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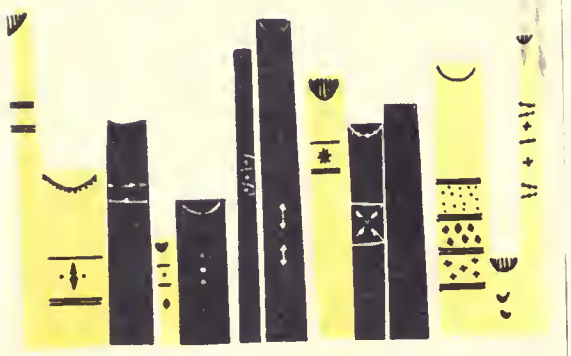

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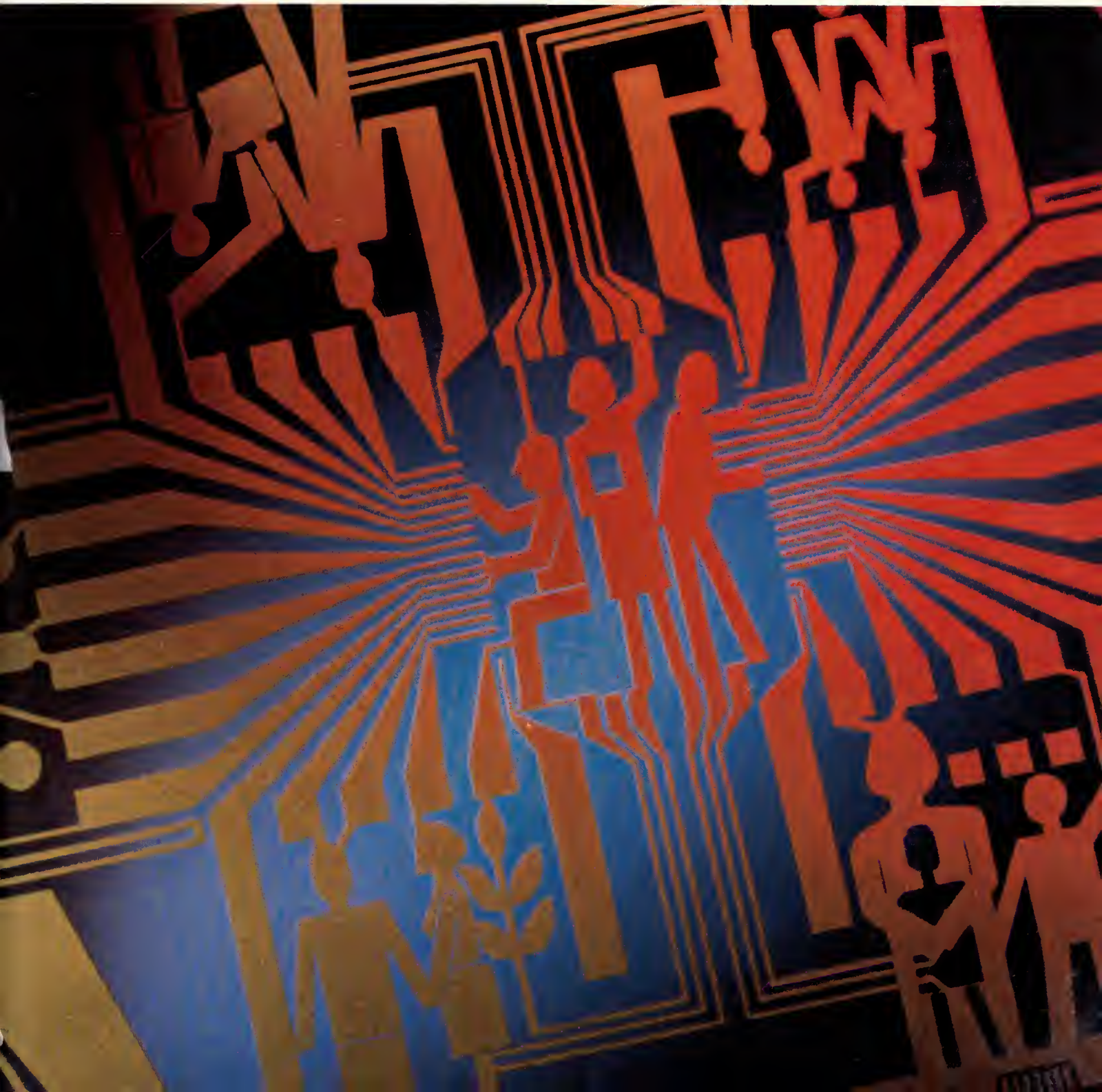
# BELL

telephone magazine

Some Thoughts About Tomorrow
A Brighter Light Is Born
How Mountains Help Make Men
Feeling Groovy—But Not From Rock



# Good Cities and Good Sagebrush

We have felt fortunate, during most of our dozen years with this business, to function from a corporate base which demanded, or at least permitted, a generous amount of travel about the land. One might say it is more meritorious to devote a career to one Bell company serving one state or one cluster of states. That, after all, is where the service and the indices are. Well, we worked in a Western Electric factory and in an operating phone company, and those times were indeed among the best ever.

We are nonetheless grateful that our mission has been, for the most part, as it is now, to work toward System-wide purposes with all branches of the business. In that way one is able to get out and see and feel what's happening. There is value in keeping abreast personally, if peripherally, of all the companies, in all the cities, and of Bell and other people who make the companies and the cities what they are.

During 1969, we were in 12 or 13 cities, usually on business but sometimes with wife and kids in tow purely for pleasure. We were in some of the cities more than once. It was *always* enjoyable.

Yet, so much is wrong with the cities today, and so much is being written about these wrongs, that one feels almost subversive about admitting to a feeling of good cheer and brotherhood induced by, say, a walk along Manhattan's Central Park South or Fifth Avenue during a winter evening snowfall. Careless though it may sound to say it, such a stroll can be awfully good for the psyche. This is not to deny that blight exists a few blocks away. It is to say that while the cold, cruddy, crowded tenement buildings of Hell's Kitchen are part of the city, so is the invigorating, poetic, explicitly urban experience of a snowfall on Fifth Avenue; falling, as it does, without regard to race, creed or color.

One may hesitate for the same reasons to tout the comforts of an evening with friends in the picturesque townhouse neighborhood of Washington known affectionately as "Foggy Bottom." One hesitates because, as everyone knows, robbers are running amok out there on the broad streets of the city. But if bandits are a common side of the current D.C. scene, so is the gracious urban atmosphere of Foggy Bottom, to which one can walk from work and from most of the city's historic sites and parks. Foggy Bottom is an exclusively inner city thing.

One may feel reluctant to emote over the impressive facilities of Exposition Park in Los Angeles with its Coliseum—where we spent countless autumn boyhood Saturdays—the adjacent new sports center, the museums of natural history, and science and industry. Why reluctance? Well, because nearby the Watts riots started the whole, tragic "Burn, Baby, Burn" sequence of inner city race wars. Yet Exposition Park is not just the property of the Establishment. It serves the whole community, every shade of citizen, for a hundred miles around.

In like fashion, one could feel compelled to soft-pedal the awesome vistas seen from Seattle's Space Needle or San Francisco's Fairmont Towers, for not everyone frequents those places. But any restriction against customers is based on their inability to pay for what they consume, not on their church or color, and today more people than ever *can* afford to relax in those surroundings, if they want to. The convenience of such bistros, and the views they provide, are strictly central city achievements. That there are massive traffic jams near the Boeing plant in Seattle or on the Golden Gate at rush hour does not cancel the attributes of those cities.

It is exciting, in Chicago, to sense and see the productive industrial pulse and highly professional style of that big town. The crackerjack operating organization that represents the Bell System there typifies the city's talent and mighty capacities. Lake Michigan is, of course, horribly polluted, and to some of this country's most promising youngsters the city, because of confrontations during the Democratic convention there, embodies everything that's wrong in the world. But the positive contributions of Chicago are no less bright for its problems.

The combination of commerce and culture which America's cities offer is impossible in any other environment. Blue Ball, Pennsylvania, or Cut 'n Shoot, Texas, could not provide such options. If the same span of possibilities existed in Blue Ball, then Blue Ball wouldn't be Blue Ball. It would be a metropolis, and most of the Blue Ballians who live there now would live in its suburbs and come into town to work, to dine, to study, to see plays, to hear music, to shop. Along with those advantages, Blue Ball would have muggers, smog, traffic, bureaucracy, ballooning taxes, protests, strikes, grousing commuters, and more surly waitresses and salesclerks than it probably has now.

The cities, despite their agonies, are still essential, inspiring, throbbing centers of creativity, industry, entertainment, education, athletics, hospitality. The point often overlooked in our eagerness to fix the cities is that they must be preserved and improved more because they are so fine, flaws and all, than because they aren't. It is not so much the need to make a bad thing good as it is to make a good thing better. By cutting the cancer out of a patient a surgeon doesn't enable a bad man to go on living. He gives his patient, who is probably a good man to begin with, new license to become an even better man—better in his business, or with his family, or on the links, or on the school bond committee, or whatever it is he does and wants to do better. The cities are a lot like that.

But cities alone can exasperate the soul. More than at any time since Man quit using vines as his favorite vehicles, he needs sagebrush to balance the urban milieu. Too much of Queens, Indianapolis, Hartford, Birmingham, Minneapolis or North Long Beach can wear a man down. He needs to get out in the brush now and then to restore his perspective. It doesn't have to be sagebrush. Man can receive the same tonic from pine forests, undeveloped beaches, or the kind of mountain water Tahoe in California once was and the Alagash in Maine still is. The important thing is to get out and get in it every now and then. And a prerequisite to that is for government and private groups to keep the remaining rustic parts of this land rustic, so that man *can* wander in them when he wants to.

One reason we, personally, have always enjoyed cities is that we have spent as much time out of them as in them. In 1969, for example, we paddled down Pennsylvania's pristine Delaware River in a canoe, and on another occasion rode Utah's rambunctious Green River rapids in a rubber raft. We went on a sleighride in rural New Hampshire snow, pulled by puffing Percherons. Recently, back in our native West, we got up very early one morning and hiked far up into the sagebrush, mesquite and manzanita-covered hills of San Diego County, near the cowboy towns of Temecula and Aguanga, where coyotes and cactus still reign. If one has never breathed early air in such surroundings, one should.

