portant function of an international meeting is the facilitation of personal contacts. After individuals from opposite parts of the world meet and discuss matters of common interest, they can establish a basis for trust and cooperation that no amount of letter writing can ever achieve. Friendships made at quadrennial meetings often last a lifetime. The 13-day length of the IUGG meeting provided opportunities for many contacts.

Many scientists who attend a General Assembly see it as a special kind of scientific meeting. During the 9 days of scientific sessions, 34 multidisciplinary symposia were conducted. Some of the advances made during the past 4 years were treated in symposia entitled "Recent crustal movements," "Deep sea drilling and the history of the ocean," "Marine pollution," and "Global effects of the interplanetary medium—magnetosphere–lower atmosphere interactions." There were many other formal and informal sessions, including those of commissions and working groups. The latter usually consist of six to ten scientists who address a specific topic in depth, canvassing existing information and outlining cooperative programs aimed at providing crucial information or analysis.

A great international meeting permits a rough assessment of the quality and quantity of scientific research being conducted in the participating countries. In the possibly prejudiced view of American attendants at the IUGG meeting, the United States was the leading contributor. Roughly half of the significant new knowledge in geophysics in the last 4 years has been the product of U.S. scientists. This was evident in presentations at the meeting. It was documented by a massive 1106-page U.S. report that had been prepared by members of the American Geophysical Union (*1*).

A key ingredient in the U.S. position is the superiority the United States has enjoyed in equipment, instrumentation, and computational facilities. Some of the other countries, notably the United Kingdom, though less well endowed with hardware, have scientists equipped to use their minds very effectively. The quality of work in western Europe, Japan, Canada, and Australia is very good. There are intelligent and competent geophysicists in the Third World, but they labor under dreadful handicaps of lack of equipment and other support. A special situation exists with respect to recently independent countries. A decade ago their leading geophysicists were usually colonial civil servants, most of whom have since been phased out. A new cadre of native geophysicists is beginning to appear and some were at Grenoble, but considerable time must elapse before a substantial number are trained.

For the most part, the quality of contributions of the Russians and eastern Europeans was disappointing. It is not certain that a fair sample was presented, since the Russians sometimes play their cards close to the chest. There were some exceptions. The Russians presented a considerable body of data and analysis of their observations of disturbances in the ocean's thermocline—work that was well regarded by some U.S. oceanographers and that has possible military significance. Another body of information involved Russian studies in connection with their space probes to Venus and Mars. In at least some aspects of their studies they have achieved leadership.

It is difficult to determine the level of effort of the Russians in geophysics, but from various conversations it appears that the number of scientists involved is comparable to that in the United States. Among the Russians, there are many highly intelligent, gifted individuals. However, it is clear that the young Russian scientists work under a number of handicaps. They have relatively poor equipment and inadequate computational facilities. The directors of laboratories wield too much power, often suppressing new ideas or new lines of research. Communication among various institutes is not as effective as it is, for example, in the United States. Finally, there is the limited ability to visit and interact with scientists from other countries.

From a strictly numerical standpoint, the less developed countries had enough votes at Grenoble to push through measures and to elect a slate of their own officers. A number of reasons can be advanced for the absence of such a confrontation. One is that the predominant spirit of the occasion was scientific rather than political. A second is that most of the delegates from the less developed countries are realists. They understand that to be effective an officer of the Union must have the backing of an appropriate infrastructure. They also recognize that geophysicists from less developed countries have much to gain from cooperation and much to lose from confrontation. Were geophysicists of the developed countries pushed too far they would respond by forming an exclusive club and all geophysics would be poorer.

—PHILIP H. ABELSON

References

1. The report, edited by Peter Bell of the Geophysical Laboratory of the Carnegie Institution, covers highlights of U.S. work in geophysics in the period 1971 to 1974. The report has been distributed to all members of the American Geophysical Union and is a special issue of *Reviews of Geophysics*. Copies may be obtained from the American Geophysical Union, 1909 K Street, NW, Washington, D.C. 20006, for $20.

