

## Justification of Cost, Cost Recovery: Electronic Bookkeeping and Billing M&M 2000 Expert's Session on Facility Management, Part 3

Debby Sherman (Session Organizer), Purdue University  
sherman@btny.purdue.edu

*This article is the third of a series transcribed from the discussion taped during the Facility Management session at M&M 2000. It is printed with permission of the Microscopy Society of America. Bulleted paragraphs indicate comments by individuals attending the session.*

**D. Sherman:** I am sure that there are many different schemes to try to recoup some costs in facilities we manage. Probably very few of us are really happy with the schemes we have at present. Hopefully this discussion will provide us with information that will be useful in refining the financial management of our different facilities. To start us off I would like to introduce our next facilitator, Dr. Greg Erdos. Greg is the Assistant Director of the Biotechnology Programs of the University of Florida. This is an extensive program in that it encompasses far more than just microscopy. In addition to his role of assistant director of the overall program, Greg is also scientific director of the microscopy core facility. One of his credentials is that he had the job of working out the cost recovery for all the core labs in the Biotechnology Center. This had to be done according to the federal cost accounting guidelines for institutions receiving indirect costs from federal grants. This probably affects the academic sector more than the industrial sector but I am sure the industrial sector also has to justify their existence.

**Greg Erdos:** I would like to thank Debby for organizing this session and I don't think there is any question that we need this session each year as part of the regular program. We are only covering three topics today and I think there are dozens we could cover in the future. My situation may be a little different than yours but I would like to share my experiences with you. I have an EM lab on my plate in addition to the entire Biotechnology Program recharge center as my responsibility. We offer 330 services essentially to the world but primarily to the state universities in Florida. That involves 9 labs and covers things like DNA sequencing, mass spectrometry, genomics, hybridoma, and a number of other molecular techniques. We are in a unique situation that probably few of you are in, in that we don't have to worry about money. We have a mandate from the state legislature with a budget of \$2 million a year and we generate another \$1 million in recharge that is pretty much adequate to run these facilities. However this doesn't get us new equipment. That has to come through grant applications. But it also provides us the opportunity to share between facilities. For instance, DNA sequencing is now our cash cow and EM never makes money. So EM can always be the poor sister and get a little charity as a result of the more profitable services provided. Years ago it used to be DNA synthesis, but now that is so cheap on the open market that we can't even afford to do it ourselves.

My job came about because of the federal cost accounting guidelines, as we never really thought logically about how we priced our services. When the accountants came to us and said we had to demonstrate the cost of our services, it was really baffling. But there are really only a few facts you have to remember. That is: 1) you don't charge a federally funded pro-

gram at your institution more than the cost of the service; 2) nobody else at your institution can get a better deal than federally funded people; and 3) you must take into account any cost returns from indirect costs in a grant that might help support your facility. Now it is as simple as remembering those three things. Proving it is an entirely different case. You also must realize that if you are doing any work outside your institution you can charge them whatever you please. It can be less than what you charge the federal grantee, it can be five times what you charge them. It can be whatever you want. The feds don't care. Your institution cares but the feds don't care. This problem can be really overwhelming. We have 330 services, 60 employees, and a budget of \$3 million... how do I allocate the costs of all these services, or allocate the costs to each of these services, in a proper proportion.

Basically what I discovered was that your local people, who are really the ones responsible for this, don't know what they are doing either. They are just hoping they never have a federal audit because they don't have to produce this stuff until they have a federal audit. For some reason the University of Florida thought it was on a "hit" list to be audited but it never came to pass. So what I finally decided to do was determine the value of a service. Now we have been providing these services for 10 years. We pretty much know the relative value of each of the services that we provide and, as experts, we should be able to convince any auditor this is true. So, for example, we charge \$75 for one thin section sample and we'll call that as a value of 1. If we do an immuno procedure we charge \$85 so it has a conversion factor of 1.3. So just by making relative values from one item to another we could figure out the relative value. If we provide 331 TEM samples that year times 1 it gives us 331 work units for that item of service. However we had 50 immuno-labeling projects but, since it is worth more, it actually generated 57 work units. After calculating expenses for the entire year, I was able to come down to a cost per work unit. I then translated that to a value or a cost based on my conversion factor so that even though we are charging \$85 for an immuno-labeling, it really costs us \$636.75.