John Gardner said our society needs good plumbers *and* good philosophers. Plumbers and philosophers and their families and friends need good cities *and* good sagebrush. THH

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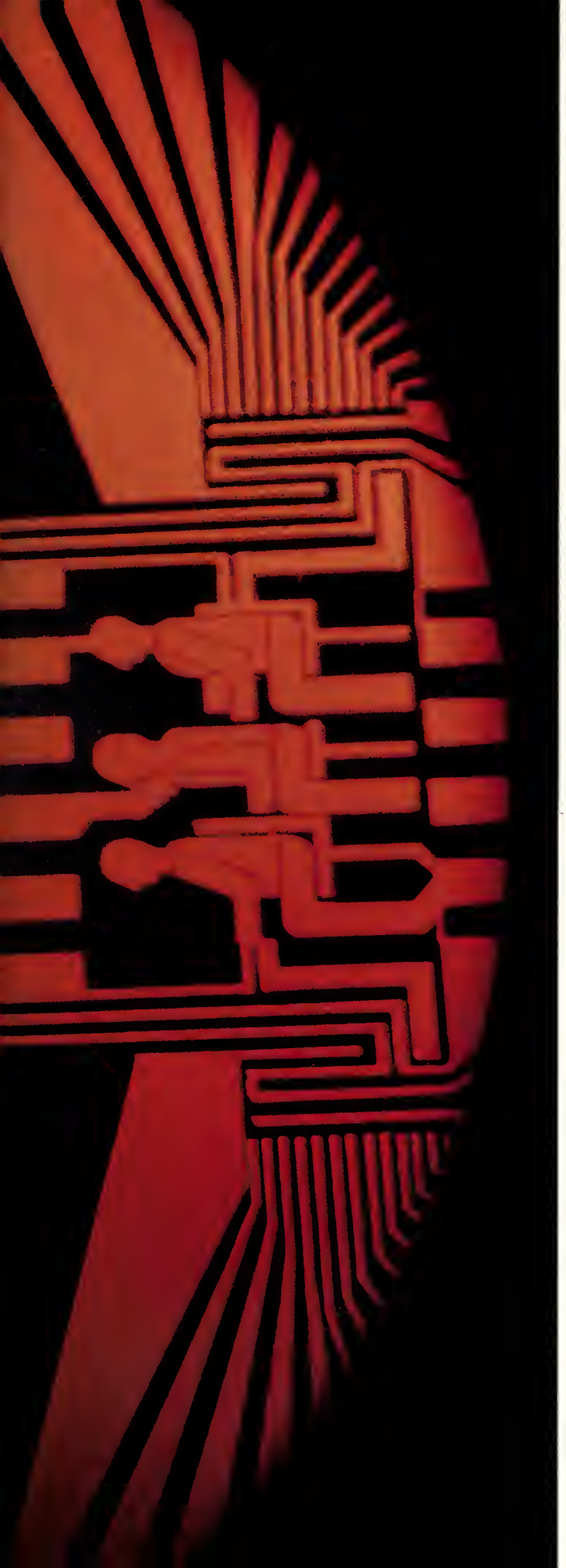


# THIS BUSINESS TOMORROW

The turn of a decade is one of those divisions of the calendar that fit neatly upon the course of human affairs, affording men an opportunity to recall the past, appraise the present, and assess the future. Since it is especially a time for looking ahead, BELL Telephone Magazine asked four of AT&T's vice presidents to comment on aspects of the '70s as they will affect the Bell System. On the following pages are views, taken from a taped discussion, of **HUBERT L. KERTZ,** operations; **KENNETH G. McKAY,** engineering; **WILLIAM C. MERCER,** personnel; and **WALTER W. STRALEY,** environmental affairs, representing broadly the areas of service, technology, people and environment.

**Mr. Kertz, what effects will new technology have on better service for the public?**

Mr. Kertz: In the future, electronic switching systems, for example, are going to provide our customers with a much more flexible service, and these systems will be easier to maintain. Beyond these, there'll be many other advances, such as automatic transmission testing sets, which are going to be a great help to the maintenance forces in improving the quality of service on our network, as well as keeping the network in shape to provide more and different services to our customers. All this is going to require the operating departments to gear up for these new technologies.

**Mr. McKay, how will the network be affected by new technologies in the seventies?**

Mr. McKay: The pace of innovation, both in development and manufacture, is so great that new technology is permeating almost everything we are now doing. It is over four years now since we first introduced electronic switching in commercial service; this year we will have about 70 offices equipped for over 900,000 lines. We expect to have an entire family of electronic offices which will serve the full range of needs, from the very small to the largest offices.

In transmission, there are some rather spectacular developments in long distance techniques which have resulted in steady reduction of long distance transmission costs. I see that trend continuing through the seventies. An important factor in this reduction is equipment for digital transmission, which is now being installed to serve shorter distances between central offices. As we go on through the seventies, I will expect more and more digital transmission through intermediate distances with larger-capacity systems, and then digital transmission on coaxial cable. Finally, in the latter part of the seventies, we expect to introduce digital transmission on waveguides. Right now, we are beginning a field trial for a waveguide system which will be able to handle about a quarter of a million two-way voice circuits over a single system. We think that will meet much expected growth.

As far as lasers are concerned, we have a good deal of work going on now, but it clearly requires the development of a whole new technology before we can use them effectively in the field. Consequently, I don't expect that lasers will be used broadly as a communications medium during the seventies.

What I have been talking about is facilities to cover not only voice but data transmission, Picturephone® service and other forms of communication. First of all we have the more complex telephone, or "station set," which does more for you than what you have now. One excellent example is the Picturephone set, which provides both audio and video communication. I can imagine other more complex forms too, which I expect would be developed some time during the seventies, but the kinds of special services the customer will get will depend not only on the station sets, but also on the functioning of the local central office, and this is the area where electronic switching plays a major role. The electronic memory in the central office can provide a number of special services readily, and I expect that others we have not yet thought of will come along.

**Mr. Mercer, how do these advancing technologies look to you over the next ten years in terms of jobs and training?**

Mr. Mercer: It seems that each of these new technologies tends to be more complex. On the other hand, they are being designed so that many of the complexities as far as the individual installer and maintenance man is concerned have been eliminated through the use of plug-in units. In many instances these really reduce the demands made on a lot of people in terms of technical know-how.

However, certain people will need to be better trained to understand the equipment, trace trouble,

repair it, and so forth. On the other hand, much of the actual repair work can be done either at a factory location, or the plug-in unit can simply be replaced and the old unit thrown away. Nevertheless, we'll need to keep our plant forces trained, including several levels of supervision, so they will know how to maintain and deal with the highly complex central offices and new transmission techniques which even now are coming into being.

I also expect that we will be hiring people who are well trained technically, either out of vocational schools, two-year technical schools, or whatever. I think we need to be alert for this kind of potential employee, but we must make sure just what each individual job requirement is so that we do not put people in jobs that are really beneath their capabilities.

**What different skills will be required of our people in the future?**

Mr. Mercer: What we will need in the future is to raise the level of general technical knowledge in the whole employee organization. Toward this end, we have technical training for our craft forces, and we now have traffic engineers at our Lisle, Illinois, training center who are going through courses on how to administer our dial central offices and how to plan for additions to them. In addition, we've started a training center in Atlanta for management people in the plant department to bring them up to date on new technology, and on how to better manage the job. We're also undertaking training in the commercial department in connection with forecasting and other aspects of the commercial management job.

**Will the ratio of management and nonmanagement people change in this process?**

Mr. Mercer: I would not think so for the immediate future. I do, however, see more specialized skills needed, not necessarily in the usual large organizations such as plant, traffic or commercial, but in the

newer, smaller groups such as the management sciences and market planning divisions at AT&T, and in expansion of other groups such as those working with economic and regulatory matters. I see new specialists in engineering, and communications consultants or account managers who will be responsible for servicing large, complex systems for big customers. But as far as the mix of management and nonmanagement is concerned, I hope that with the improved technology, we could have a higher ratio of nonmanagement to supervisors as new techniques and operating procedures develop.

**Mr. Straley, what effects do you see the environment having upon our business in the next decade?**

Mr. Straley: First, I think as far as the physical environment is concerned, there is something significant going on which will affect not only our business but all businesses in the country generally. For the first time the *environmental* issue is becoming very rapidly a *national* issue. I read that, during the game between Stanford and Cal, one cheer that went up on the Berkeley side was "Stop the war in Vietnam—clean up the environment, and beat Stanford"—in that order.

The so-called youth movement is beginning to get concerned with problems of the physical environment. Importantly, this "clean up the environment" issue is nonpartisan, and independent of whether or not we have Democrats or Republicans in national, state or local jobs for the next decade. The physical environment as such will be a national issue that crosses parties and crosses ages. I think that, for the first time, everybody is for it. I think that we as an enterprise are going to be intimately involved in a lot of physical environmental efforts that are being made. For example, the people in AT&T and out in the telephone companies, along with a lot of other industrialists and governmental agencies who use large vehicle fleets, are really going to be pressing for an improvement in exhaust emission control devices. I think some important breakthroughs are also going to be made in the development of electric vehicles.

More and more people are coming to understand that industry has made very rapid progress in water pollution control. The great need there is for bringing various overlapping governmental groups together into districts and metropolitan areas, regional areas and so forth to do something about public pollution of water. I think that Western Electric has done a good job of reducing factory water pollution, and of controlling air pollution by burning less sulfurous oils.

The social environment is a different problem. It involves the shape, the structure of the cities; it involves the economic facts of life for the people who find themselves increasingly ghettoized there; it involves government, and here there is no universe of opinion. Government is struggling in a political sense with such matters as what taxpayer group shall support the major expenditures. Sixty percent of the revenues of most of the big cities are taken up by education and welfare costs. In most of the rest of the world free public education is paid for by the central government.

In the early seventies, we will increasingly hear the cry we are hearing now: that the states must pay for education and that the Federal government must pay for welfare. A tremendously important political argument is going on: how and where to shift the burden of the costs of the cities. I do not believe this debate will be settled in the seventies. We in business suffer our most critical environmental effects through what happens to people inside the cities, and all of us are deeply involved in that human problem which affects service. That is why much of the emphasis in our new department of environmental affairs is on the human aspects of the environment.

**Do people have the kind of commitment they ought to have nowadays, and if not, is the trend going the wrong way?**

Mr. Straley: To generalize for a moment, I think we have two kinds of young people coming into the busi-

ness. First, there are those who have been so spoiled as a result of the permissiveness of their parents and their environment over the past generation, the two decades in which they have been growing up, that they are disenchanted with everything. That may be an unfair generalization, but it is my opinion. They don't accept a commitment because they have not been asked to by the post-war parentage that I also belong to. We all felt obliged to save the little monsters from ever being pushed to any kind of an important personal decision. We, the depression generation, have said, in effect, "they will never have to go through that, it will all be easy for them," so they have never been pushed for any personal commitment of any kind.

Then there is a much larger and a much more important group of youngsters in the cities who are the victims of big city high school training. We take them in very often for their first job. In this case, they are quite a different group. From their point of view, and generally it is true, nobody has kept any commitments to *them*. They really don't understand when people ask them to implement such terms as "the customer's needs are first in this office." They don't understand this because no one in the kind of environment they come from, including the white community if they happen to be black or brown, has ever said that to them and meant it, so they don't know what *we* mean. Hurdling this barrier of understanding involves a very difficult process which we must master, and through which we must keep our commitment to them as employees. They *then* will begin to reciprocate.

Mr. Kertz: There is no question about it. We certainly had, in past years, craftsmen and service representatives and operators who really had the customers' service requirements in mind, and I think most importantly too, they took a pride in the job they did. When the repairman fixed a case of trouble, he took satisfaction in doing the job right the first time. As Walt Straley says, we've got some people coming into

the business who, for one reason or another, just don't have that attitude. We as management people have a real responsibility to help them acquire it.

We have quite a few plans under way to help develop the right attitude. We have been working with the personnel department to improve the content of the job through what we call the "work itself" concept. That has really done wonders for the attitude of employees and for the service in general. We'll put it into effect in our operating departments as rapidly as we possibly can.

Mr. Mercer: I think the very success we have had with the "work itself" program is an indication that basically people do get satisfaction out of accomplishing a job when unnecessary restrictions are removed. This is a little different from what we did in the past, and I think this is part of the change we have to effect here.