Employment Testing: Debate Simmers In and Out of Court

The United States is the world's biggest user of psychological tests. In the area of employment selection, placement, training, and promotion, they have been used indiscriminately and discriminatorily. Some people believe they should be thrown out altogether because any pencil-and-paper test operates to the disadvantage of blacks and other minorities. The government, however, argues that good tests properly used can be an effective means of bringing socially and educationally deprived persons and groups into the golden land of "equal opportunity."

Testing is only one of a wide array of techniques for screening and selecting employees. But because it is purportedly the most objective and most nearly scientific means of ascertaining an individual's qualifications and potential, it has been the object of a great deal of attention.

The world of testing is in a state of ferment and flux, particularly because of its high political volatility. The federal government is in the process of developing a revised set of guidelines on test use that will apply uniformly to the public and private sectors. Employers, many of whom have been frustrated by seemingly contradictory and complex demands made by the government, are eagerly awaiting the new guidelines. Psychologists and psychometricians are laboring at smoothing out the discrepancies between the uses of tests to achieve employment based on merit and to increase minority representation. And, as these groups are struggling to establish equitable and consistent procedures, the courts are beginning to establish a body of case law—in a rapidly growing number of employment discrimination cases involving tests—that some people fear will result in wholesale abandonment of the use of tests.

The history of the current situation begins with the Civil Rights Act of 1964, Title VII of which forbids employment discrimination on the basis of sex, race, color, religion, or national origin. The Tower amendment (Senator John G. Tower, D–Tex.) to that section specifically allows for the use of "professionally developed ability tests," so long as they are not used to discriminate against the groups named in Title VII.

Back in the 1960's, the abuses of employee selection procedures were so blatant that the means to eliminate them appeared to be fairly straightforward. The prevailing philosophy was simply that, if applicants were selected solely on the basis of their ability to do the job, the problem of disproportionate representation of minority groups and women would automatically be resolved. The assumption still holds, but it is complicated by the recognition that so long as minority groups continue to suffer from social, economic, and educational disadvantages the government's twin goals—fair treatment and increased minority participation—are not entirely congruent. It is this discrepancy, and the attempts to devise a uniform approach to resolve it, that have made testing so complex and controversial.

Several government agencies are responsible for overseeing employee selection procedures in the public and private sectors: the Department of Labor's Office of Federal Contract Compliance (OFCC), which looks after federal contractors, the Civil Service Commission (CSC), which governs the federal government's employment practices, and the Equal Employment Opportunity Commission (EEOC). The EEOC has become increasingly prominent since 1972 when, in addition to responsibility for overseeing employment in private industry, it was given enforcement authority as well as responsibility for determining the appropriateness of employment standards in state and local governments.

A fairly well refined set of definitions now exists for what constitutes discrimination under Title VII, and what measures should be taken to deal with it. The trouble begins when an employer's selection procedures are shown to have "adverse impact" on a group protected under Title VII. Adverse impact occurs when selection procedures act to disqualify a disproportionately high number of minority or female applicants. When adverse impact is shown in a job discrimination case, the burden of proof shifts to the employer to prove that this effect is not a result of illegally discriminatory procedures. Any standard for assessing an applicant that is not "job-related" is illegal. Therefore, "discrimination" equals "adverse impact" plus evidence that selection standards were not "job-related." While the EEOC defines "test" as almost any selection procedure (an interview, for example, is a "test" if it is scored), the big focus is on pencil-and-paper tests as being the most objective and, many say, the most reliable way to predict an individual's job performance.

Briefing

Finding NIH Institute Directors Is Not Easy to Do

After an interregnum of nearly one and a half years, the National Heart and Lung Institute (NHLI) has a new director. He is Robert I. Levy, who has been with the institute since 1963 and is an authority on lipoprotein metabolism. He has been coauthor on a number of papers with former NHLI director Donald S. Fredrickson, who is now director of the National Institutes of Health (NIH). Levy's appointment came after several attempts to recruit someone from outside NIH failed, pointing up the continuing problems of enticing scientific leaders away from universities to work in the federal bureaucracy for a maximum of $36,000 a year.