Is everyone sufficiently baffled by my logic? That's the whole point. If I could only establish my credibility the first year by doing this than I was home free. This was true because subsequent years are based on the first year. For instance, the kind of costs we had to take into consideration were salary of our hourly employees, our general operating expenses which would include supplies and so forth, our service contracts, and our building use (electricity, water, toilet paper, floor wax, etc.). The university has formulas for how much it costs per square foot to support a room depending on what kind of equipment is located in that room. We also had to factor in equipment depreciation. The university will have formulas for that. Some equipment can only be depreciated for 5 years, some for only 3, some for 10. They seem to manage to depreciate some forever. An electron microscope depreciates 10% a year forever, even after you have totally depreciated the original purchase price.

We also have to go above the level of our laboratory and go to our main administrative office and parcel out the cost of this administrative office to each of our core laboratories. So these are the secretaries, the Director, the Associate Director, the bookkeepers and so forth and the physical costs of their operation (Xerox machine, paper, etc). So what if finally came down to was that the total cost to run my electron microscope core was really \$272,472. Then they asked what proportion of this was being used for our recharge operation. We do about 15% education, training, and

*Continued on page 10*

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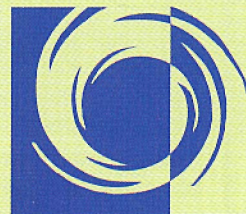
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## Justification of Cost, Cost Recovery: Electronic Bookkeeping and Billing

*Continued from page 8*

outreach, that kind of thing but mostly 85% service provision in order to run our lab. This was OK the first year but then the accountants had an entire year to sit around and think about that they decided that you couldn't just work with total depreciation of your equipment. In the EM core we had 24 service lines and what we had to do was take each piece of equipment by its inventory number and apportion its use to each of the 24 service lines. A service line is, for example, an hour of TEM time or the preparation of a TEM thin section sample. This is equipment depreciation. There are pages for each one of the categories listed. What was worse was they wanted me to take the entire center, and do it as one so this would have been 330 service lines over about 400 pieces of equipment. We settled on doing it lab by lab. We had to do the same for personnel in the lab. For each person working in the lab I had to figure out what portion of their time had to be devoted to each of those services produced. The same was done for service contracts, administrative costs, building, etc. If you can convince them you know the value of each of the services in the beginning, this becomes easy. You just take the value times the number and that probably is the percentage that you have. Now it is real hard to use the cost of your SEM and apportion it to the service provided on your TEM. That's what you have to watch. I ended up with a cost per service line per year. Then what I could do was take the number of things we did, such as beam time and the total dollars collected, divide that out and it gave me a true cost per hour. Then I showed what we are actually charging. Even though we are charging those federal grantees way below the true cost we can't just say that. We have to prove it. But this then at least gave us some idea of what is really going on financially in these laboratories. Are we charging too much or too little for a specific service? We found out that the sequencing lab was probably charging too much for DNA sequences. They were charging \$25 when they really should have been charging \$8-9. Other times we found out that we were giving services away and we could really demand more cost recovery.

At this time the Biotechnology program service portion was converted into a little business. It's called a university auxiliary and it is sort of like the University bookstore, owned by the University but is a business that is run unto itself. So we had to establish some kind of billing and invoicing system. This might not be appropriate for a small lab but we bought a software package, *Yes I Can Run My Own Business*, and it is a front end for an access database. What makes it easy is that all the clients are in a database. You type in "BB" and it brings up Bill Buhouse's entire billing information, address, and encumbrance number. Then each one of our items was given a catalog number so you type in the number and quantity. It brings up the service, the unit cost and the entire cost for this service into the sales order. This then goes to our fiscal office where they print out invoices in the appropriate format. Then all this data is available to us in the future. This was important that we be able to store the data and get back to it. Before this I had to go around to each lab with an adding machine to go through records because there was no organization. You need some type of organized system to go through your data so that each year when you have to go through this cost accounting you have something you can work with. I just wanted to share

this with you and then open up for discussion of how others are handling the cost accounting situation.

**D. Sherman:** Before we open this up to the whole group, I asked John Chandler if he would present some information about the system they are putting into place at Colorado State.