We recognize that up until 10 or 15 years ago, people were willing to take and do a job strictly on the basis of pat phrases and ways of responding to a given situation, while today they like freedom to try and work out their own problems in a way that makes them feel *they* are solving them. I hope we can develop a sense of commitment, a proprietary interest in the customer, not necessarily as the *Bell System's* customer, but as the *individual employee's* customer for whom he is personnally responsible.

I think we could assign a man a piece of real estate — give an installer four square blocks, for instance, in a suburban area or a certain part of a city, where all the customers in that particular segment of geography are *his* customers. We started a trial like this in one of the companies, and it was amazing what one individual installer did. He went around on his own and rang door bells and introduced himself to his customers and told them who he was, that he was the telephone man, and if they had any problems to call him and he would come and fix it. This is what I mean by proprietary interest in serving the customer.

Mr. Kertz: Bill, I'll say it is a *must* that we lick this problem. Our customers have been getting better service each decade as we go along, but at the same time their expectations continue to go up. Service in general in the sixties has been better than it was in the fifties, and customers everywhere are going to expect service in the seventies to be consistently better than it was in the sixties.

Mr. Mercer: Also, I think it helps if we can provide immediate feedback to our employees so they know that they either do well or do poorly. This has been proved in many of our trials and programs that are under way now. We have over 400 different programs like this going currently, and I think we are going as fast as we can in this area.

Mr. Straley: There are other things we can do. For example, young mothers with small children who have no place to leave them, are going to need a place. In my opinion, we have to take some leadership in seeing that this is done. If employees require education, job-oriented or not, we probably should do something about that, too.

In the child care centers we need not just someone to take care of the children but also to start their educational process. Moreover, in the big urban centers we need more management people who have a working-living "street" knowledge of many of the kids who are coming into the business.

In a simple sense, as we employ more blacks, it means that we are going to have more black management on first and second levels than we have now. We need more people who understand the kind of employment market we have, what their values are, how they react to things, what they really want out of the job. We need more managers who understand them.

**Do you see an expanding involvement in the next decade with such organizations as the National Alliance of Businessmen and the Urban Coalition?**

Mr. Straley: This is hard to answer. As you know, the NAB is a Labor Department funded agency, for the most part privately managed. But it's co-managed with the Department of Labor to the extent that it continues to contribute to prejob remedial training. I am certain the Bell System will be an important user of that sort of thing, an important partner of that effort.

The Urban Coalition is still another private community effort to attempt to attack the proliferating problems of the city.

The fact is that anyone who sets out to put all of the urban problems together in any fashion or in any kind of a coalesced effort is in for trouble because they are, in effect, redesigning the human being. There are so many things to take into consideration that we can't use the systems approach to the whole complex.

I have hope, however, that we can begin to pick up piece parts, working with government task forces, joined by private enterprise. Jim Allen, Commissioner of Education, recently has announced that he wants to begin a nationwide campaign with private organizations to enable every child to read by the end of the seventies. By what standard I do not know, but to read, let's say, at the 10th or 11th grade achievement level — read well enough to be effective in a reading environment or perhaps read well enough to *want* to read. Maybe that's a standard.

Most educators try to make the whole child, and of course they fail miserably because the environment is too tough for them.

It may be that if we take what seem to be little pieces one at a time, and partnerships of local, state, federal, government, private operations of one kind or another, and approach each piece, we may make some real headway in the seventies.

I think we must have priorities. I am hopeful that the Urban Coalition will pick out a priority list of three or four things; I think a major effort mounted in that way would show marked improvement in a ten-year period.

**Mr. Mercer, would you comment on labor relations in the next ten years?**

Mr. Mercer: There's going to be a continuing organizing effort on the part of the unions in an attempt to grow stronger and more powerful. This effort will center in trying to organize groups who are presently unorganized, as well as for large national unions to take over the smaller independents. In fact, some of the independents believe that perhaps they no longer can remain alive, and therefore choose to align themselves with a national union. I see this effort working more in the service industries, since unions have done as well as they can in manufacturing industries. As the percentage of total manufacturing employment goes down, the service side is going up.

I certainly hope that there can be an improved atmosphere of a mutuality of interest, instead of the unions only trying to get this and that for their members. Certainly we will see no let-down on unions trying for improved wages and fringe benefits, but I hope that somehow we would get to the point where we *both* have primary interest in service to the customers, with other considerations being secondary. Perhaps we can also work more closely with the unions in other areas — in solving some of the problems of our cities and society generally.

**Mr. Kertz, do you see any change in the measurement of our service performance?**

Mr. Kertz: Yes, very much so. We have gone quite deeply into service attitude measurement plans. We utilize questionnaires which we send to our customers and in effect ask them how they like specific kinds of service being provided. And we find that we have good correlation between the results of these questionnaires and our technical indicators. In the future we need to pursue both of these. What we really can use our technical indicators for is to better manage the business, and that is all they should be used for. They are a management tool.

But when it comes to how the *customer* feels about service, we should depend upon what he says through the service attitude measurement plans. We are proceeding with that, and in the future we are going to expand it to include large business customers, PBXs and others. I feel that it is one of the vehicles by which we are going to provide the customers in the seventies with the service they expect, and which, I assure you, we are going to bend every effort to see that they get.

**Mr. McKay, what would you say will be the long range effects of the increasing interconnection of systems and devices with the network in terms of technical quality?**

Mr. McKay: The thing we have been most concerned about, of course, is pollution of the network: that is, improperly maintained customer-owned devices producing electrical interference in the network. We have insisted upon safeguards, and I believe they are effective safeguards. These are interconnecting devices which we would interpose between the customer's system or device and the network. I think it is extremely important that they be required as a way of preventing all sorts of electrical interference from getting onto the network.

With them, I am reasonably content that the network will operate effectively. And, those who want to own their own communications equipment or system will be able to interconnect safely with the network.

Mr. Kertz: I would like to mention one thing that has to do with forecasting. Of course, this is a most important function, and the better the forecast the better we do business and the better service we provide our customers. We are aiming to raise the general technical knowledge of the people who do forecasting. To do this, we are developing plans and training courses that utilize computer techniques, working with Ken McKay's engineers and Bell Labora-

tories. These more sophisticated ways of forecasting demands for telephone service involve a lot more than just looking at household formations and where new buildings are going up and things like that. They involve such things as increased usage of the telephone, which in the last few years has taken some rather dramatic jumps, increases which of course require more equipment.

Also, we are most interested in finding where the new demand is coming from: whether it's penetration in a user market, second homes — and there is a lot of that, incidentally — or second lines in existing homes, or just new family formations. To do this with the degree of sophistication we think we need in the seventies, we are calling upon the Laboratories to help our forecasters by the use of new computer techniques. Early in 1970, we plan to have many of the forecasters in the operating companies come into Bell Laboratories to take training in these new techniques.

Mr. McKay: We have been talking both about the rate of change of technology and also about education. If I may put these two together, I consider the question as to what happens to our own technically trained people as the technology moves faster and faster. Of course, those who are making it move, those who are on the crest of the leading wave, are themselves involved in what is a rather violent learning process, and those of us with a technical base, who wish to be a part of the on-going technology, must also have a continuing learning process. This calls for continuing education on the part of our technical people, or else they will become wedded to the things they learned when they were young and they will be left behind.

Mr. Mercer: I think we need to encourage people, either on their own or through company sponsored programs, to go back for additional education, to take sabbaticals if you will. Also, to attract some of the brightest nontechnical college graduates today, perhaps we need to institute a liberal arts Master's program similar to the Laboratories and Western Electric technical Master's program.

Mr. Straley: I might mention briefly the manpower laboratory that we expect to establish here in New York early in 1970. It will be a small operation set up between personnel, the operating departments, and our environmental affairs operation. We will have some systems research people going to work very quickly, inventorying all of the innovative things that are going on.

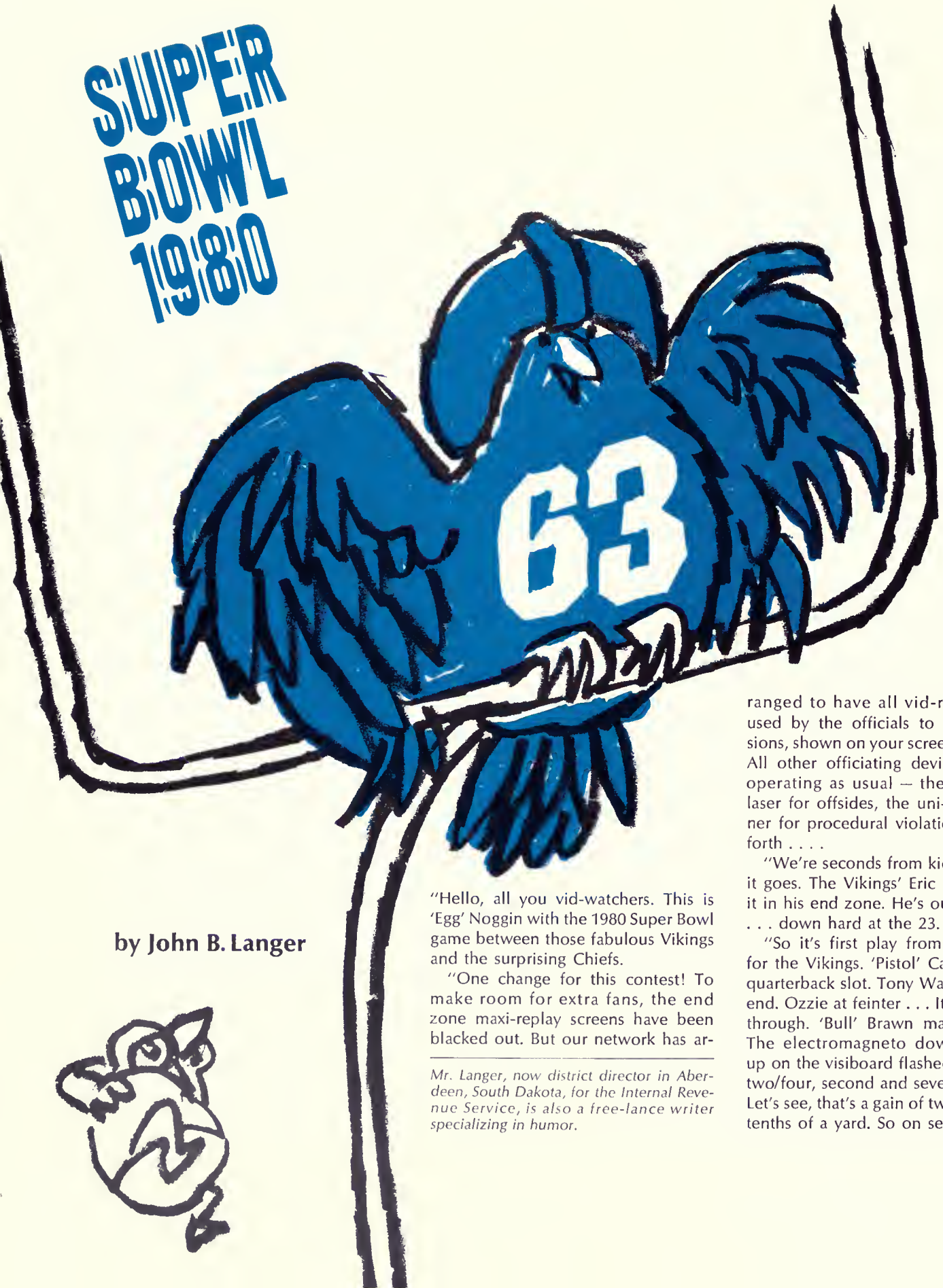
Especially in the central city areas they will be studying the whole process—from recruiting to preemployment training, to job training, to post-job training. Then they'll try to select the best of those ideas and programs, put them in an evaluation center under actual conditions, and seed them back out into the companies and follow their progress.

