevitably have a struggle in staying committed to its mission in the longer term because at some point the concerns of the parent institution will become overriding.

Conclusions

The current growth in the number of such institutions would not be happening around the globe if they were not perceived as successful over the longer term, both in terms of the research they have produced and the influence they have on the intellectual lives and development of those who spend time there.

Comments from those who have been Members of the Princeton Institute very frequently speak of a life-changing experience.

So in summary the reasons for the proliferation[30] of institutes for advanced study include:

- they provide academics with opportunities to pursue their own research projects;
- they provide relief from the pressures of the modern university;
- they are international in an increasingly international academic world;
- they provide badges of aspiration or status for a university;
- they cross disciplinary boundaries.

This last aspect – interdisciplinarity – is perhaps the most subtle and difficult to discuss. This was certainly one of Flexner's motivations: the Schools of the Princeton Institute each encompass the territory of a number of departments in a typical university. Institutes provide environments where there are opportunities for discussing one's work with scholars and scientists from other fields, and, freed from teaching and administration, the leisure necessary to take advantage of them. Only to a limited extent can such opportunities be orchestrated; the serendipitous encounters and exchanges are often more important than the arranged programs.

The research based in the various departments of universities, defined by the disciplines and sub-disciplines delineated in the 19th and 20th century, has increasingly intersected in recent decades. Some have referred to a third stage of university development, the first leading from the medieval form to John Henry Newman's idea of a university, preserving and diffusing knowledge rather than advancing it; the second the formation of the modern research university, from the nineteenth century onwards, based on departmental structures; and the third – well, what structures do enable boundaries to be crossed while preserving the valuable frameworks and reference points provided by individual disciplines?

The need for such structures has led to the formation of cross-disciplinary research institutes inside and outside universities cutting across departments and disciplines. But this can mean that an academic may have three roles within a university: in undergraduate teaching, in a department with a research function within a discipline, and in an interdisciplinary institute. It is reminiscent of the confusion of purpose Flexner perceived a century ago.

Institutes for advanced study need not have the hubris to feel that they can solve the systemic problems of the contemporary university. They can help to some extent, but their success and their proliferation is perhaps a symptom of a malaise if not a crisis in the modern university.

What advice can one give to a fledgling institute? It might include the following:

- A mission responding to (local) challenges and opportunities;
- An individual or small group, with vision, commitment, tenacity, skill at acquiring resources to get it established;
- Excellent working conditions for the scholars;
- An attractive physical location;
- Institutional frameworks or facilities to encourage a sense of community;
- Freedom from short-term assessment and predetermined goals.

Good luck.

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