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The Academy in Transition

By examining the library within the framework of the university, Billy E. Frye provides a much needed perspective on a national problem that is too often portrayed in local terms. Moreover, by focusing on the dramatic increase in research as a key component in the growth and spiraling cost of universities, he also points to the underlying reason libraries are struggling to assemble the resources needed by changing academic programs. New disciplines and interfaculty initiatives are launched leaving librarians, with library resources already overextended by current demands, wondering how to respond.

At one level, the problem for both universities and their libraries is financial, and cost containment is their most pressing need. Frye provides graphic evidence of the financial crisis now affecting universities. Equally important, however, he provides stunning proof of the enormous national commitment to building library resources and proffers a solution to our local needs. The challenge is to harness this system of resources. But the competitive model of American higher education, while it does not entirely preclude the idea that library resources are a common good, nevertheless tends to associate the benefit of the library with each university. Scholars understand, of course, that research depends on the contributions of many institutions, but the notion of a common good is too abstract to garner much public support, and universities simply cannot continue to sustain research collections at the same level as they have in the past.

Technology, says Frye, provides the tools for increasing access to and sharing information; what is lacking is the institutional will and collaborative organizational structures that would enable universities and their

research libraries to share resources. But failure to achieve collaborative solutions undermines all universities' ability to support research, thereby undermining the principal ingredient in the success of American higher education and the engine of our economic prosperity.

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Universities in Transition: Implications for Libraries

Billy E. Frye

Introduction

Many institutions are groping with the issues arising from the changing role and character of the university library, and it seems especially significant that Harvard University—the site of our nation's first and greatest academic libraries—should be engaged in an effort to fathom the full implications of emergent technologies for the future of information management.

Harvard, among all American universities, has the longest and most successful tradition of building and maintaining in-depth collections of books, monographs, journals, and archives across a wide spectrum of fields. These great collections provide Harvard libraries with the opportunity to exploit the benefits of new technologies by expanding access to them but also increase the risk that commitment to the collection may seem compromised by these technologies.

In some ways the status quo must seem both safer and more comfortable than the electronic future of libraries. But the choices presented by emergent information technologies *must* be faced by all of us. I suggest that the process is not one of turning away from our traditional approaches to information management but of looking beyond them. Without great collections the new technologies can have only limited significance for scholarship.

Although I have no expertise in digital technology, it is my thesis that a marriage between paper and electronic technologies is both necessary and serendipitous given the changing conditions of academic life. In the future the dominant feature of the information environment will not be

scarcity of information but the need to make order of its abundance so that it is meaningfully accessible.

Thus, the metaphor of the library as the gateway to knowledge is very apt because it emphasizes one of the traditional functions of the library—access to information. In the context of electronic technologies, the gateway concept causes us to suspend our usual notions of boundaries, whether library walls or book covers. More than that, it offers the portent—indeed, in considerable degree the actuality—that the melding of information with the powers of electronic technologies will bring about basic changes in the ways we teach and learn, the sorts of research questions we ask, and the ways we synthesize knowledge.

Contemporary Challenges Faced by the Research University

When considering the higher education environment within which the new era of information access is evolving, I think it important to examine some of the prevailing challenges that American universities now face and will face into the foreseeable future and also to reflect on the predicament of research libraries. Together these perspectives point to the necessity, indeed the imperative, to look beyond the present to new approaches to information acquisition, storage, and access that can more adequately address our needs in light of the new realities of our operating environment.

A friend of mine, a prominent faculty member in the Emory Business School, recently gave a lecture to a group of businesspeople about the future of higher education. His central thesis was "change." The thrust of his speech was that "if the American system of higher education is going to retain its position as the greatest in the world, our universities have got to change the way they conduct the business of teaching and research."

This, of course, is essentially what all higher education soothsayers are saying. Indeed, it's about all they are saying with any degree of certainty. To be sure, some of the more imaginative speculate about new paradigms of teaching and research, and those with the courage to do so suggest what the nature of socially responsible changes *ought* to be. But consid-

ering the destabilizing tensions and imbalances that have built up over the years and are now pressing insistently for resolution, no one can say just what our future *will* be.

Most of the current concerns of research universities have their principal roots in two historical trends that have taken place over the last fifty years: (1) the great increase in the size and complexity of universities and (2) the increasing involvement of universities in broader social agendas. The latter trend includes especially the push for greater access to our universities by underrepresented social classes and a growing partnership between universities, government, and industry in pursuing the practical benefits of research.