We hope to find out how to motivate new employees to accept service standards which are set by employers. In a sense we will have the first social science laboratory separate from the Labs, and some of the Bell Laboratories Behavioral Sciences people will be involved in it. Secondly, we'll aim to better utilize some of the really remarkable things which are spotted here and there. It's an interdepartmental effort, and we are eager to get it under way as soon as we possibly can.

Mr. Kertz: The provision of good service is our number one objective today, as always. We have a few trouble spots and those few are conspicuous. We are giving good service, however, in most parts of the country, and in some places it is better than it has ever been. But in the seventies we just have to give even better service.

Mr. Mercer: I think part of the problem is our merely saying to our employees, "give good service." We've got to get to the point where each of us says, "*I* am the one who is responsible for giving good service." □

# SUPER BOWL 1980




by John B. Langer

"Hello, all you vid-watchers. This is 'Egg' Noggin with the 1980 Super Bowl game between those fabulous Vikings and the surprising Chiefs.

"One change for this contest! To make room for extra fans, the end zone maxi-replay screens have been blacked out. But our network has arranged to have all vid-read-backs, used by the officials to make decisions, shown on your screens at home. All other officiating devices will be operating as usual — the converted laser for offsides, the uni-radar scanner for procedural violations, and so forth . . . .

"We're seconds from kickoff. There it goes. The Vikings' Eric Leafson has it in his end zone. He's out to the 10 . . . down hard at the 23.

"So it's first play from scrimmage for the Vikings. 'Pistol' Capp's in the quarterback slot. Tony Wash's at slide end. Ozzie at feinter . . . It's a straight through. 'Bull' Brawn made a little. The electromagneto down monitor up on the visiboard flashed it as plus-two/four, second and seven/six to go. Let's see, that's a gain of two and four-tenths of a yard. So on second down

*Mr. Langer, now district director in Aberdeen, South Dakota, for the Internal Revenue Service, is also a free-lance writer specializing in humor.*

it's seven and six-tenths yards to go.

"The Chiefs are in a three-storm, two-pull line with three mid-backers . . . Capp fades to left pocket. The pass is to Ozzie slotted out. He's got it at the sideline. The official's signaled a vid-read-back . . . There it is on your screen. The read-back shows it's complete!

"Let me tell you, since they added that electron-circuit spray four years ago these read-backs have been life-savers. It takes 300 square centimeters of the spray on ball and player to make sufficient contact to complete the circuit and show whether a player's in bounds. Certainly knocks out the guessing!

"Magneto flashes first and 10, Vikings on the 49/four. Looks like a slant-go. Brawn. Magneto flashes neutral. No gain. Wait, the uni-radar caught Wash in motion . . . Chiefs are taking the play, though. No penalty.

"Now it's the Vikings in a spread . . . A long one to Wash. Knocked down by Marcells. Capp's asking for a vid-read-back. This is the Vikings' first. This year, the teams are allowed 12 read-backs where they feel a rules infraction has been missed. . . . No interference is showing, however . . . .

"What a contest folks! Six minutes to go in the game. Chiefs on top 31-24. Vikings have a first on their 35/five . . . Capp throws from a mobile shed . . . It's complete to Wash! Magneto shows him out at the Chiefs 13/two.

"Vid-grammer's signaling a commercial. So let's take a time out . . . .

"Back to the Galaxadrome. Minutes left. Brawn sweeps! The laser-belt is flashing a score! Let's look at that on the subsurface goal line vid. There it is, by two inches. The ball outline is the green electron belt on your screen. White lines are players, of course.

"Now for the point . . . Just nipped the static zone between the posts, but enough to turn them on. It's all tied up! . . . There *is* an offside blinker but it's blue, Chiefs.

"The teams are back downfield for the kickoff. Just a second! . . . George, what's happening? Didn't I see the Vikings' posts flash on? They've flashed again! Now the laser-belt is flashing a Chiefs touchdown . . . George, the sideline stripe flashed at the 20 . . . Fans, something's haywire . . . Another field goal! George, can you see anything down there? Looks like it's flying? Put our zoomer-isolect vid on it . . . Looks like a pigeon . . . He's through the Chiefs' static field again. Chalk up three more points for the pigeon. He's down on the goal line . . . Another touchdown. George, what's the pigeon got so far? What? Six field goals and . . . Folks, it's Vikings 31, Chiefs 31, and pigeon 39!

"How'd he get in here? The entrances are all air locks. There goes the laser-belt again. He must have something on him. The belt can only be activated by that special coating on the ball . . . Crowd's going wild. They're cheering the pigeon. Must be 200 people on the field . . . police and . . . no one's touched that pigeon yet! . . . There he goes for three more . . . Hold it! He went through the static field but nothing happened! What's that, George? Oh, they've shut off the whole system . . . the whole automatic officiating system.

"Yeah, George? They're going to try to finish the game without it? But, George, won't that mean the officials will have to make all kinds of *judgments*? . . . George says they're trying to find a piece of rope 10 yards long . . . What's that for, George?

"Folks, it looks like they're going to do it! The teams are going back on the field . . . Let's see, where were we? Oh, yes, Vikings were going to kick off . . . George, what about offsides? How will they watch that? What's that official doing squatting down at the 40?

"George, can you see the pigeon? Where? Oh there. See him, folks, on the cross bar. Looks tired. Certainly should be. We have him with 63 points . . . and the Vikings and Chiefs together have only 62!

"Will they be able to use vid-read-backs, George? No . . . Folks, I don't know what we're in for, depending on those officials to make all those *judgments*. Guess we'll just have to settle for four minutes of . . . uh, primitive football . . . What's that, George? Back in the old days . . . it was always a dog on the field . . . Well, guess that's the way it is . . . you just can't stop progress. . . ." ▢

A young high school teacher sits alone under a makeshift lean-to in the forest. He is there in voluntary "exile." It is raining and cold. He has no food, nine or ten matches, a sleeping bag, a plastic sheet, the clothes he is wearing, a canteen of water and a pad and pencil. He is using the pad and pencil making entries in his journal . . . .

"I sit here in the forest as if I am the only person in the world . . . I am very swiftly struck by a heavy loneliness that seems to be a combination of all the loneliness I've felt in the past year. It is very painful . . . I imagine that if I cry at all while I'm here, this will be the cause—never hunger, nor cold . . . .

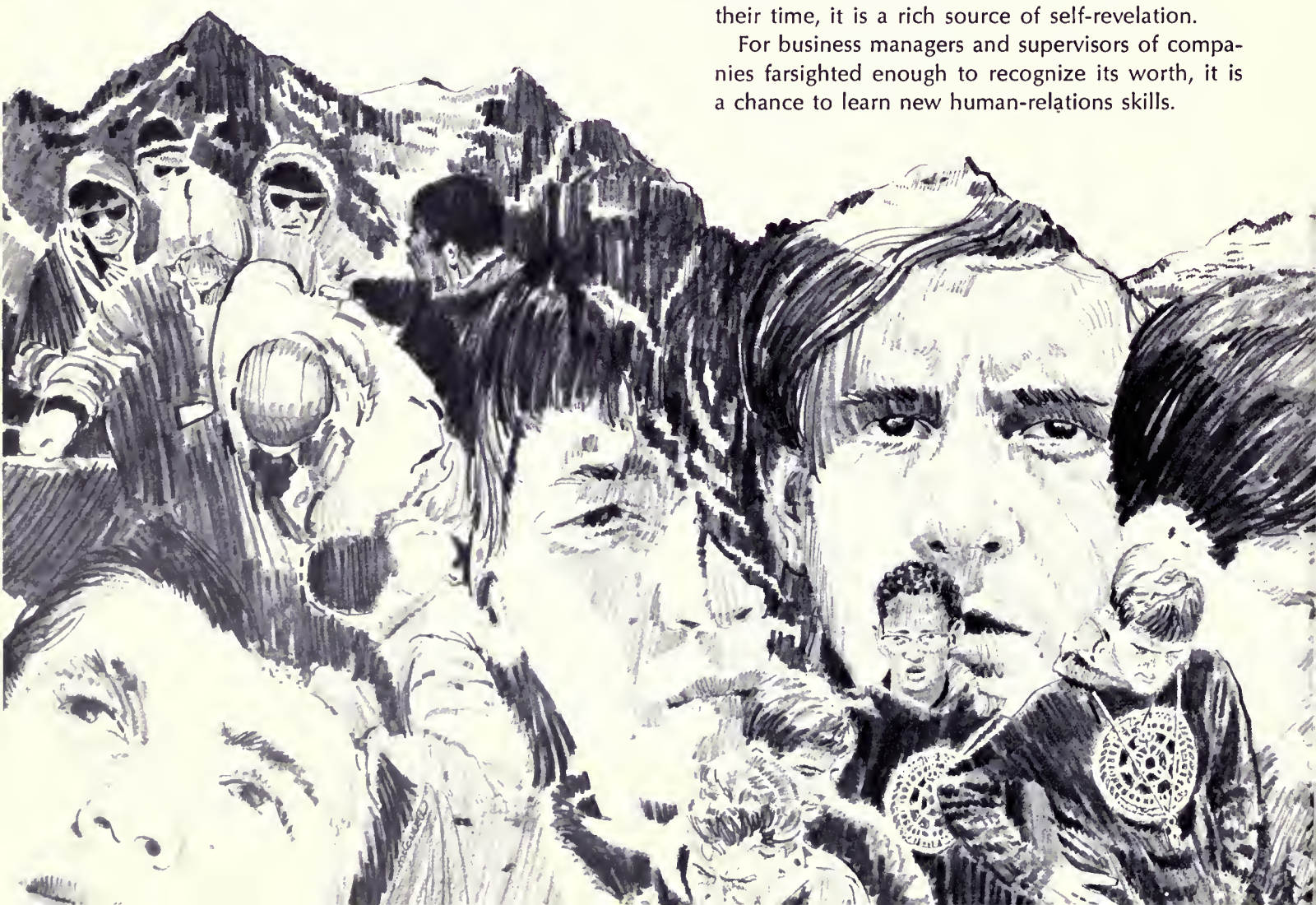
"It's good to be alive this afternoon. It's not a feeling of ecstatic joy, but just a simple pleasure. . . . This has not been the profound self-confrontation I thought it would be. Rather it's been a settling down, a digesting and assimilation of all that I believe . . . I'm going to have to be more productive in all I undertake because life is too short to just sit on your tail and let it go by."

This young teacher was camping "solo"—a three-day segment of his 26-day Outward Bound course in the mountains west of Denver. Though his experience was deeply personal, it is not unlike those felt by others who have gone through the often-grueling Outward Bound courses—from the cold Atlantic waters off Hurricane Island, Maine, to the air-starved mountains and desert land of Mexico.

Outward Bound, as its participants learn, is many different things.

For teachers who are willing to give it a month of their time, it is a rich source of self-revelation.

For business managers and supervisors of companies farsighted enough to recognize its worth, it is a chance to learn new human-relations skills.



