LETTERS

Origin of Red Shifts

I write to raise an important point omitted from Vera Rubin's article "Stars, galaxies, cosmos: The past decade, the next decade" in the Centennial issue of 4 July 1980 (p. 64). Like most of her colleagues, Rubin, in discussing quasars, manages to ignore any mention of the remarkable results obtained over the last decade or more by Halton Arp and others which by now provide strong evidence that not all red shifts are of cosmological origin. If this evidence is presented to any gathering of scientists who are not astronomers, as I have done on a number of occasions, it is accepted without any real debate. But among the professionals, it is largely ignored. Why? Perhaps because we have no physical theory which will explain the phenomenon, and this is not treated as a challenge but by many as an objection to the evidence. Perhaps because astronomers knowing that their subject in this area already rests on rather shaky foundations as far as hard-proven evidence is concerned, cannot face up to the opening of Pandora's box in extragalactic astronomy. Perhaps, because they are so wedded to present ideas. For example Rubin's statement "Quasars were more numerous and more luminous in the past" rests completely on the cosmological presumption concerning the nature of the red shifts.

Rubin states, "most astronomers agree that there are no compelling reasons to doubt that the observed red shifts indicate enormous distances or to believe that 'new physics' is required to understand quasars." However the evidence is there, and if we are really searching for the truth, we ignore it at our intellectual peril.

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Balloon Surgery

I read with interest Gina Bari Kolata's article (Research News, 10 July, p. 195) on a recent workshop on percutaneous transluminal coronary angioplasty (PTCA). PTCA is truly one of the most exciting accomplishments in modern medical technology. I agree with most of the workshop participants that before PTCA spreads "like wildfire" (to quote Katherine Detre of the University of Pittsburgh), a clinical trial should be carried out. However, Friedewald of the National Heart, Lung and Blood Institute is quoted as being opposed to the idea because "possible end points [for a trial], such as quality of life, exercise tolerance, and blood flow to the heart are too subjective and easily disputed." Although the quality of life may be a subjective matter, there is certainly nothing subjective about exercise testing, using either electrocardiography or radionuclide imaging, or about assessing blood flow to the heart, using either thallium-201 myocardial scintigraphy or selective coronary arteriography.

I wholeheartedly agree with Paul Meier of the University of Chicago that, "If we don't do some sort of clinical trial, it is not as though the problem will take care of itself," and with his question, "If we don't do the trial, what will we do instead?" My answer is that, if we don't do the trial with PTCA, we will be making the same mistake that occurred when coronary artery bypass graft surgery (CABGS) came into use more than a decade ago. There was no clinical trial with CABGS at its outset, and it became widespread before its usefulness and criteria for application had become established.

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Indirect Costs

Bravo for Kenneth T. Brown's article (24 Apr., p. 411) on overhead! In particular, I would like to support his proposals that this tax on research—and that is what it is—be made uniform among various institutions *and* reduced on the average.

It is true, as he says, that the higher the overhead tax, the less money is available for research. That is, perhaps, the main point.

But allow me to point to some other unfortunate consequences of the currently excessive level of the overhead tax. In my view, it makes the universities so dependent upon federal research grants that the ability to raise such funds becomes too large a factor in hiring and promotion decisions. In particular, this consideration seems to dominate decisions as to the mix of fields or subdisciplines among the faculty. This, in turn, inevitably yields an excessive emphasis on the currently fashionable; with too little diversity, too little concern for the past and too little concern for the future.

Moreover, a faculty hired in this way can contribute too little to teaching. So an excessive overhead tax ultimately yields an excessive separation of research from teaching; a separation that is as bad for research as it is for teaching.

Perhaps it is time for the universities to regain some of their independence by reducing the overhead tax.

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In these times of fiscal pressure on research budgets it is useful to examine critically all aspects of our expenditures as Brown has done with respect to indirect costs of federally supported research.

I must point out certain fallacious arguments in the article. Brown would allow a single, indirect rate for all universities and eliminate accountability to the government. However, this does not eliminate the requirements for accountability to various other parties such as the faculty itself, taxpayers, and trustees—groups that should be more critical than federal auditors. In addition, certain aspects of federal reporting, such as those associated with affirmative action programs, could probably not be negotiated away so easily.

A second, more serious defect of a uniform indirect rate is evident when Brown notes that the University of California has a low indirect rate resulting from a policy of charging as many costs as possible to the direct cost category. Thus able and energetic administrators would have a field day with a fixed, nonaccountable indirect rate. Brown would find himself paying for his parking space, telephone, library privileges—even the administrator's own salary.