The end of World War II brought a rapid influx of students into our colleges and universities. At the same time, the nation's appetite was whetted for more technology and a better-educated citizenry to cope with a world increasingly reliant on technology and knowledge. Driven by these developments, American colleges and universities grew enormously. Between 1949 and the present,

- The number of colleges and universities increased from 1,800 to over 3,000,
- Enrollments grew from 2,250,000 to over 12,500,000,
- Annual expenditures rose from about $1.7 billion to over $70 billion,
- The aggregate size and value of the physical plant increased more than fiftyfold, and
- Federal sponsorship of research grew from around $100 million to over $11 billion.

In the single decade of the 1960s, American higher education grew more than in the previous three centuries, and despite current complaints about downsizing and budget reduction, many of these figures continue to increase significantly each year.

This growth, extraordinary in its own right, fueled an even more fundamental change in the structure and organization of universities. It led to an enormous proliferation in the depth, variety, and scope of programs under the university's administrative umbrella and a corresponding multiplication of the missions and purposes of the university. To the core function of instruction in the liberal arts was added a vast

array of professional education programs, auxiliary services, and institutes for research and application of knowledge.

For example, between 1945 and 1991, the number of faculty at Emory University, my own institution, grew from 126 to almost 1,900; the number of academic departments increased from 46 to 83; the number of degree programs increased from 14 to 70; and the number of centers, institutes, and other special programs increased from essentially none to several dozen.

In the now famous words of Clark Kerr, the American university has been transformed from a more or less "unified community of masters and students with a single 'soul' or purpose" into the "multiversity, a city of infinite variety." In short, while we have continued to think of ourselves in much the same terms as in the past, universities have in fact become vastly different places than they were before the war.

This transformation came about largely because growing enrollments generated revenues that enabled colleges and universities to add more faculty, which made the addition of new programs and fields much easier. This, in turn, led to increased emphasis on graduate education to supply the growing demand for new faculty. This greater emphasis on graduate education, combined with a new national appreciation for the practical benefits of research and scholarship, resulted in a great surge of public and government support for research and publication. Thus was ignited an explosion of knowledge that has been accompanied by the fragmentation of academe into new scholarly specialties and, of course, by a great increase in the variety and volume of scholarly publications.

Although this transformation began in the sciences, it was so powerful that it eventually spread to the social sciences and even to the humanities. While these disciplines had a smaller utilitarian claim on federal research funds than the sciences, the effect on the spirit of the faculty became almost as great as in the sciences, and so the rush was on to make research and publication the *sine qua non* of academic achievement and recognition.

This telescopic characterization of the metamorphosis of academia is not to be taken as a criticism. The rise in the importance of research and scholarship and the emergence of the academic disciplines as semiautonomous professions were accompanied by many highly desirable changes.

The pace of generating and applying new knowledge quickened in an autocatalytic cycle of expansion. Methodologies with greater power and reliability emerged. The intellectual standards of scholarship became higher and more consistent. And the ability of academic disciplines to serve both their professions and the public interest increased to the point that in some the junction became almost seamless.

Perhaps most significantly, the tie between teaching and scholarship became less the established canon around which intellectual life was centered and more the very process of search for objective knowledge. It is this, I believe, that has contributed most to the success of modern universities, not only because it created a great expansion of knowledge but because it has engendered a spirit of inquiry in place of dogma.

But if these developments invigorated American higher education, they also had their unfortunate effects—internal tensions and conflicts that to this day have not been resolved. Two of these, it seems to me, have particular pertinence to understanding the challenges that we are facing today.

In the first place, the growth that began in the 1950s and 1960s became habitual. Even in the decade of the 1980s, when the increase in enrollments declined and when many institutions began to experience difficulty balancing their budgets, expenditures for higher education in America grew by five or six points above inflation. Thus, an expansion that began as a necessary response to social need became a way of life that permeated the attitudes of faculty and administration alike. Growth continues to govern policy decisions long after the public has begun to doubt the worth of so much expansion and to question its own ability or willingness to pay the price of it. More faculty to develop new and emerging fields, larger and better laboratories and libraries, and other such things came to be viewed almost as entitlements. Growth that had been enabled by a rapid increase in revenues, driven largely by enrollment growth, became instead an upward cost spiral that drove institutions to increase revenues as fast as possible by whatever means available.