# OUTWARD BOUND

## A Rugged Climb to Self-Discovery

For the well-to-do youth who can pay his own way, it is a toughening, maturing experience.

And for the disadvantaged youth who is lucky enough to get a scholarship or have a sponsor, it is often the first chance to achieve and succeed.

Outward Bound has been teaching people about themselves since 1941. In that year British shipping magnate Lawrence Holt became puzzled by some strange fatality patterns among young seamen being lost to Hitler's submarine warfare. Older survivors of sinkings insisted that younger men were dying from sheer lack of will to live in the face of severe hardship. Holt turned to Kurt Hahn for help. Hahn was a distinguished German educator who had been exiled by Hitler. Holt and Hahn founded the first Outward Bound school in the Welsh port of Aberdovey. There they began training young men in survival techniques and a deeper spirit of tenacity.

The "graduates" of these early Outward Bound courses came through the war's emergencies in proportionately much greater numbers than did others. The Outward Bound idea was launched.

After the war, the Outward Bound program began to spread gradually. Schools were established in Europe, Africa, Malaysia, Australia and New Zealand.

In 1962, the program came to the United States. Josh Miner, an educator, helped found a school in the Rocky Mountains west of Denver. Within a few years, other schools were established in Oregon's Cascade Mountains, in the Great Smokies near Morganton, N. C., in the Minnesota wilderness near the Canadian border, and on Hurricane Island ten miles off the coast of Maine.

In addition, an Outward Bound type of center was established, under government impetus, in Puerto Rico—this for the training of Peace Corps candidates. And dozens of colleges, preparatory and high schools have adapted the Outward Bound idea to their curricula, offering courses in concentrated weekend, holiday and summer-vacation versions. Courses are offered for both men and women.

By 1969, the program's influence had even spread into such diverse areas as businesses and prisons.

For example, the Jewel Box Corporation, of Asheville, N.C., sends its young management trainees through Outward Bound courses, following the lead of more than 800 British business firms. And penal authorities of Massachusetts and British Columbia rely on Outward Bound-type activities for the rehabilitation of youthful offenders.

In the United States, Outward Bound is a nonprofit corporation with national headquarters in Andover, Mass. Its five schools—Northwest, Colorado, Minnesota, North Carolina and Hurricane Island—are largely autonomous. Details of the programs vary from school to school and each has branched out in different ways with its experimental efforts.

The schools are supported by individual gifts, grants from foundations and companies, and by payments from students who can afford it. No applicant is ever turned away, however, because he lacks funds.

The basic course in each of the schools is a 26-day endurance activity for young men, 17 or older (and in some cases, young women). Tuition is about $500 for the 26-day period.

On arrival at the schools, candidates are divided

into groups of eight to 12 people, deliberately varied in family and economic background, education, race and levels of past achievement and motivation. A professional Outward Bound instructor is assigned to each group.

The 26-day program includes mountain climbing, hiking, sailing and river running, depending on the locality. In each of these activities, the candidates are purposely placed under conditions of stress. They are faced with unfamiliar, uncomfortable and often frightening tasks. They must then rely on their own resources and the resources of others in their group to complete these tasks.

The climax of this 26-day course is a 72-hour "solo." Each candidate is turned loose in a wilderness area to be on his own: to live, to think, to forage for food or fast as he will.

Throughout his course, the student is required to keep a journal, and from these journals have come personal insights and insights about the Outward Bound idea as a whole. Reactions vary all the way from intense self-criticism to euphoria.

- "Just as the instructor said, we make our own experience at Outward Bound. Whether we have wet feet or dry ones is up to us and the same is true in our lives. Starting with what we are given, we build our own set of experiences to make our own lives. Our fate is very much a result of our own work—or the lack of it."
- "I have noticed many changes in myself. I remembered at one time if I was miserable I wanted everyone to be that way. But now it's different."
- "I hope I can retain the spirit of adventure I gained, not always coming out on top, maybe failing a task, but nevertheless *trying* it."
- "Something I learned on the river trip was that I could show anger, get really mad at another crew member for not pulling his weight, shout at him, and still like him—and have him still like me. I learned that you don't lose a friend that way. A friend is one who knows your faults and likes you anyway."

The basic course for individuals is only one of many forms the Outward Bound idea is currently taking in the United States.

Another—still in the early experimental stage—is a course for supervisors, foremen and managers in industry. Its purpose is to encourage such men, through the rigorous self-examination that Outward Bound courses seem to foster, to stretch their understanding of human motivations and human conflicts —their own and their subordinates'—on the job.

A recent example was a course conducted for management and supervisory personnel of the Gates Rubber Company of Denver by the Colorado Outward Bound school.

Because of the time of year and attractiveness of participants, the course was plotted in Mexico along the Sea of Cortez. It included, at least in a general way, the same activities that have proved so productive in the basic courses for youth. But adjustments were made, of course, for the ages of the men (25 to 35) and backgrounds (two years' college, on the average) and their already demonstrated emotional and mental maturity.

There were marathon runs, hikes across the desert, mountain climbs to 10,000 feet, sailing on the Sea of Cortez—and the lonely, self-revealing "solo."

It's too early to tell what the long-term effects will be on these men and their jobs and on the welfare of the company that sponsored them, but the results look promising. Short-term, subjective reactions can be read from their journals and tape-recorded interviews after their return.

"Our daily discussions seem to be getting more and more interesting. Some of the group are still holding to their old ideas. Some seem to be changing while others have grasped a new meaning of things. Now I think I know why some never get any further than they do. Nothing seems to bother them. When you are a supervisor, certain things have got to bother

you. Those who do something about their feelings, the ones who are bothered, are usually the more imaginative individuals.

"The accomplishments in the course were personal confrontation, challenge, human relations, learning how to live with other guys, evaluating oneself and being able to accept oneself for what one is, knowing one's strong points and weak points, being able to communicate with people, development of trust in others. And growth. Personal growth."

Still another experimental activity of the Colorado Outward Bound school was a course conducted first in 1968 and repeated in 1969 for black and Mexican-American youth who had been unable to succeed in Denver's job market.

Eleven young dropouts from schools and jobs were promised permanent work in several of Denver's industries if they would successfully complete the 26-day Outward Bound course in the high Rockies. The costs were to be borne by the sponsoring industries.

Most of these young men had never been up in the mountains, even though they lived only a few miles away. Most knew nothing of climbing, hiking, camping, even tying a knot.

They were full of hostilities—toward their instructors, whites, the establishment, toward the whole idea of self-imposed hardship. They had long records of failure and expected to fail again.

All but three surprised themselves. One walked out, broken and discouraged, in the middle of the course. Two refused to complete parts of the course. The rest, though often terrified and exhausted, scaled sheer 100-foot cliffs, and climbed ice-covered mountains with 50-pound packs on their backs. At times, they rebelled and even fought, but when they found they had no alternative, they kept going. And they endured three racking days of solitude on "solo," though some of them had never been alone for more than a few hours in their lives before.

Six of those who finished were offered jobs in industry and took them. The other two were offered additional training.

Four of the six still continue to hold their jobs, but their progress has been disappointing. Judging from their comments upon completing the course successfully, these young men undoubtedly felt at that moment the satisfaction of succeeding, some for the first time in their lives. But a gradual decline in their new-found confidence began when they returned to their old neighborhoods, their old leisure-time patterns and their former associates. Outward Bound has worked no permanent miracles; it has merely revealed potentials.

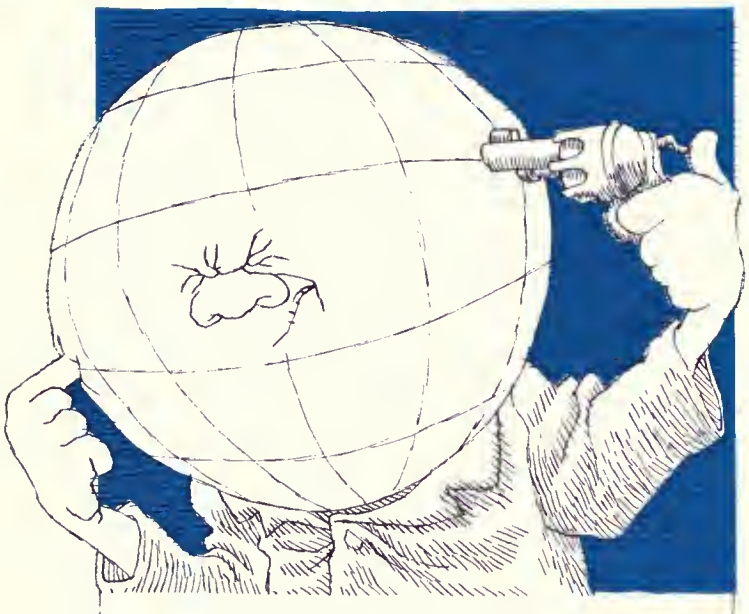
One of the activities common to all five of the Outward Bound schools is a yearly program of courses for teachers and others who work with youth. These courses are usually scheduled during the summer months.

Although the courses are very much like the basic courses for youth, much greater emphasis is placed on discussion sessions and on the insights the individuals are drawing from their experiences.

This entry in one of the journals offers a measure of results:

"Ernest Hemingway once said it was a great pity that wars are so infrequent, because a man might go his whole life without finding out whether or not he was a coward. In a sense, Outward Bound creates wars—small, individual wars between what the student thinks he can do and what he is told to do. And somewhere amid all the pain and fear and frustration, the student gets a chance to look at himself in a new light, to see just what he is really worth and what he is capable of. He gets a chance to look into his soul. Outward Bound is not enjoyable; it is not meant to be. Only under the pressure of fear and pain does a person get the chance for such self-analysis. It is something you can't find in the soft routine or ordinary existence. It is something very good." ▢

# the future is not inevitable



**by John Kettle**

Six billion people, 20-hour work weeks, three pills a day for food—all in the year 2000? Not necessarily, explains a writer-futurist who believes the future is what we make it.

Almost everybody I know believes unquestioningly that there are going to be six billion people on earth in the year 2000. Some of them are even sure the population of North America is going to double by then. There are politicians and town planners and bureaucrats who know for a fact what it is they—and we—must at once start doing, so sure are they of what the world of the future is going to be like.

*Mr. Kettle, editor, newspaperman, film and theatre critic, is a member of the World Future Society and author of the forthcoming book, "Footnotes on the Future."*

Now all this is a peculiar new sort of confidence trick. Nobody knows how many people there are going to be on earth at the end of this month, let alone at the end of the century. There is no divine law that says cities will ever be domed, or underground, or suspended on vines from Jack's beanstalk. It is very unlikely that a single soul will ever try to live on three pills a day, and if some peptic misfortune caused me to do so temporarily, I would certainly not love it.

Yet in the past few years the press's taste for outrageous dogmatic assertions has been whetted by growing numbers of people who think they have somehow grasped the future by the tail and can ride it. The professional futurists are not directly to blame; they qualify their cautious predictions to the hilt. Journalists and broadcasters prefer the amateurs, however, because they sound more positive.