There is a certain sociology of funding. Individuals, whether principal investigators or deans, will try to minimize their costs and maximize their available funds. Changing the boundary conditions simply changes the strategy slightly, and eliminating accountability provides a license for abuse of all kinds.

There is a central issue: namely, how shall basic research be funded? Although Brown rejects the idea that no indirect costs be allowed, he does not fully discuss the extent to which the universities are now paying for research in the United States. These costs are substantial. At Harvard, as an example, they include, at a minimum, professorial salaries and a portion of the rent (since the rent charges do not normally include the payback of

the capital costs of construction). Even the City of Cambridge subsidizes federal research programs, since Harvard's laboratories are exempt from real estate taxes.

I have always been puzzled about the manner in which universities are reimbursed for the costs of research. The federal government sponsors research at a variety of institutions. At least for private industry and the federal laboratories essentially *all* the costs are reimbursed, and in private industry, at least, the level of indirect support is substantially greater than it is at typical universities. Much of this research is of a kind that is not appropriate to universities, but there are at least a few areas (for example, plasma physics) where university, federal, and industrial researchers compete for the same funds. Why then, in some cases, are all costs reimbursed in a rather straightforward manner, but in the case of universities it is only with the greatest difficulty (at least that is the impression one gets) that less than the entire amount can be recovered?

In my opinion, universities are underfunded in both direct and indirect categories by some factor. This issue will be particularly vexing in the coming years, when university finances will be in bad shape generally. Yet we as a society face critical technical issues and research problems of a kind traditionally addressed in the university environment. Weakening the universities in any way cannot help.

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. . . Brown's analysis rests on the use of a percentage of either the direct research support as a total of federal research support or of the indirect costs as a total of federal research support. The former appears to be declining, the latter rising, thereby proving the hypothesis. What Brown does not point out is that the universities are trying to maintain a high level of research at a time when outside funding is not keeping up with general growth in university costs. At Washington University, a recent analysis showed that the indirect cost of federally sponsored research taken as a percentage of the total university budget has remained constant over a 10-year period. . . .

Brown states that universities have no incentive to minimize indirect costs. Indirect costs in universities are allocated across three pools: organized research; instruction and departmental research; and other institutional activities. Very few costs are allocated only to the research pool. Therefore universities do indeed have a significant incentive to minimize overhead since, depending upon their research activities, they are responsible for paying a significant portion of it.

Brown raises a number of important issues, some of which we can all agree on: that the current environment is fraught with excessive regulation; that there is a tendency for accounting principles to be applied without an understanding of the research process; and that the requirement for 100 percent effort reporting is without merit. However, in an effort to solve these problems, it is essential that we recognize the complexity and individuality of our universities. The currently recognized accounting principles have evolved in part because of a recognition that these essential differences in our universities make a unique contribution to our society. Attempts to oversimplify the determination of indirect costs could lead to pressures on universities to fit all university work and faculty responsibilities into a standard mold. This could result in a uniformity that most faculty members would resist just as strenuously as they now do the effort reporting requirements.

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Brown performs a valuable service by exposing the increasing proportion of the federal research budget that has been consumed by indirect costs over these past few years. If these trends continue, a linear least-squares projection—which, by the way, accounts for 97 percent of the variance—indicates that we shall attain Nirvana on 17 November 2048. On that landmark date, only 67 years hence, the entire research budget will be allocated to indirect costs, and none will remain for the conduct of research! I recommend that, after that date, indirect costs be justified as necessary to support the preparation of new proposals for research that might have been carried out if any funds had remained for actual research.

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The letters of Guze and Gursky raise several points that require further discussion.

Guze overstates, then challenges, my

article's point that ". . . there is inadequate incentive for universities to be cost-efficient with respect to indirect costs of grant-supported research," especially by comparison with direct costs. In my view this is a clear and fundamental flaw in the federal indirect cost policy. Direct costs of National Institutes of Health (NIH) grants undergo a prospective three-step review by study sections, institute councils, and NIH intramural personnel, and specific items are cut that are inadequately justified as necessary to the proposed research. Indirect cost rates are approved in the renegotiation process, where the review is largely retrospective, and there would naturally be great reluctance in disallowing, for example, indirect cost funds for salaried persons already hired. More important, I am informed by federal personnel who conduct these negotiations that it is not feasible to determine whether any given item of indirect costs is justified as part of an efficient operation, or even whether it is needed at all. They can only determine whether an item falls within accepted definitions of indirect costs. If a similar approval system were applied to research equipment, for example, an investigator could purchase any equipment desired, providing only that he could demonstrate at a later date that it fell within the definition of research equipment. It would not be necessary to show that it improved the efficiency of his research or even that it was needed in any way for his research. Clearly this would be an unsound policy that would lead to obvious abuses. Yet that type of policy is currently applied to indirect costs, where the consequences are less obvious. Under these conditions it is hardly surprising that many university administrators are reluctant to accept a change of policy. There is no adequate information on the percentage of indirect costs of federally supported research that is actually covered by universities. It undoubtedly varies greatly but is probably small in most cases. Even if a university paid as much as 25 percent of its total indirect costs, it could not realistically be expected to be as careful and efficient about costs of 25 cents on the dollar as about costs it must pay in full. This inevitably seems an important factor behind the steady upward spiral of indirect costs.