Difficulties in getting someone to become the first director of the Institute of Aging, NIH's newest institute, parallel the problems in finding a director for NHLI. The Aging search has been going on for a year. There have been candidates from outside NIH but no takers.

To compound the recruiting problem, three other top NIH posts are also vacant. Ads are out for directors of the Clinical Center, the National Institute of Dental Research, and the National Institute of Allergy and Infectious Diseases. It is likely that the latter job will go to Richard M. Krause of Rockefeller University, who will be one of the few new outsiders in a top NIH position if he takes the post.

NIH is not only having trouble recruiting for top jobs. The pool from which it chooses young research physicians known as "clinical associates" is also diminishing. During the days of the draft, some 600 young scientists applied every year for about 100 openings. Training at NIH was a way out of military service. Now, the number of applicants has dropped to about 200 and officials are worried that if the number goes down any more, they may be reduced to taking associates who are only second-best.—B.J.C.

World Firewood Shortage Examined

Worldwatch Institute, Lester Brown's new think tank, has produced its maiden paper, the first in a series of studies on matters of global import. "The Other Energy Crisis: Firewood," written by Erik P. Eckholm, highlights the plight of those who are too poor to be directly affected by the energy crisis as we know it. One-third of the world's population depends on wood for cooking (and, to a lesser extent, heating), and Eckholm estimates that half the wood harvested each year in the world goes for this purpose. But population growth is outpacing growth of new trees. The demand for firewood is contributing heavily to deforestation, driving up prices, and forcing people to substitute manure for wood, which results in diversion of badly needed fertilizer. The "firewood crisis" is most intense in the semiarid regions of Africa and India, but is a problem throughout the Third World, turning many areas into dust bowls such as occurred in the United States during the Depression.

As for solutions, Eckholm asserts that new alternative means of generating heat, such as solar cookers and biogas plants, will not be financially or practically feasible for a long time. So, in addition to reduction of population growth, he sees massive tree-planting programs as the best way to retaliate.

—C.H.

Governor's Decision Kills Red River Dam

The proliferation of bloated environmental impact statements, some of them obviously designed merely to justify federal decisions reached a priori, frequently gives rise to the comment that the changes brought about by the National Environmental Policy Act (NEPA) of 1969 have been largely pro forma or cosmetic. Hard evidence that

When use of a test results in adverse impact, the employer is required to "validate" it, which means to prove that it is indeed job-related and, therefore, nondiscriminatory. Test validation is very complicated and expensive. There are three commonly accepted validation strategies (and the validity of the strategies is also in dispute): criterion validation, content validation, and construct validation.

Criterion, or empirical, validation involves proving that the abilities, interests, and knowledge measured by the test are directly related to job performance, and the only way to do this is to match test scores of fairly large numbers of people with assessments of their job performances obtained through supervisory ratings and other measures of productivity.

Content validity is established by demonstrating that the test samples the specific knowledge, skills, and behaviors required for a particular job. This does not require a test population, and is of limited use because it does not firmly establish a significant correlation between an individual's *performance* on test and job, as does criterion-related validity.

Construct validation is so complicated that most people don't want to (or can't) talk about it. But construct in this context means measurements of traits—such as verbal or mechanical aptitude—that are allegedly desirable for successful job performance.

In a culturally, racially, economically homogeneous population, devising good tests—that is, tests that accurately assess an applicant's qualifications—is not so difficult. But in a pluralistic society like the United States where there is intense pressure to bring disadvantaged groups into the economic mainstream, testing and test validation become a very loaded proposition.