There are, of course, some certainties lurking in the gaudy mists of the future. One is that a number of rates of increase must decline at some fairly near point because they would explode natural law if they did not. The increase in human population will cease —in historical terms—soon; if it did not, the press of people would soon be so great that there would be no space to grow food, and soon thereafter people would make up a mass greater than that of the earth that harbors us, so that celestial mechanics would be disarranged and we should all plunge off course. The growth in the proportion of scientists in the population is such that before long all God's children would have to have white coats and microscopes to satisfy the growth curve. The proportion of the Gross National Product given to research and development is heading rapidly toward the point where it will, theoretically, exceed 100 percent. At the rate at which machine-borne man has been attaining new speed records (even before space-travel speeds were achieved), we would reach the speed of light in 57 years—too soon to get that particular law repealed.

Not only are some technologies rapidly running out of breathing space, but there are also in our midst

## substituting numbers for imagination


a number of trends, certainly more than three, each of which bids fair to consume more than a third of GNP if it goes on unhindered. For example, a real automation of education; air travel; computers; welfare spending. Simple competition for capital will slow or halt some of them.

It would obviously be useful, interesting, and profitable to be able to foretell the future. All the people who have ever lived have thought so. They didn't go to Delphi or consult the haruspex to learn history. Twenty-five hundred years ago the Chinese military theorist Sun Tzu offered the view that "What enables the wise sovereign and the good general to strike and conquer, and achieve things beyond the reach of ordinary men, is foreknowledge." We do the thing in our own twentieth century way with computers instead of chicken's entrails, substituting numbers for imagination.

A number of factors favored the development of professional futurism. At least until the dawn of the nineteenth century, and in many places until quite recently, people expected that things would stay as they were—and they did, or else changed by small regular steps. But gradually it became apparent that some phenomena, and with time a growing number of them, were increasing geometrically rather than arithmetically. A modern futurist expects population to grow by a steady annual percentage increase—to compound, to increase by larger leaps each year. In fact, the rate at which many dominant trends are changing in our day is so rapid that one feels the need for a guidebook to the future. Nothing less will escape obsolescence at the printer's. For instance, it is surely not by design that new expressways and airports are traffic-jammed the instant they open. What happens is that in the time from drafting board to the departure of the construction crews, traffic demand grows more rapidly than was anticipated. The designer in such high-change technologies as transportation and communications now requires a skillful projection to tell him what is likely to happen in the intervening years and the years after opening

3 pills
a day
instead of
3 meals?


day. It is three generations since people put up new buildings only when the old ones were ready to fall down. So futurism in our time is one way of trying to feel at home. One could even say that it is a way of trying to feel at home *in the present.*

Another stimulant is intellectual perfectionism. We are mostly very good at it. Under the prodding of Operations Research men, business executives have learned how to quantify their hunches and say: "The probability that the market for paper dresses will grow at 10 percent a year for the next five years is 50 percent, and the probability that it will grow at 15 percent is 20 percent" (or some such figures). This is saying no more than "I reckon we're onto a fairly good thing with paper dresses," but the first comment can be put in a computer or a decision tree and the second cannot. It looks better when one is talking to the bank. Which came first, the futurist or the desire to snow the bank?

This yearning for certainty in our daily doings, even when it is a spurious certainty that we achieve, is characteristic of our time. People say "there is a high probability that it will rain on the weekend" when they have done no frequency study and merely mean "I've got a feeling it's going to turn out rotten again." At the racetrack they expect assistance from the law of averages when it is really in the sole employ of the bookies.

The idea of progress, itself a recent phenomenon, sustains and intensifies futurism. If you reckon in quantities, progress is all around us. We have more money and goods, and there are more of us. Recent increases in air-passenger miles performed by the world's airlines constitute a truly astonishing technico-financial achievement which fully deserves the name of progress. All that is needed is agreement that it is an improvement to move so many more people so many more miles in a year. On that assumption, one needs a criterion for measuring the improvement. Only the average annual percentage increase — or some such concept as doubling time—will serve to describe the change. But once you have it, it is hard

## subduing unruly nature


to resist the temptation to say that it will happen again next year, and the next. After all, we believe in progress.

A fourth factor that can be identified is Faustianism—a label suggested by the moment in Goethe's play in which Faust seeks to convert stagnant marsh and low-lying coastland into "Green, fertile fields . . . a land like Paradise."

Synthesized polymers, nuclear reactors, hurricane seeding, and contraceptive pills show how far we have succeeded in subduing unruly nature. Mastery of the environment is as powerful an impulse for us as religion was in the middle ages. Futurism is sometimes a desire to extend this mastery over as yet unhappened events, an intent to direct the aimless force of the unruly future.

I take the unfashionable low-population side in discussions about future world population. The standard position, and the most fully informed one, one ought to add, is that of the United Nations:

Continuation of present trends gives 7.5 billion people in the year 2000:

| | |
|---|---|
| High variation | 7.0 billion |
| Medium variation | 6.1 billion |
| Low variation | 5.4 billion |

Professor Donald Bogue of the University of Chicago has pointed out that the UN model for declining fertility has already been outmoded by events in large Western countries and small Eastern ones, where the birthrate has fallen quite a lot faster than the UN demographers expected. In Canada, the birthrate fell from 2.85 percent in 1954 to 1.77 percent in 1968—a rapid decline that followed a sharp, 17-year rise in birthrate and which started well before the introduction of The Pill. At the same time the decline in the mortality rate was slow, so that the decline in the rate of natural increase was virtually as marked as in birthrate. If the world's present population were to follow the Canadian pattern of 1954-68 and then to stick at the 1968 figure, population at the end of the century would be around 5.25 billion.

In the Soviet Union the birthrate has recently de-

don't plan on family planning?

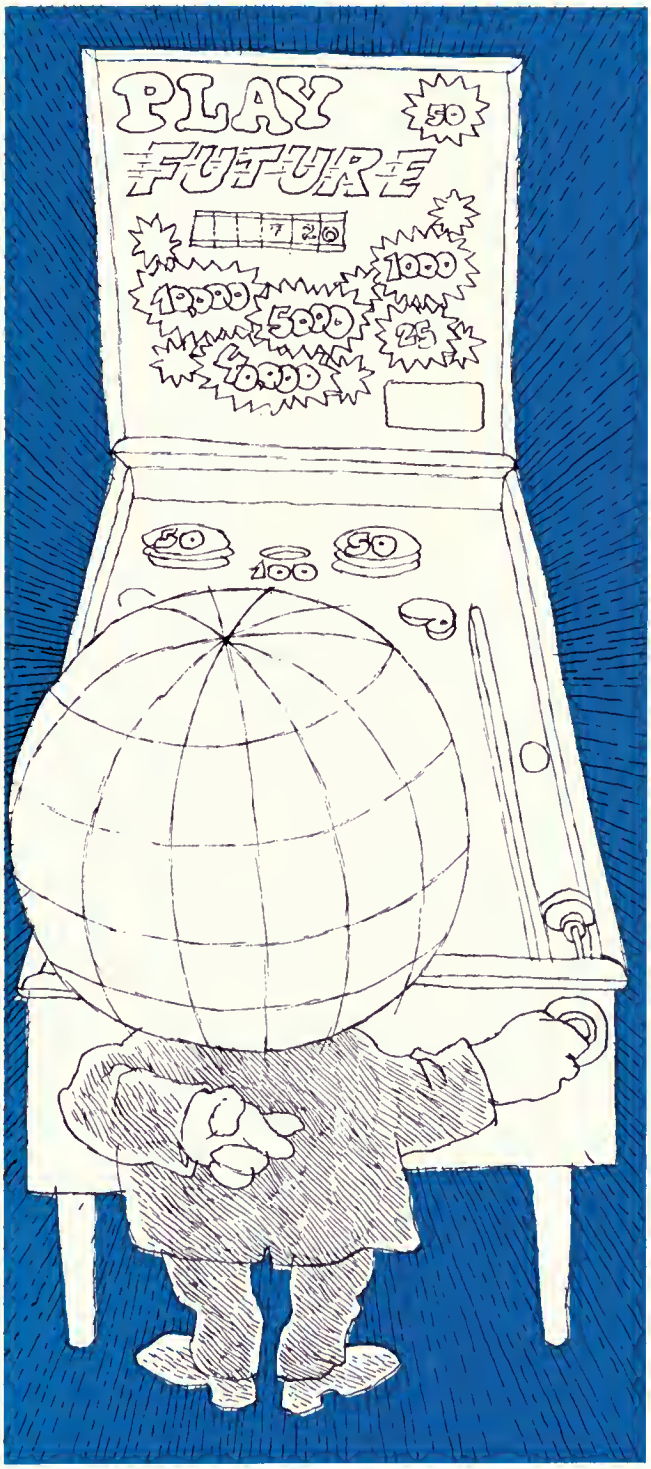

clined even more sharply, and has reached a lower level, than in Canada. Over the same period the Soviet death rate declined scarcely at all; today it is actually increasing. If the world were now to follow the Soviet pattern of the past 10 years and then stay at its 1967 level of natural increase, world population in the year 2000 would reach 5.1 billion. Since the rate of natural increase in Canada and the Soviet Union—as well as in other countries—is still declining, a figure of five billion people on earth on the eve of the 21st century might be a liberal estimate.

At the same time, we are in no position to deny that many millions of couples during the next 30 years may decide they would like large families. The Russians themselves may do so; their officials are worried about the limitations on economic growth that a smaller population would impose. So are the French, who have shelved a law to permit the sale of female contraceptives. So are the Argentinians, whose government recently raised the state allowance for large families "to discourage birth control." So are the Tunisians, who have stopped the government-sponsored birth control program. And the Indians, among the world's most fertile people, are resisting government family-planning programs in record numbers. Seven and a half billion may be a conservative estimate.

So talk of six billion mouths to feed in the year 2000 as a figure beyond dispute is ignorance or demagoguery, and maybe both. Nor do any of these figures take account of the possibility of widespread plague, which in our time can spread round the world faster than doctors can hope to cure it, or global war, that patently thinkable possibility, or other forces that would rapidly reduce the world's population.

If we decide that the future is not inevitable, it must affect our reaction to changes in the world around us. The increase in the smog index in major cities or in the phosphate content of rivers and lakes alerts us to the dangers of pollution and moves us—or should—to seek to remedy the causes. The best of the professional futurists have done well to remind us

## a multitude of possible futures




that we have to make the future. Olaf Helmer, a senior mathematician at the Rand Corporation, describes the new attitude now developing: "The future," Helmer says, "is no longer viewed as unique, unforeseeable, and inevitable; there are instead—it is realized—a multitude of possible futures, with associated probabilities that can be estimated and to some extent manipulated."

It is true that five points on a line give no guarantee that the sixth will also fall on the line: that is where the amateurs have erred. But the line can suggest a cone of possible locations for Point Six, and by study it may be possible to declare the outer limits specifically less likely. It is still necessary to remind oneself that it is human motives, whether conscious or unconscious, that are going to place that point in position, not the operation of algebra.

Before the futurists, we were perhaps too inclined to take a fatalistic attitude toward the morrow—an attitude at once blithe (because the future was felt to be unknowable and therefore beyond human responsibility) and despairing (because it was felt to be uncontrollable and therefore threatening). The futurists, when they first appeared, were thought by many people to be superhumanly knowing, even omnipotent; much as the first psychologists were expected to reveal all the secrets of the human psyche. With a collective sigh of relief people abandoned their blithe, despairing fatalism, flocked to what they supposed was the banner of powerful omniscience, and confidently looked around for the daily long-range future forecast.