**John Chandler:** I don't have to much to add to Greg's presentation because it is really apparent that if you are going to know what you are doing, you have to go through the exercise of figuring out what your costs are and have some way to justify them. If you know what you are going to be billing you have to know what you are going to charge so must know cost for all supplies, etc. What we have decided to do, rather than separate TEM from SEM and billing individually for sputter coating and vacuum evaporator runs, is lumped everything into the hourly scope charge. This simplifies things a lot. You can also do it by splitting out each individual service, which is fine.

Our accounting people looked at the way we are doing it and decided that it was adequate. We know how much we spend each year for equipment maintenance and we add all those expenses over the last several years to average out to an annual amount. Then we add up all the expenditures for the year and divide the expenditures by the total number of scope hours. Although service contracts are not identical on individual scopes, they are close enough in the grand scheme of things that we can have the same hourly charge on the SEM and TEM which again simplifies things. But we keep records of everything that is used.

One of the first things we did was generate a spreadsheet to calculate our hourly usage rate. We plug in our expenditures, the amount of up-front research support that we get from major user departments, the amount of income we expect to get from an hourly charge basis, the projected number of hours of our two instruments, the amount of income we expect from internal users and the amount of income from external users. Our balance of internal verses external users has been very consistent at about 15% external. We plug budget numbers into an Excel spreadsheet and it spits out a base rate that we base everything else on. Based on the number of dollars that we have to recoup, with that projected 85-15% split, it tells us how much we will need to charge an external user if we want the internal rate to be a certain level.

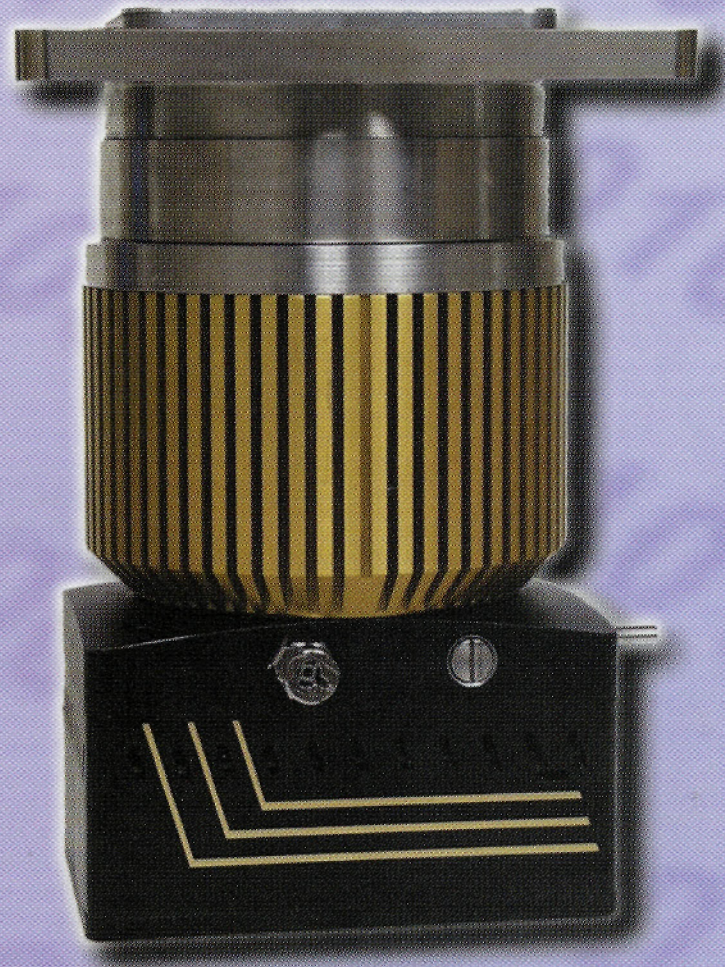
Our ability to bring this total revenue requirement down is a result of a lot of years of work. We tried to get a system for supplementary funding for the microscopes that other colleges in our university would support. We used to call this a research subsidy but subsidy is a dangerous word we have been told. Now we term it research support. This is money that user colleges give to the EM center at the beginning of the fiscal year that they never see again. It is prorated on the basis of percentage of use over the past 3 years and allows us to charge the internal users an adjusted research rate and the external users a much higher rate. That amount of income has allowed us to get very close to zero balance at the end of the year with some left over coming in from the external users. There are other parts of the spreadsheet that will calculate what amount of the income will come from each of the operations we do.