The need to have sound and scientifically supportable tests is particularly urgent now that they are becoming crucial in court cases on employment discrimination. In addition to numerous lower court cases, there have been two Supreme Court decisions where plaintiffs have won because the tests involved could not be shown to be valid to the court's satisfaction.

The landmark decision, in 1971, was the case of *Griggs* v. *Duke Power Company.* The court nailed down the job-relatedness issue by ruling that the company's requirement for a high school education or passing of a standard intelligence test operated to disqualify blacks and had not been shown to be a necessary qualification for the jobs in question. This year, in another case, *Moody* v. *Albermarle Paper Company*, the court ruled in favor of the plaintiff, saying that the company's validation study of its testing program was inadequate. The court also tightened the screws on employers by stating that when a test, even if valid, has adverse impact, every effort should be made to find an alternative, less adverse, selection device.

Both these decisions relied heavily on the "Guidelines on employee selection procedures," published by the EEOC in

Briefing

this is by no means altogether true can be seen, however, in the recent events that appear certain to have killed the Army Corps of Engineers Red River dam project in Kentucky.

Governor Julian Carroll of Kentucky announced on 11 September that he was withdrawing his support for the project, and subsequently Kentucky's two U.S. senators said that they intended to follow Carroll's lead in the matter. A controversy over the proposed dam, which was authorized by Congress in 1962, had been under way before NEPA was enacted and steps were taken by the Corps of Engineers in 1969 to modify the project to preserve part of the Red River gorge.

But, given the NEPA requirements for an environmental impact statement (EIS) first in draft, then in final form—plus the certainty of court challenges as to the adequacy of the EIS's—actual construction work on the revised project could not possibly begin before the mid-1970's at the earliest. What's more, the corps' findings as to costs and benefits, project impacts, and possible alternatives were indeed found to be faulty by the President's Council on Environmental Quality, the U.S. Environmental Protection Agency, and, at least with respect to the costs and benefits, by the General Accounting Office. As a consequence of this and other criticism, this project which was controversial to begin with has become too heavy a political burden for either the governor or the two Kentucky senators to carry. And it is NEPA that has allowed the time for the critical second look.—L.J.C.

Comings and Goings

To follow a higher calling, so to speak, veteran astronaut **Alfred M. Worden** has left NASA to join the High Flight Foundation, a Christian evangelical organization in Colorado Springs, Colorado. Worden, an Air Force lieutenant colonel, is retiring to become a vice president of High Flight, which is headed by **James Irwin**, commander of the Apollo 15 lunar mission on which Worden was command module pilot. Another former astronaut, **William R. Pogue**, is also a High Flight v.p. . . . What have the following in common: **Thomas Andrews, Wilfred Beckerman, Hans Bethe, Wernher von Braun, Colin Clark, Buckminster Fuller, Philip Handler, John Maddox, Viscount Pirrie, Dixy Lee Ray, Edward Teller**, and **Alvin Weinberg**? There must be something, because all are acknowledged by **Paul R. Ehrlich**, in an article in the September *Bulletin of Atomic Scientists*, on the grounds that their "thinking on technology has been a constant inspiration to me in the writing of this paper." . . . **Maxine F. Singer**, a biochemist at the National Cancer Institute, has been named to a 12-year term on the Yale Corporation. Singer, who has been in the news recently for her role in calling public attention to the potential hazards of recombinant DNA, is the third woman to serve as a trustee in Yale's 274-year history and currently is the corporation's only bench scientist. . . . **Gardner Lindzey**, author of the recently published *Race Differences in Intelligence*, has left Harvard to become director of the Center for Advanced Study in the Behavioral Sciences, a nonprofit organization based at Stanford University. Lindzey believes that "much of the recent criticism of social sciences [to wit, attacks by Senator William Proxmire] is based upon a naive expectation of what social science can contribute to solving the problems of society." . . . **Pat Perry**, armed with a degree in medieval history from Yale, is newly in charge of overseeing the NIH budget for the Office of Management and Budget (OMB). As such, she is keeping up the OMB tradition of naming a budget examiner with no training or special experience in science. Before going to OMB, Perry was an intern at the Food and Drug Administration, but she will not come out and say so. Citing a new privacy act and related OMB policy, she refused to disclose anything about her background to *Science* on the grounds that it would violate recently set OMB rules to do so. Thus fares our "open" government.