Both attitudes, which I have of course here caricatured, seem to me to be wrong. The futurists have enabled us to recognize the value and potential of long-range planning, and are developing means of considerable subtlety for anticipating the context, and the consequences, of our plans. This does not mean—and the futurists do not say—that the future is now under new management. It does mean that we must assume today a larger responsibility for what happens to us and our children tomorrow. □


ABC DEF
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PRS TUV WXY
OPER

# A Light Is Born

A new light source from Bell Laboratories is one of the youngest in a proliferating family of solid state devices.

**by Marvin Elkoff**

For some years now, many areas of science and technology have been dependent on new materials; certain areas of progress could not have been achieved without development of these new materials.

One area of modern science which has been at once fertile and spectacular is that of solid state physics. Ever since the discovery of the remarkable semiconductor qualities of silicon and germanium, and the development of transistor technology after 1948, researchers have been carrying on basic work in semiconductors. New devices are now available which do things never before possible. They evolve from the natural course of fundamental research. They can also solve specific technological problems.

As the level of sophistication grows, specialization grows with it. Men become trained to do "nothing but" grow, build, invent, discover new materials. Other men do "nothing but" develop ways to use, test and measure these materials. Others see certain general practical applications for them. Still others institutionalize these applications, fashioning them into working devices for our communications systems.

In this new sociology of scientific discovery, every new technological development that changes our

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*Mr. Elkoff is a free-lance writer who has authored articles on a wide range of subjects in* Esquire, Holiday, McCall's, Cosmopolitan, True, *and other national magazines.*

lives, however slightly, has been preceded by a thousand and one discoveries by groups of men in different countries and different laboratories and different sections of the same laboratory. After all, there are more scientists alive and working today than have existed in all previous history. Of the several large Bell Telephone Laboratories installations, the Murray Hill, N.J., lab alone employs about 2,000 technical people; of these, more than 650 have Ph.Ds.

## Look toward a new light

A group of these scientists first began work in the late fifties on the electroluminescent possibilities of semiconductors. These involve the electrical excitation of the atomic structure of a material so that it produces light.

The *physics* of luminescence consists of discovering and describing the mechanisms of this excitation; the *chemistry* consists of discovering which impurities in the semiconductor crystal are important in the physical processes and determining how to add or remove them to produce luminescence of a particular type.

When this basic research was going on in the late fifties and early sixties, scientists did not envisage a specific use for this electroluminescence. Work was still in the realm of fundamental research into the nature of semiconductors, with the understanding that the growing or building of new semiconductor compounds *could* be very important.

There were a few men who, because of their bent and curiosity, were working in *materials research* to grow purer and purer crystals of gallium phosphide and to discover ways to make it a more efficient luminescent material. As several Bell Labs people have pointed out, the ambience of the Labs, especially in this basic research, has the speculative and intellectually open quality of a university research group. The people who work in these areas deal in fairly abstract issues, and thereby exist far from the seats of power; it's a long way from the discovery of a new form of hole-electron combination to the manufacture of millions of phones.

By 1962 John Galt, who was then and is now director of the solid state electronics laboratory, saw enough promise in gallium phosphide to make it more of an "official" project and organized two groups to work on it. One of these groups, headed by Carl Thurmond, was composed of people oriented to discovering the basic chemistry of the problem, and the other was oriented more toward physics, toward understanding how luminescence occurs. Mr. Galt brought in David G. Thomas, who was then involved in research on other semiconductors, to head the physics-oriented research.

These two groups were, of course, very dependent on one another. It was a reciprocal relationship in which the chemists gave the physicists materials to work with, and the physicists by their measurements and tests gave information back to the chemists which helped them refine their work.

Communication between the groups was crucial, and scientists involved in the project credit Bell Labs management with wisdom in the selection of men, the arrangement of jobs, the proper rewards; they also feel the scientists involved had an unusual rapport and a sensitivity to each other's needs.

It is of note that the reference material appended to a technical piece by Mr. Thomas in a British physics journal on *Gallium Phosphide Electroluminescence* shows that nine out of ten pieces on that subject were written after 1963.

## From research to application

While increased effort was put into gallium phosphide research, it was still a very small operation by Bell Labs standards. As many Bell Labs administrators have pointed out, there are scores of research projects in promising stages. But not every one can be backed fully. Management must place emphasis on what it thinks is the most promising of the promising. So, while the research people had started "pushing it at the device development area" in an attempt to elicit greater interest, the reaction from management was mainly one of "calm interest." What the research peo-

ple had by 1964 was, in their own half-joking words, "after all, just some crummy little crystals, with lights that weren't all that bright." But they, in their closeness to the project, could begin to foresee the future. They were moving out of the realm of pure research toward some general application. They felt they were on to a genuinely new source of light with untold possibilities for visible display. They also felt that they could steadily increase the efficiency of the diodes so that they could produce a practical device, though at that point there was no readily apparent use the Bell Labs management could see for the new lights. So, while researchers had some interesting little diodes which could produce both red and green light —a significant advantage—the official reception was not yet overwhelming.

It was not until two years later that there was a major transfer of effort.

## Interaction and action

In looking back, the men involved in the development of the gallium phosphide diodes see four reasons for the 1966 change of direction, and one suspects this is a pattern in great industrial labs all over the world. First of all, researchers produced diodes of higher efficiency. Secondly, they, the research people, were constantly pressing the development people. Thirdly, there was a strategic symposium held in 1966 to which leading Bell figures were invited, which analyzed the current state of gallium phosphide research; needless to say, it had a very optimistic ring to it. Fourth, the research people put together a Trimline® phone which had its buttons illuminated by a dozen diodes, and showed how little current was needed to light them: they had a concrete, dramatic display.

## Sell the product

In other words, as idea people seem to be learning in every sphere of life, ideas do not necessarily sell themselves. They must *be* sold. A bit of the promoter lives in everybody. But no idea can be sold unless its time has come. And two things had happened which made the gallium phosphide diode seem even more promising than it had two years before. These were development of silicon integrated circuit technology, and the resulting electronic switching circuits.

In the traditional multiline telephone, lines available on the phone are selected by a mechanical switching and locking apparatus, the mechanical "keys," which appear as buttons across the base of the phone. Since all logic functions are wired into the telephone set, a bundle of 50 wires is required for every six-line set (200 for a 30-button switchboard). Services are assigned to individual buttons by the installer; the button corresponding to an active line is indicated by a light from an incandescent lamp, which consumes 400 milliwatts and is operated on local power. Now, with the electronic multiline phone system in which logic functions and power supply are contained remotely in central control equipment, nonlocking buttons will be used, with little or no movement and with electronic switching. Since logic functions are carried out in a distant central unit, the number of wires needed for each set can be reduced to only six; the services can be assigned to a particular button from the central control unit. Since incandescent lamps now used require more power and operating voltage than the central unit can furnish, the new system would require solid state indicator lights, which operate on very low voltage and miniscule current.

## The payoff in sight

Moreover, aside from such inherent advantages of solid state devices, there is the advantage of compatibility with the increasingly common tiny integrated circuits which operate at low voltages, low power levels, high speed, and are mounted directly on circuit boards. The size, electrical performance and processing technology of gallium phosphide diodes are compatible with these, while conventional light sources would present serious interface problems. Gallium phosphide now had an unbeatable parlay

going for it: inherent value, intellectual salesmanship, and "happy" circumstances. Bell Labs decided to mobilize a more intensive effort behind the effort to make the gallium phosphide diode increasingly efficient and, eventually, a manufacturable and commercially feasible product. It was moved into the development stage.

Carl Thurmond, one of the men most intimately involved with the project in its materials research stage, moved over to the development end to supervise this part of it. Later, David Thomas, who had played a vital role as leader of the physics-oriented part of gallium phosphide research, also moved over to the development area, and now has overall charge of this and a wide variety of other materials development projects.

This was puzzling to an outside observer, who had already been impressed with the specialization of roles at Bell Labs.

## Closer to the world

It was explained that the work of bringing gallium phosphide closer to a usable form was an extension and intensification of the experimentation that had been carried on, and therefore not, in this instance, a *new* specialty for the people involved. But it was a new *psychological* specialty for them. It is perhaps true that at a certain point in time the interest of many scientists shifts from pure research to research closer to technology itself, closer to the "world." Occasionally there may be something about pure research which makes the researcher feel that he is missing out on something else the world offers.

Whatever the reason or combination of reasons, the push worked.

Two basic things had happened. First, crystals of gallium phosphide had been produced of a purity and regularity that made them seem a manufacturing possibility. And second, they had a quantum efficiency of one percent, which was the minimum the researchers had been striving for. Assembly techniques were also advanced. In a multiline phone, for example, six diodes can be mounted by thermocompression bonding to a ceramic circuit board, and the reflectors for these diodes can all be contained in a single metalized cover plate. The resulting assembly is highly effective as an indicator light up to ten feet from the telephone at high levels of room light, *using only five to 13 percent of the power now required for incandescent lamps.*

Diodes with the quantum efficiency of one percent are now being evaluated in an electronic telephone system at Mountain Bell in Phoenix, Arizona. These diodes, interestingly enough, are made at a pilot manufacturing setup in the Bell Labs itself, under the supervision, among others, of erstwhile researchers Thomas and Thurmond, which brings them a long way toward direct application of their basic work. At the same time, Bell Labs recently reported the production of diodes with greater than seven percent quantum efficiency. And it is, of course, the same research and development group responsible for this advance. Meanwhile, Western Electric, the manufacturing arm of AT&T, and its labs have become actively involved in research into the gallium phosphide diodes. So what had started with a few men working alone has now become a many-sided industrial operation, with research operating at every step along the way, from basic crystal research to its functioning within a commercial phone system.

## Light up the future

The heart of the problem which lies ahead poses the direct connection between basic research and manufacturing feasibility. For what the researchers must now develop is a crystal of such purity and such regular dimensions that 4,000 chips of .015 mil can be produced from one square inch of gallium phosphide —and at reasonable cost. If such a crystal can be produced—and there seems little doubt that it can—the gallium phosphide diodes will become economically practical competitors of the tungsten bulb.

Indeed—though this is far in the future—they theoretically can become a new source of light. □

# A JAZZ MAN LOOKS AT ROCK

by Ira Gitler

Cole Porter once raised the musical question, *What Is This Thing Called Love?* Today, a generation that grew up on his music — and that of Jerome Kern, George Gershwin, and Rodgers and Hart — is asking, "What is this thing called rock?," a query as complex as Porter's in its own way.

Above all other considerations rock is definitely the music of today's youth, and its importance to them is more social than musical. It is their milieu, or "scene" if you will, one that sets them apart from the values and attitudes of the adult, establishment world in a more emphatically schismatic manner than ever before. But if it is the music of youth, that doesn't mean that adults are not participating in it, especially on a business level.

This doesn't irritate me as much as the writers who keep trying to tell me how artistic rock is. True, the quality of rock has improved greatly since the days when Bill Haley gave us a kindergarten version of Joe Turner, but outside of the Beatles it hasn't offered anything substantial enough to turn the head of someone with a more sophisticated listening background. I approach rock as I do any music, on its own terms, but I have been following jazz since I was nine years old and frankly admit that it has prejudiced my ear.

In being aware of jazz for most of my life, I have also been drawn to other forms of what some now call "the black musical experience." If I want to get into some blues, I'm going to gravitate toward Sonny Boy Williamson or B. B. King before I listen to some kid from The Isle of White imitating a black man, sincere or skillful though the imitation may be.