We have a very simple billing system. We bill for scope hours, for supplies, and for coordinator time or technical support. I really like Greg's use of a business application as a front end for a *Microsoft Access* database. We are developing a web-based system that uses *Cold Fusion* as a front end for an *Informix* database, and we can move it to *Microsoft Access*. We have one table with us-

*Continued on page 12*

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Continued from page 10

ers, another with equipment information and we generate new output tables each month that contain usage data. It winds up being a fairly large table that we can archive and we generate invoices directly from that. We enter various fields into the user data base, and can access information such as who is using a particular piece of equipment, their user number, how much they have used a particular instrument, onto a list that mimics what my log sheet looks like. I think it is really essential that if you are going to be managing your information, you have to go through the exercise of figuring out how much it is costing. No matter how many users you have you need to have a way to keep track of their uses, archive that, and justify it to the auditors.

**D. Sherman:** Before I open this up to the audience, I want to make a comment about my facility which, up to this point, has been totally subsidized by 2 major academic schools. That means they cover the cost of salary and service contracts with a small fund for supplies, repair, etc. Users are charged for consumables such as film, fixative, photographic paper and chemicals, and such. This works extremely well for a multi-user facility only if you keep your salaries down. That means you don't offer service per say because service requires many hands. However, you must have a department willing to put in this base amount to cover the major costs that are there year after year. But like many other institutions, our administrators don't want to continue providing all the support because they have so many other centers to support. So now they are looking at how much we can generate from the facility to reduce the subsidy. Up to now, when I have determined that we should have a \$10,000 digital camera and I send out an E-mail asking for contributions from my regular users, they have been very generous. I can generate the \$10,000 inside of a few days. Of course you can ask few and far between, explaining what the new equipment can do for them. People will sometimes put money into the pot when they do not even know whether they will need the equipment but they have had such a good experience of having the open lab. I can generate funds for equipment up to about \$20,000 but we have to rely on grants for items over that. But there is so much good will that people are willing to do this.

The question becomes what happens when we put in charges and users are charged every time they walk in the door. Will this affect the type of research being done, which is done a lot by students that are slow doing procedures? You don't want them to go fast. You want them to be slow and careful rather than worrying about charges. Are there comments about this and whether some of you might have had experiences of losing users when you have gone to a charge system? How you handle the need for good research and not having to rush through something, balanced against limited funds available to spend? How do you provide access to the facility for those people who don't have funds at the present time but if they get in there and get data, they may be able to generate funds in the future?

• I can address that a little bit and I also have a question. I tend to do a fee for service. The way my lab is set up, the college pays my salary and I generate enough income to cover all my operating costs including the service contract. It works out

pretty well but along with that, since my salary is covered, I can be very generous with consultations with students, etc. . I will sit with someone and go over something so advisors are not spending their money having students sitting in my lab day in and day out going over things. When they are doing their prep and have a question, they can easily contact me. That works pretty well except for immuno, since they never want to pay for the time it takes to work out their immuno EMs. The question I had has to do with billing. My accounting people require me to get an authorizing signature on my bills and I am often running around getting signatures at the end of the month.

**John Chandler:** In order to get an account in the EM center, they have to fill out an application form. I get a single signature when the account is set up from the accounting staff member in the office of the department of the researcher, not from the PI. It is not their money,. They do not have control over it...however, they do not usually realize that. I get a valid signature in ink on file before anyone walks into the lab. Then we are set. We can use E-mail to charge accounts. Whatever account number is on the sheet, which can be changed as needed, is then used on the invoices. We use that same database to generate electronic journal entrees that can be uploaded to the invoicing system on campus. This system works so well for us because we use one database to keep track of the users, the departments, to generate paper invoices, etc. . Eventually, using the *Cold Fusion* software, an individual, based on their user number and access privileges, will be able to get a full record, as complete as they want, of their use during any time period they want. The PI will be able to look at all the people in their lab to see what the usage is and can keep track of expenses. Department chairs can see how their department is using the facility. Deans can look at everything in their college.