Thus was planted the seed of the biggest problem now confronting American higher education—*the need for cost containment*. As the provost at Cornell University put it in a letter to his faculty colleagues, "Each term I meet with the provosts of Stanford, Princeton, Columbia, Harvard,

Yale, MIT, and Chicago. Despite enormous differences between the institutions, we all find ourselves in similar financial situations—expenses outpace revenue by 1 to 3 percent a year." In my own case, the most persistent question I hear from Emory faculty is, "Why is our annual budget growing by only 9 to 10 percent a year, when our endowment has doubled in the last five years, and as recently as three years ago we were enjoying annual increases of 15 to 20 percent?" Learning to live within earned income rather than prospective income has proven to be enormously difficult after so many years of dependable growth.

But every sign indicates that the era of endlessly expanding budgets really is over—and has been for many institutions for over a decade. Under these circumstances building academic budgets each year becomes more and more characterized by the search for ways to cut costs, avoid costly redundancies, achieve greater selectivity and focus in the programs we support, and increase the "productivity" of the faculty (a phrase that for most of us has connotations that are about as pleasant as scratching one's fingernails across a chalkboard). We may be able to preserve the old values under these new circumstances, but we surely will have to relinquish our old ideas about *how* we do things.

In the second place, as has already been suggested, the period of growth was accompanied by significant shifts in institutional emphasis and culture. There were many such shifts, but it seems particularly significant to me that the undergraduate curriculum, which had been the major organizing force among college and university faculties, was displaced from center stage by a new emphasis on graduate and professional education and research. In any case, the era of growth and professionalization led to a real, if uneasy, shift in values within the higher education community. Research and publication came to be perceived as having greater value than teaching. This was understandable, since research and publication rather than teaching in large degree actually became the principal bases for academic promotion, salary increases, individual recognition, institutional prestige, and other rewards. Concurrently, as I've noted, the academic professions, including the professionalized liberal arts departments, became increasingly dominant centers of academic life, while the role of the university diminished in relative importance. In short, the faculty came to serve two masters, and a sort of conflict of

commitment arose between them. Research vied with teaching, and external scholarly associations and agencies vied with the university for the faculty's time, loyalty, and affection. In some institutions, this conflict remained more latent than real, so long as growth in resources and in number of faculty enabled individual faculty members to reduce teaching loads and restrict teaching largely to their area of special interest and expertise. But the conflict was there, nonetheless, and forms the basis of much of the reform that is now brewing in American higher education.

To these shifts in the economic and social organization of higher education must be added other major transforming pressures, including the push for greater ethnic and cultural diversity in the faculty and student body and the growing dependence of large sectors of academe on the federal government and industry for support for their programs. Together these four factors probably account for 90 percent of our current concerns.

The best exposition of the current instability or unease that I have seen—distinctive because it points beyond the familiar economic exigencies that we all face to the underlying values conflicts within the academic community—is an essay by Jonathan Cole in the Fall 1993 issue of *Dædalus*. He describes four dilemmas of choice faced by research universities: (1) the dilemma of governance, or how to decide priorities in the face of an expanding knowledge base and diminishing resources; (2) the dilemma of balancing traditional views of university structure and process, built around notions of rationality, objective truth, and meritocracy, against the recently emergent view that all knowledge is subjective, situational, inherently political, and biased to preserve the traditional power base; (3) the familiar dilemma of striking a proper balance between teaching and research; and finally (4) the Faustian dilemma that derives from the partnership between universities and the federal government.

Whether one comes at the contemporary challenges of higher education from the vantage point of economic exigency or educational philosophy, change is the order of the day. This seems to be as true of rich institutions as poor ones, of large ones as much as small ones. Change will surely involve shrinkage or consolidation of programs as resources get tighter, but it will almost certainly involve much more than that:

revision of the curriculum, new approaches to and a greater emphasis on teaching, more focus and selectivity in the range of academic programs, new ways of publishing and evaluating scholarly work. All of these and more are hinted at. While the tensions and imbalances have to be relieved, exactly how that will happen depends on the choices we make.

Whither the Research Library

What does all of the foregoing have to do with libraries? Before I answer that, let's consider a few rather astonishing facts about the aggregate magnitude of our nation's research libraries.

Collectively, the research and teaching libraries of the country—including the major national, state, and public libraries (such as the Library of Congress and the New York Public Library) as well as all college and university libraries—probably contain between 450 and 500 million volumes. These 500 million books would occupy on the order of 50 million linear feet or almost 9,500 miles of shelf space—enough to reach across the nation three times! Library budgets typically comprise about 3 percent of an institution's operating funds or 8 to 10 percent of the instructional and research budget. The physical plant of the library usually comprises on the order of 5 percent of a university's capital assets.