Under regional uniform indirect cost rates, as proposed in my article, universities would have strong incentives to place as many costs as possible in the "direct" category. Rather than a "serious defect" of the proposal, as stated by Gursky, this is an advantage because the direct costs are much more stringently controlled. Administrative excesses in shifting costs could be prevented rather simply by defining costs that cannot be put into the "direct" category. Some definitions of direct and indirect costs are necessary under any policy and are currently provided by Circular A-21 of the Office of Management and Budget (OMB).

Guze expresses the belief that diversity among universities requires diversity of negotiated indirect cost rates. This view seems more emotional than logical, since significant diversities rest primarily upon faculty and upon university policies. This view also ignores history, unless Guze considers that the desired diversity among universities has existed only since 1966, when the current indirect cost policy became effective. Guze goes on to predict that faculty members will resist my proposal as strongly as they now resist effort reporting. In fact, the response of nonadministrative faculty has been strongly supportive, the letters of Jaffe and Donahoe being typical of many I have received. Opposition to date has been almost exclusively from among those like Guze and Gursky, who have long held administrative posts.

Instead of diversity among universities, the more basic issue is, What policy would treat all universities the most fairly in reimbursing their indirect costs? Defenders of the current policy often assume that it does this very well, but I doubt it. Based upon differing goals and educational policies, universities will inevitably hold differing views concerning the desirability of seeking maximum indirect cost rates. Also, among the universities that do seek maximum rates, there will inevitably be differences in diligence and abilities that are applied in the negotiations. All these factors will result in inequitable indirect cost rates. So it is not at all clear that regional uniform rates would be any less equitable than the current policy. Certain inequities would probably occur in both cases, with the nature of the inequities probably differing somewhat under the two policies. In short, it appears that equity considerations cannot be decisive in rationally comparing these two policies. On the other hand, my proposal would remove or alleviate most of the serious problems that have developed under the current policy, as described in my article. These perceived advantages of the proposal seem to require particularly close attention, since they offer a much more decisive basis for evaluating the proposal in relation to current policy.

In Gursky's letter many statements

need correction or comment. He says I would ". . . allow a single, indirect rate for all universities . . . ." Instead, my proposal is for uniform rates within each geographical region that has reasonably uniform fuel costs. He also says that my proposal would ". . . eliminate accountability to the government." On the contrary, it would eliminate only the need for specific cumbersome mechanisms that the universities must now use under OMB Circular A-21 in demonstrating accountability for indirect costs. The basic accountability to all major groups affected by indirect costs would, of course, remain. And accountability to the federal government would continue to be assured by the information required from universities in establishing regional indirect cost rates. Since Gursky seems impressed that his university pays for some faculty salaries, it should also be noted that federal grant policy reimburses faculty salaries for the portion of time spent on grant-supported research. That policy pertains even for tenured faculty, whose salaries might be regarded as the exclusive responsibility of the university. This important and complex salary issue was not discussed in my article because grant-supported faculty salaries are normally charged to direct costs.

Gursky says he has always been puzzled by the different indirect cost policies applied to federal research at universities and in private industry. But why? As mentioned in my article, universities have always accepted faculty-initiated research as a primary responsibility and in former times paid both the direct and indirect costs of much of that research. Also, universities are nonprofit institutions. Unless Gursky's institution has given up its avowed dedication to faculty-initiated research, and its nonprofit status as well, it hardly seems eligible for the same indirect cost rates as private industry.

Finally, Gursky implies that my proposal would weaken the universities. Instead, this proposal would stimulate a healthy competition between universities in the efficiency of using their indirect cost funds. Through this, and a variety of other factors that were described, indirect costs would be reduced. More federal research funds would thus become available to support the direct costs of research. These changes, augmented by others that were cited, should considerably strengthen, not weaken, the universities.

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