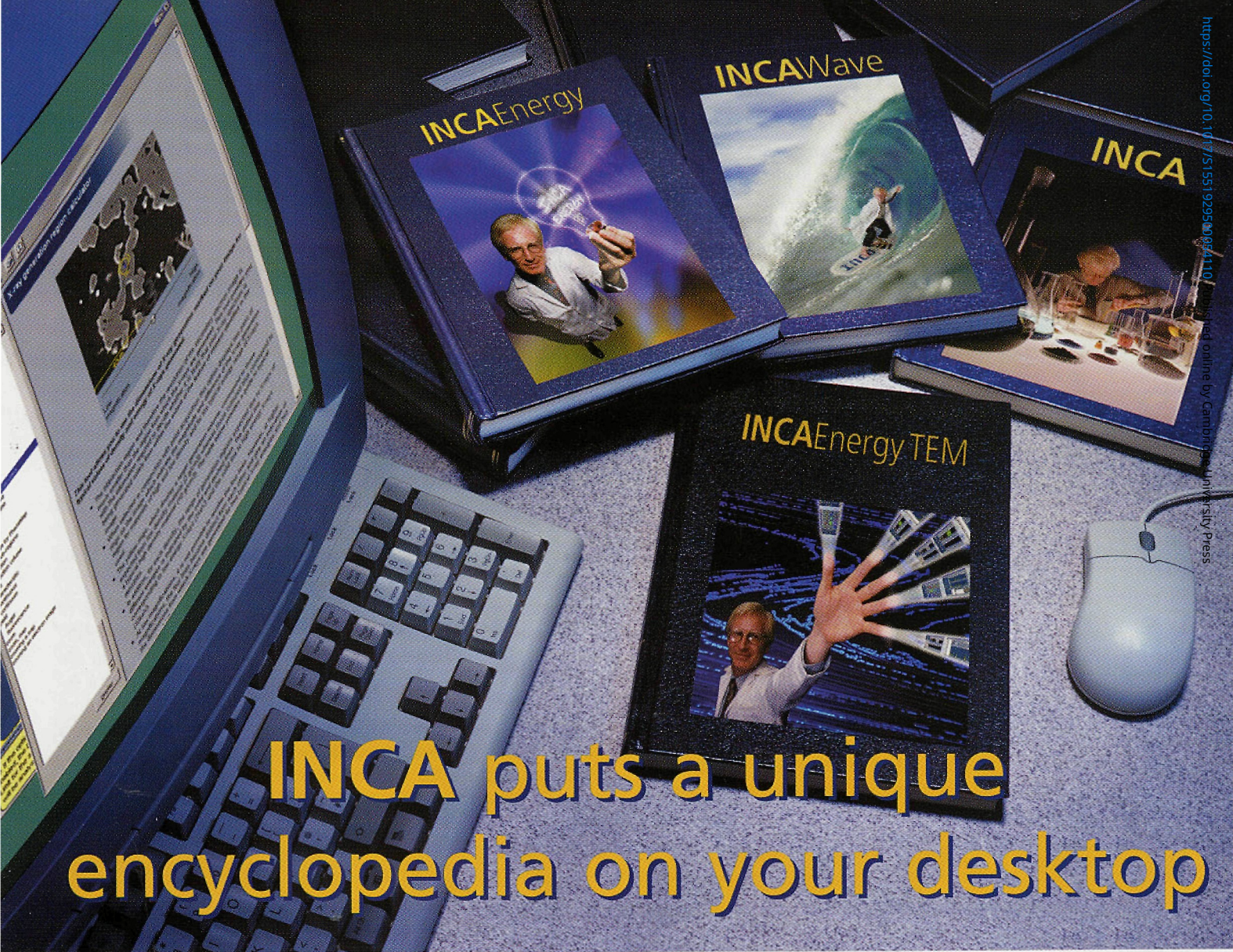
**G. Erdos:** I want to comment on the invoicing problem. You are not a bookkeeper. It is not your responsibility. Get it put where it belongs. Refuse to go after those signatures. We send our invoices to the department that administers the account that is paying and they have to get the signatures. It should not be your problem and you need to try to get that off your plate.