These figures extrapolate into very large sums, but when one considers the replacement value of the books, journals, and archival materials housed in the library, its real value starts to be understood. Consider, for example, the average Association of Research Libraries (ARL) library of 2 million volumes (small by Harvard's standard). At a replacement cost of between $75 and $100 per volume (including the full costs of purchasing, cataloging, and shelving), the value of the collections is on the order of $150 to $200 million. Nationally this extrapolates to $35 to $45 billion.

Moreover, these numbers take no account of incremental *future* costs of owning and building major paper-based collections: the quickly expanding base of publications to be acquired; building maintenance, renovation, or construction to house ever-expanding collections; preservation of the 80 percent or so that, ironically, are printed on acidic paper and are in the process of self-destruction.

The point of reciting these figures is not merely to make the obvious point that the library is a great asset, but to emphasize that it is also a potential liability of enormous proportions, when one considers the future costs of continuing to grow, house, manage, and preserve these great collections in the same proportion as in the past.

To return to the earlier question about the relationship between the contemporary circumstances of universities and libraries, in a general way it is obvious that the developmental cycles of libraries over the past four or five decades reflect those of the institutions of which they are a part. Thus, libraries, like universities, experienced a period of intense growth and diversification followed by a period of increasingly severe resource constraint relative to need, while high expectations continued almost unabated. It is widely acknowledged that basic changes in the way information services are provided are inevitable, even though there is not yet complete consensus about what the nature of those changes can or should be.

Some specific connections can be made between the general lives of universities and of their libraries that are important in our progress toward the new era of information access. It is obvious that the restrained growth of revenues that American universities are experiencing will significantly limit the funding available to libraries to meet the information needs of students and faculty. Furthermore, libraries are the victims of a "double whammy." That is, while coping with a reduced rate of resource growth, libraries also have been experiencing a severe upward cost spiral of their own. Journal prices have soared 400 percent in the past twenty years, while books and monographs have increased 40 percent in just the past five. At the same time, the amount of published material to be acquired seems to be increasing almost geometrically. Thus, in recent years the acquisition of books, monographs, and journals has actually declined, even as the *number* of available books and journals and non-paper formats has grown at an accelerating pace, because inflation of costs has far outstripped the growth of acquisitions budgets. Into this economic dilemma must be factored the cost of renovating or expanding physical facilities that have generally become both inadequate and outmoded. In addition, between 25 and 50 percent of the books contained in those facilities are embrittled (up to 80 percent are endangered)

because they are printed on acidic, self-destructing paper. Together these two problems of inadequate facilities and endangered books involve maintenance costs in the hundreds of millions of dollars for individual institutions and tens of billions for the nation as a whole, if we continue to do business as we have in the past and if there were any realistic prospect that expansion and preservation could actually be funded.

It is equally obvious that the explosion of information and fragmentation of the disciplines over the past fifty years that I described earlier led directly to an explosion of the volume and variety of books, journals, and monographs that libraries were expected—and needed—to acquire. Since 1945, the number of new book titles published each year has increased two- to threefold, from fewer than 300,000 to around 850,000, depending on what you count. The number of journals has increased during this period from around 7,500 to 140,000, a level of proliferation that I find absolutely astonishing. Just since 1991, a period in which many libraries have been canceling journal subscriptions on a significant scale, the number of new journals being published appears to have increased by 5,000. Even a casual scan of the titles of these new journals would provide ample evidence of the fragmentation of the scholarly disciplines into smaller specialties.

Moreover, as university faculties and students have become more and more diversified in their interests, background, and skills, they have brought to the library an increasingly diverse set of information needs. This in turn has meant—at least for the present—that librarians have had to cope with increasingly divergent levels of preparation and expectations among users, ranging from pressure to maintain the traditional card catalog at one extreme, to the desire for key-word access to the content of texts and the imminent expectancy of online electronic text retrieval at the other.

This cultural gap in our expectations has created a situation in which libraries today are in a very real sense struggling to be three different institutions concurrently: the library of the past, with all of its traditional expectations about building comprehensive collections and providing direct access to printed materials; the library of the present, with the extraordinary added costs of inflation, automation, and preservation of

decaying print; and the library of the future, with all the attendant costs of developing and implementing new concepts, prototypes, and technologies for publishing, acquiring, storing, and providing access to information through digital technology. The fact that the costs and the expertise required to envision and support expectations and planning at all three levels are often directly competitive with one another surely makes academic librarianship one of the most politically challenging jobs in American higher education today. Such diverse interests and needs are served at the expense of considerable strain on both the library staff and the library's budget and simply cannot be sustained into the indefinite future.