1970. Now, while the rulings came down on the side of fair employment, there are two problems. First, according to several psychologists, the tests that came under scrutiny were so inappropriate that they probably would have been rejected even without the help of the guidelines. So legal precedents are being built on what an EEOC psychologist calls a "pathological" sample of tests, and the weight of this precedent could make it much more difficult for fair and valid tests to stand up in court in cases where adverse impact is involved. The other problem is that in these cases, particularly *Albemarle*, the court treated the guidelines as though they had the force of law when in fact they are not regulations but are intended to be "guidelines," written in an area in which much data—on minority test performance, for example—was incomplete. In other words, court interpretation of the law has reinforced some assumptions that it is beyond the state of the art to prove or disprove.

The EEOC guidelines are based on the best professional wisdom available—that is, standards for test use developed by the American Psychological Association. But representing, as they do, "ideal" procedures (ideal in the context of available knowledge), they have come under heavy criticism. The most common word used by employers to describe them is "unworkable"; they have been said to be contradictory and to "invite litigation." The precautions surrounding the use of tests and the requirements outlined for validation thereof are so complicated that many employers believe the message is that testing should only be used as a last resort, when all alternatives have been exhausted. So, as a recent survey by Prentice-Hall has shown, many employers are backing off the use of tests and are resorting to the old "numbers game"—hiring sufficient numbers of applicants from minority groups to avoid litigation and keep the government off their backs. Some psychologists fear that, if objective selection procedures continue to come under attack, many employers will go back to the dark ages of placing primary reliance on personal interviews, which to them is the most notoriously subjective and unreliable way of assessing a job candidate.

They see hope around the corner, though, in the form of a new set of "uniform guidelines" that are being put together by the Equal Employment Opportunity Coordinating Council, made up of representatives from the departments of Labor, Justice, the Civil Rights Commission, the CSC, and the EEOC. These guidelines would encourage more use of testing by making validation requirements more realistic, encouraging the transportability of tests and allowing different companies to conduct joint validation studies. And while companies are urged to seek alternative measures when a test, even though valid, shows adverse impact, they are not required to scour the countryside for it.

Underlying all the complex and rather dry procedural and statistical maneuverings surrounding employment testing is a simple, emotionally loaded fact: blacks (and some other minorities), on the average, get significantly lower scores on tests than do whites. Conventional wisdom has it that this is because tests were devised for and by white middle class people; therefore, it could be inferred that, since tests were polluted by irrelevant cultural factors, blacks would perform better on the actual job than on the test. "Differential prediction" is the term used to describe the varying reliability with which a test can predict performance for different groups. The current EEOC guidelines therefore require that when adverse impact is found, a test must be validated separately for each group and if differential prediction is found, compensation must be made by, for example, lowering the passing score for blacks, or giving less weight to their test scores than to other elements of a screening procedure.

A Good Idea at the Time

The differential validity hypothesis was an article of faith among industrial psychologists in the 1960's, but now, as Robert Guion, author of a classic textbook on personnel selection, says, most experts see it as "a great idea that didn't pan out." The fact is, more recent studies tend to show that good (that is, valid, job-related) tests usually have equal predictive value for both blacks and whites; and where differential prediction does occur, it comes more often in the form of overpredicting rather than underpredicting black job performance. So, making such tests more fair might occasionally mean raising the cutoff point for blacks. This, of course, no one wants to do.