• I have a question for both of you. You both mentioned that you have two sorts of users...in house and external users. I think you both said that for external users you could charge whatever you want. There is no restriction on that. Does this apply to everybody who has a government grant or some kind of federal funding? I was led to believe that if anyone had an NIH grant, or if the NIH was funding you, you had to charge the same rate for everyone.

**G. Erdos:** No that is not true. The government is only interested in projects that are being paid by grants that provide indirect costs to your institution or lab. So when you go outside your institution then it is the other institution's problem. So we developed a three-tier system of in-house charges. We have a middle price that we call our non-profit price because we feel that, as a University, part of our role is to interact with other universities and research institutes. Then we have a commercial price that is for commercial companies. Right now our charges to do 1 TEM sample for in-house is \$90 but commercially I charge \$450.

• I am from the University of Illinois at Chicago. We started charging about 3-4 years ago. At that time we had maybe 3 or 4 extremely old microscopes. We were lucky enough to be able to upgrade our EM facilities so that now it has 8 electron microscopes

Continued on page 14



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Continued from page 12

covering a much wider range of possibilities. There was some reticence to begin with concerning paying these charges but once people were made aware of what the university was putting in, the complaints started to decrease. We went through phase where we charged different rates for different instruments. We soon dropped that because we found that people were using the 24-year-old 35C at \$10/hour rather than the brand new instrument at \$50/hr. So they were making choices not based on a technical reason but on a cost reason. As of last year we changed that to a constant rate for all instruments for internal users. We saw a decrease in use in the first 12 months. But once that first period had gone by and we started getting the new equipment in, usage is now something like 4 times the amount it was before we started charging.

• We had a situation 15 years ago where it was easy to use the lab and almost free. Then the administration told us to put charges on the systems. The director put on his tie and went down to visit the Dean with his retirement letter. They fought about it for a while and they said, "you don't have to retire. It was just an idea". Over the past 15 years people have gotten used to the idea that we have to become bookkeepers of sorts. We argue about this regularly about how much more the administration would like to see us pay and we have accepted that. Morally I think it hasn't been very good. We have gotten away from thinking about research and sit in front of Excel spread sheets...we've got a lot of them. It used to take us 3 days to go through all the logbooks, figure out some general scheme and throw this at the department head. Now it takes some regular work every week and about three weeks at the end of the year to really make sure it is right. So, in regards to your question about how people are feeling, they feel pressured about money now. I have a question about how you actually get data from your users to your system. We have this bookkeeping system now. I am thinking of taking a bunch of old Mac pluses or something with Excel spread sheets and put one in each microscope room and connect them on a network for access.

**J. Chandler:** That will work. I transcribe all the log sheets once a month. It is very rapid with this system and I do it one time. That data can then be used without more recalculating.

• A number of comments I would like to make perhaps working backwards in time. One is I was astonished when Greg spoke about depreciation because that is specifically excluded from our bookkeeping. The way our bookkeepers argue is that our equipment is bought on federal grants for particular purposes that are outlined in the proposals that were written. Cost recovery is only, and very specifically only, for operating costs and not equipment costs. So in our case the equipment is absolutely excluded. So we don't have to worry about any of those sorts of things that you spoke about. I do think it is very important that we have a clear vision of what our mission is. And this might vary, certainly will vary, from lab to lab. But if you can have a clear statement of the mission of your lab, especially if it does include some component of education, than it makes it much easier to argue that we have done this amount of education. We have contributed so much time to such and such course. And that it is therefore appropriate that depart-

ments cover some of our costs. This also goes along with what we were talking about in the first session in that if we have a clear statement of our mission, it will change how we manage the lab. If we see that we have a major education part of our mission, that part of our job is to teach people how to use the electron microscopes, than we are going to operate our facilities very differently than if our mission is purely to generate results. Generating results means keeping the equipment up. Teaching students how to use equipment means accepting that mistakes will be made. So I do think that we do need to have a very clear statement within our own mind at least and perhaps written of what the mission of our lab is. Perhaps my third reaction is, listening to what some people are saying, how grateful I am at working at MIT which, up until now, I hadn't until now though was such a great institution. So many of these things that people are talking about are actually covered by the institute's accounting policies. We've got a central SAP system that does a lot of this accounting that people are talking about. The only thing we have to worry about is a bit of a front end and the issues that people have brought up are some of the things that we are struggling with too.