Finally, prevailing attitudes and expectations in the academic community are affecting the evolution of information management and access. In large, diversified universities with a strong tradition of faculty independence and individuality, prevailing attitudes can have a profound effect on the capacity of libraries and universities to evolve. Two aspects of this have particular pertinence to this discussion.

First, despite the fact that what I have said about rising costs and the information explosion is generally known, many of our faculty and administrators continue to hold traditional ideas about the role of the library. The strength of the library as a provider of information services continues to be measured largely by the locally held and owned collection. This attitude has persisted despite the increasing evidence that a more appropriate measure of its effectiveness is its ability to provide *access* to the rich information resources of the world rather than the quantity of locally owned materials. Our reluctance to let go of tradition has a serious opportunity cost in the form of delayed development of new and more powerful approaches to information access through shared collection development and other forms of collaboration among universities and libraries.

The resistance to change that stems from traditional faculty autonomy and independence is reinforced by a similar tradition of *institutional* independence and individuality. To be sure, American colleges and universities have much in common. They form a kind of loose higher education system through the effects of common purposes, common sources of faculty renewal, the forces of the academic marketplace, and

mutually accepted standards of accreditation. But within this system, the most dominant characteristic is a powerful culture of institutional autonomy and even competition.

This culture has contributed immeasurably to the richness of American higher education, but it also has some unfortunate consequences. It contributes to an almost paradoxical conservatism, as aspiring institutions often define their goals in terms of the path set by those few institutions perceived to be the best, and it has provided limited opportunity for and experience with cooperation and collaboration. This has become a particularly significant liability in the arena of information access, for it is in this arena above all others that cooperation offers the greatest benefit for universities.

One hundred twenty-five or so years ago Harvard Librarian John Langdon Sibley wrote, "It would be well if it were generally known that there is nothing printed of which the Harvard libraries is not desirous of obtaining a copy." This ambition was pursued with a wondrous degree of success for many decades, even centuries. But one may ask whether even Harvard can realistically hope to continue meeting the needs of its libraries entirely in the traditional way. The creation of the Harvard Depository several years ago, a less than ideal solution from the traditional point of view, was undoubtedly a response to the excessive cost of constructing and maintaining new space on the campus. More recently, Harvard's science libraries have had to cancel up to half of their journal subscriptions, and the Serials Review Project anticipates just such a contingency at Widener Library. It is urgent that these symptoms be recognized as the beginning of a curtailed ability to sustain the strength of collections through traditional acquisitions policy.

Conclusions

I can sum up this discussion in two points. First, it has become untenable for college and university libraries to plan to meet the future information needs of their faculty and students solely through the traditional avenue of growing their collections. The combination of continued high inflation in operating costs (especially for acquisitions), the explosion in the amount of published material, the emergence of numerous kinds of

nonprint information (such as images, databases, and musical performances) in electronic format, and the decay of acidic paper on which the major part of most collections is printed makes it impossible today for institutions to maintain or build comprehensive collections as they did in the past.

Second, new digital and telecommunication technologies offer possibilities for resource sharing and collaborative collection development and management that were unimaginable a generation ago. Thus, both necessity and opportunity have led to the recognition that cooperation is the only realistic way for institutions of higher learning to assure their faculty and students that they will have access to a comprehensive storehouse of published knowledge.

The positive view of this realization has come to be expressed as the vision of "the virtual library": the dream that through the powers of computer and telecommunication technologies, the libraries of the nation (and eventually the world) will be linked to one another, enabling users to have access to any information in any format quickly and at reasonable cost, without regard to *where* the information is located physically. Notwithstanding the power—and even urgency—of this idea, it has not yet happened on a significant scale. In the words of James Govan, the recently retired librarian of the University of North Carolina,

> The different and intriguing quality of this concept is that it acknowledges the fundamental shift in learning and investigation that information technology has introduced. This [digital] technology has the potential of liberating the academic library to become the proactive instrument in education and scholarship that it has struggled to become with printed tools. But so far no one has focused on the issues involved, the approaches to be used, or the structural changes required. No one has examined, in a formal setting, the kinds and organization of personnel, combining systems and library skills, to lead students and researchers to exploit this dual world of information. No one has investigated systematically the interaction of printed and electronic collections or identified the gaps in the infrastructure that prevent these collections from becoming an organic, unified tool. No one has delineated the kinds of instruction necessary to equip apprentice investigators to approach, engage, and advance this new informational structure. Partial and uncoordinated efforts have been made . . . but no effort that directly addresses [these] issues.

What is interesting about Govan's statement is that he points primarily not to deficiencies in technology—for indeed the technology is here