"Fairness" needs to be explained here. It is one of the concepts psychologists agonize over because "fairness" is very much tied into the values society wants to emphasize, or "utilities," as the experts call them. There are a number of competing definitions of fairness, all of which sound like hair-splitting, except that in practice they can have quite different influences on employment decisions. The best known definition is: a test is fair when individuals with equal likelihoods of performing well on a job have equal likelihood of being selected for it. Other models of fairness put greater emphasis on the value of compensating for past inequities: the most extreme proposal, based on fairness to the group rather than to individuals, would call a selection procedure fair if it resulted in a "fair share" (that is, proportional to the total number of the group) of job opportunities. Ideally, both these models would have the same operational results. But in practice it is clear that one can go down quite different paths, depending on whether one has as one's goal fairness to a group or fairness to individuals.

Achieving "equal opportunity" is quite like the process of cleaning up the environment. In the early stages, abuses were gross and remedies for them obvious, and benefits were enjoyed by all: qualified persons previously excluded were allowed to rise to their natural level and employers benefited from having a larger pool to draw from once they eliminated artificial barriers. We are now in the next stage. The cream has been skimmed and the nation's employers, public and private, are being pressed into taking responsibility for the failure of educational systems to provide rudimentary preparation (a solid grounding in the three R's, for example) for the world of work.

Some people argue that testing should be done away with altogether because it adversely affects minorities. But the position of government officials, personnel people, and industrial psychologists is that testing is one of the soundest tools available for detecting true ability and thereby giving minorities a fair shake. They argue that a retreat to more randomized selection through quota systems (illegal, but there are usually no complaints if the numbers look right) will not only discriminate against qualified applicants but will result in downgrading of the quality of workforces, and increased failure rates on the job. Guion points out that employers can get away with playing the "numbers game" at entry-level jobs now, but will have to face the music later when they are sued over failure to promote the people they hired to avoid enforcement action. In other words, there are no shortcuts to equal opportunity land. And squirm as they may, says the government, employers are not going to be let off the hook.

To keep employers on the track, the government must tread a narrow line between making selection requirements so rigid and complex that only the largest and wealthiest employers can afford to follow them, and making them so lax as to permit continued use of the kinds of general ability tests that are not strictly job related and therefore more likely to result in adverse impact. It is this balance that framers of the new guidelines hope to achieve.

Perhaps the most important product of the intensified focus on employment selection is the general upgrading of personnel

departments. It has been common practice for employees who proved incompetent to be shoved into the personnel office where they were supposed to be relatively harmless. But as selection procedures have become more sophisticated the importance of well-trained personnel officers has become obvious.

Adopting employment procedures that are both professionally and legally sound is difficult and expensive, and some employers may deeply resent that, in addition to the goal of making a profit, they must also actively incorporate the goal of social justice (just as they are being forced to take responsibility for environmental clean up). But society must pay for its discards in one way or another, as it must pay for all the corporate inefficiency and personal misery that results from haphazard, biased, and inappropriate employee selection and placement. What now seems the most difficult and expensive route may prove the least costly.—CONSTANCE HOLDEN

RESEARCH NEWS

Cell Surface Protein: No Simple Cancer Mechanisms

Whether a cell is normal or cancerous could hinge on the presence or absence of a few key molecules. Tumor viruses or chemical carcinogens could convert normal cells to transformed cells (that is, tumor cells) by preventing or altering the expression of one or several genes whose products are necessary for normal cellular metabolism. Since this explanation of transformation has long been considered plausible, cell biologists have spent years looking for proteins that are present (or absent) in all normal cells, regardless of the kind of cell, and absent (or present) in all transformed cells, regardless of the means of transformation.

About one and a half years ago, investigators at six different laboratories, using four different experimental techniques, independently discovered that one gene product—a large cell surface protein—is lost when cells are transformed. This large external transformation sensitive (LETS) protein has a molecular weight of 250,000, contains the sugar galactose, and is found on normal cells from a wide variety of species, including human beings, rats, and chickens. Moreover, some investigators found that when normal cells are exposed to enzymes that strip off their LETS proteins, they can lose control of their growth and biochemically and morphologically resemble transformed cells.