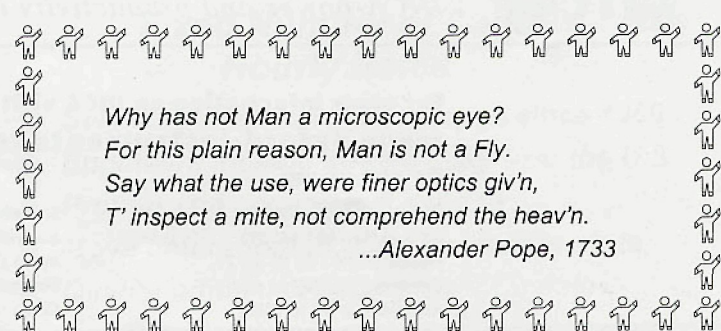
**J. Chandler:** Your tax accountant in the business office does have to report depreciation of equipment. They may not be telling you but they are doing it. So if your tax accountant comes to one of your meetings of your management team and says, "you really should be thinking about this", don't be caught off guard. You are expected to enter other expenses that go along with running a facility into your operating costs. Your salary for the amount of time that it takes you to maintain the instrument, whether it is 2 hours a year or 40 hours a year, needs to be put against the expense of running that scope. So it is the service contact plus what it cost you out of your time in the facility. Federal cost accounting standards require that. You must account for all that it takes to run the facility.

**G. Erdos:** And that includes depreciation. So the fact that you don't factor depreciation into your charges is fine. But you do want to factor it in when you show true costs of a service so when the feds come you can really say, "it really costs \$900 and I am only charging \$650". That is a cost of the service even though you don't have to factor it in to what you actually charge.

• I don't agree with you. It is not a cost in terms of something that you can charge to the federal government. The government has already paid for it.

**G. Erdos:** They haven't paid to replace it and that is what you are depreciating. They want to know the total true cost. They don't care where the money came from. Then you can disqualify certain costs in terms of it. That is why we were asked to factor all that in.

*The session was concluded due to lack of time, not the lack of questions and enthusiastic discussion.* ■



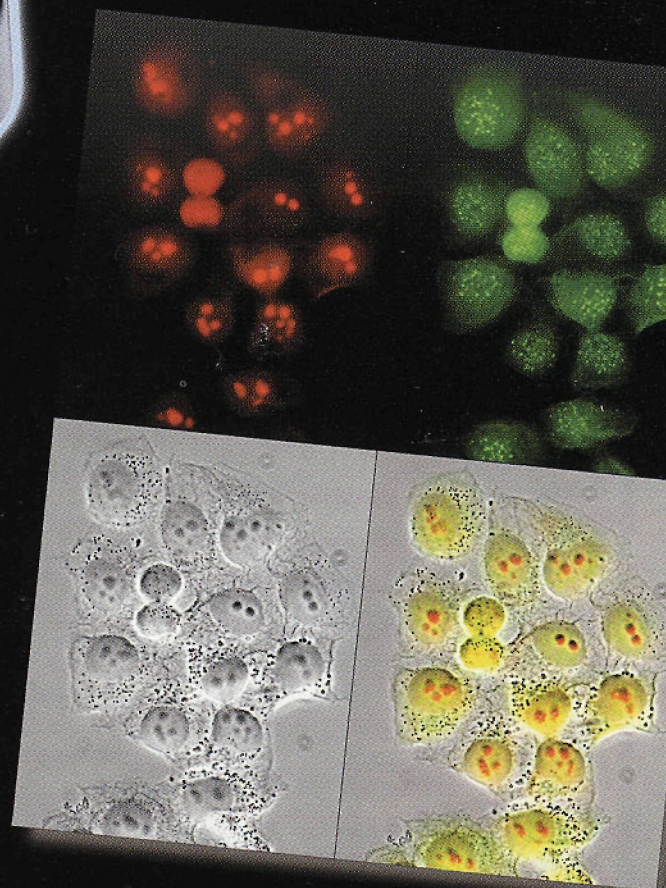
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