The loss of a cell surface protein could conceivably be a crucial event in cell transformation. Transformation involves changes in growth rate, morphology, adhesion, metabolism, and migration of cells. A cell surface protein could affect the expression of any or all of these things. For example, it could affect growth control and adhesive properties of cells by altering the membrane structure. Removal of such a protein could be one step in a chain of events that occur during transformation or it could be the primary event in transformation. However, recent studies of the LETS protein indicate that unraveling its function in transformation may not be as straightforward a matter as was originally hoped. The protein is now believed to be involved in cell adhesion. But there is some question as to whether its absence is necessary for other aspects of transformation.

Three groups of investigators who discovered the LETS protein used the enzyme lactoperoxidase to attach radioactive iodine to this protein and so observe its presence on normal cells and absence on transformed cells. Other investigators labeled the galactose portion of LETS with a different enzyme—a galactose oxidase—to monitor the presence of this protein. A third way in which LETS was discovered was with immunochemical methods. A fourth method was employed by a group of investigators who measured changes in membrane polypeptides of transformed cells.

Kenneth Yamada, now at the National Cancer Institute, and James Weston of the University of Oregon developed a method to isolate the LETS protein of chick embryo fibroblasts and demonstrated that the isolated protein is capable of reattaching to cells from which it had been removed. This method provides a way of studying the function of LETS by observing the consequences of its addition to cells.

Results obtained with the purified LETS protein and indicating that it may play a role in cell adhesion were recently reported by Yamada, Susan Yamada, and Ira Pastan of the National Cancer Institute. Although this role is not firmly demonstrated, the experiments of Yamada and his associates are of interest because they provide the first direct evidence of a biological function for the LETS protein.

One test of whether the LETS protein is involved in cell adhesion is based on the observation that certain cell adhesion proteins cause red blood cells to agglutinate. Steven Rosen of the University of California at San Diego demonstrated this for a protein that presumably causes slime mold cells to adhere. Yamada and his colleagues report that the LETS protein, isolated from chick embryo cells, agglutinates red blood cells and thus behaves like the slime mold protein.

The ability of the purified LETS protein to agglutinate red blood cells vanishes in the presence of antibodies to LETS, chelating agents such as EDTA, and proteases (enzymes that degrade proteins) such as trypsin. Chelating agents and trypsin are routinely used to dissociate cells. In addition to this evidence that the LETS protein may function in cell adhesion, Yamada reports results indicating that LETS can cause other kinds of cells to adhere. When he added purified LETS protein from chick embryo cells to dissociated chick embryo cells or to transformed rat kidney cells, the cells aggregated (Fig. 1).

If the LETS protein plays a role in cell adhesion this could help explain why transformed cells frequently show decreased adhesiveness. However, it remains possible that this protein may also be necessary for the expression of other traits that distinguish normal from transformed cells. Richard Hynes, now at the Massachusetts Institute of Technology, and Jacqueline Bye of the Imperial Cancer Research Fund and, independently, Carl Gahmberg and Sen-Itiroh Hakomori of the University of Washington, report that the presence of the LETS protein on the surfaces of normal hamster cells varies with the stages of cell growth in a way that might be expected if LETS were involved in growth control. Hynes and Bye detected the LETS protein by attaching radioactive iodine to one of its amino acids, whereas Gahmberg and Hakomori labeled the LETS protein with radioactive borohydride. Absence of detectable LETS protein could mean that the protein was missing from cells or that it was inaccessible to reagents that react with the surfaces of cells.

Hynes and Bye, as well as Gahmberg and Hakomori, find that the amount of iodinated LETS protein on normal hamster fibroblasts is greatest when the cells are resting rather than growing. The amount of LETS protein on growing cells decreases as the cells approach the stage of the cell cycle at which they divide. At mitosis, the cells have little or no detectable LETS protein. Since mitotic cells re-