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*Mr. Gitler, associate editor of* down beat *since 1967, has written hundreds of album notes for jazz records, produced the Jazz in the Garden series at the Museum of Modern Art and authored three books, one on "Jazz Masters of the Forties."*

Not that the interest in black music hasn't been a good thing. (It is ironic that it took groups of young Britons to awaken white America to its own black blues heritage.) Some performers, like Janis Joplin, feel that patterning themselves after black players and singers helps them to achieve a freer, personal expression later on. This is true of any musician, artist or writer —unless he is exceptional—who must first learn from exemplary models before going on to create something in his own image. And if someone wants to sing or play the blues, he definitely has to go to "Soulville" to find out what it's about. It's environmental, as proven by the natural, unpretentious authenticity of singer-pianist Mose Allison, a white man, raised in the Delta country around Tippo, Mississippi, who was deep into the blues long before the mod Britons crossed the pond.

The mass of rock fans may overtly act and dress in today's "in" style, but the majority of them are still no hipper, as applied relatively within their contemporary music scene, than the pop fans of yesteryear. Frank Zappa, den mother of the Mothers of Invention, doesn't hold their taste in very high esteem. In an October 1969 *down beat* interview, he said: "Those kids wouldn't know music if it came up and bit 'em. Especially in terms of a live concert where the main element is visual. Kids go to see their favorite acts, not to hear them. . . ."

Rock has a pervasive beat and the audience responds to it on a primal level. The excessive amplification of many groups succeeds in bending minds by hermetically sealing its own total environment inside the listener's head. The high decibel level often obliterates the lyrics, which more often than not are superior to the simplistic melodies. In a culture where soup cans and giant papier-mâché frankfurters have

been heralded as art, it is no surprise to see rock reintroducing the most simpering kind of banalities of the early 1950s as "oldies but goodies," with the implication that, with rock having reached a certain status, these early pieces are now "classics."

## Rock me eight to the bar

Rock is a mixture of several musics. Originally it drew from rhythm and blues (now called "soul" music) and country and western. Later it added folk, baroque, jazz and anything else it could assimilate. Since its inception it has become a more unified, homogeneous expression within its own boundaries, despite the different forms with the various appellations such as acid rock, folk rock, etc. It has become the pop music of our society. If the Tony Bennetts and the Peggy Lees are performing and still earning good money, it is because they are working to another generation still very much alive, and represent the pop music of a well-remembered past.

In the Swing Era, jazz was an important element in the big bands that dominated America's musical entertainment, but it would be erroneous to say that it was completely the popular music of this country. In the mid-1950s, before the advent of the Kingston Trio's packaged folk music, people like Dave Brubeck and Gerry Mulligan found acceptance among college students, but the real giants like Clifford Brown, Sonny Rollins and Miles Davis appealed to a relative minority—even among black people. (Davis is popular today because he has been a great, resourceful, attuned talent over a long period of time; white America is more aware of black America; and black America is discovering itself.)

In the 1960s jazz—its new, younger players more committed to "free," non-chordal playing — lost a great part of its potential young following to rock. Jazz enjoyed its greatest popularity when it was dance music. The ideas that Lester Young was playing on his tenor saxophone were not the reason he was playing to full houses. It was the rhythm that the Count Basie band was laying down behind him.

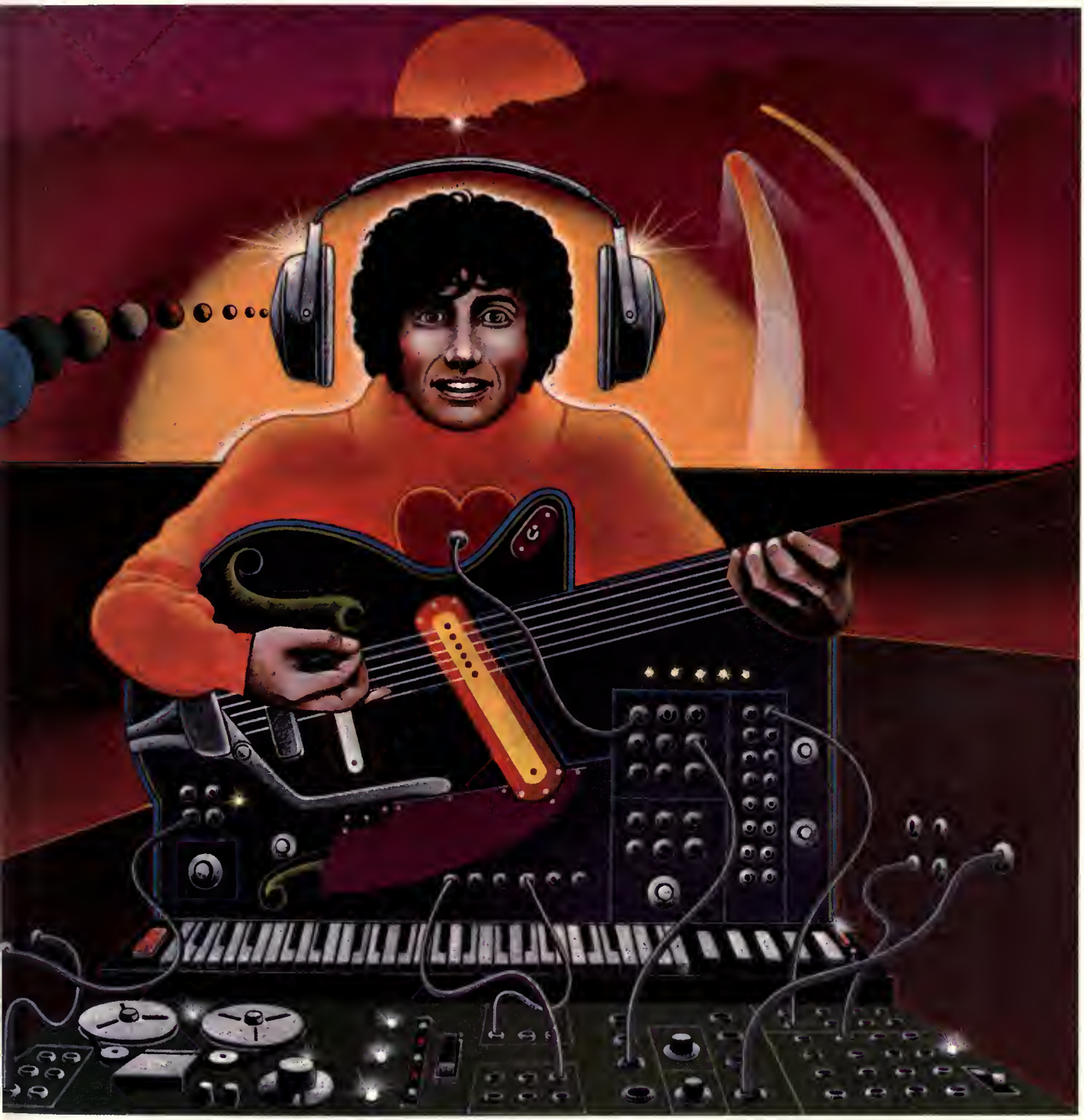
Some people in jazz have scoffed at the success of the rock group called Blood, Sweat and Tears, claiming that there is really nothing very musically daring or different about them. Others, citing the fact that they are utilizing horns (trumpet, trombone and alto saxophone) rather than the heavy guitar orientation of preceding rock groups, and incorporating jazz techniques (several members were jazz players before they ventured into rock) are gladdened by their wide acceptance.

Rock, for all its popularity, does not always make money. For every successful group there are hundreds of less-than-mediocre combos that have been able to tape at least one album in the record companies' relentless search for hits. Employing a scattershot approach, the executives figure that if they score with one hot group, it will surmount all the failures and then some. One major label proved this theory faulty and is reputed to have lost $4 million in one year. Whether the figure is accurate or not, it was definitely red ink, and heads rolled rather than rocked in the front office.

## Now hear this

Electronically amplified instruments, especially guitars and keyboards, have been a very salient feature of rock. With the use of attachments such as the Varitone and the Multivider, saxophones and trumpets have been amplified and their voices duplicated both an octave above and one or two octaves below. They have even been made to sound like other instruments. This gimmickry with horns has occurred, oddly enough, mostly in jazz, though on a limited basis.

One jazz group which features an infusion of rock attitudes and heavy amplification is the trio of drummer Tony Williams. He plays highly energetic drums, and his group mates play highly souped-up electric guitar and electric organ. A half hour of listening to them in a club one night almost accomplished what no rock group—even in the maelstrom of the Electric Circus—had done. That is, it deafened me. For at least one half hour after leaving the club my ears ached



from the sheer volume of sound and high pitch.

On the other hand, Williams' former employer, trumpeter Miles Davis, has made inventive use of an electric piano. While his music is not rock, it effectively combines feelings from the different musics of today. Many of the young black jazzmen, inspired by alto saxophonist Ornette Coleman and the late tenor saxophonist John Coltrane, don't want their music to be called jazz, a word they equate with "nigger." Just the fact that a man is black and he is playing a trumpet or saxophone, instruments historically associated with jazz, does not mean he is necessarily playing jazz. Some have termed the expressions "New Black Music," and certainly many of the pieces played by saxophonist Pharoah Sanders, a disciple of Coltrane, with their religious-folk quality, are closer to an Afro-ethnic music than to jazz.

A lot of young black people are buying Sanders' records, but thousands more are tuned in to James Brown, the number one record seller in the "soul" field. Where some Negro performers are big in the white pop market, Brown is almost exclusively the property of the black people. A dynamic singer and dancer, who also plays a driving, if uncomplicated, electric organ, he is king of a musical area from which rock draws much inspiration.

## The poet of now

The black kids have their heroes and the white kids theirs. One of the latter is Bob Dylan, who emerged from the folk tradition of Woody Guthrie to the point where he now performs with electronically amplified rock backing. At first his fans objected to the new format and he was booed, but now he has reached new popularity, and the musicians who accompanied him, known as The Band, have made a strong impression of their own in rock circles. While Dylan may not be the "poet" his greatest admirers call him, he is a man whose personal material, ranging through a variety of contemporary subjects, has been a major factor in his appeal.

Today, youth is singing about racial prejudice, war, drugs, topics that were never Hit Parade material in the past. They are still singing about love, but with the June-moon syndrome far behind them.

It all concerns their generation and the way it looks at life. The adult world may tune in but they are not the primary intended receivers. Janis Ian, whose best known song, *Society's Child,* deals with interracial teenage romance, has often been concerned with parental attitudes but it is *about,* not *to,* her elders she is talking. When Grace Slick sings her *White Rabbit* with the Jefferson Airplane she is relating today's drug culture to Alice's Wonderland. Steve Stills with the Buffalo Springfield sings of youth versus the police in *For What It's Worth.*

## Nonmusic, not music

We have seen in 1969 the power and attraction of rock in the phenomenon of Woodstock, but the mass gathering of the clan again underlined the social, non-musical aspects. Robbie Robertson of The Band was quoted in *Rolling Stone* (December 13, 1969): "The event was not the music, the event was the people. We were like Muzak."

As the 1970s unfurl, we have, on one hand, the Moog Synthesizer, an elaborate electronic network which can be programmed to reproduce an infinite variety of sounds, effects and rhythms, and which also can accommodate the input of other instruments and voices. On the other, there is The World's Greatest Jazzband, a collection of excellent, traditionally oriented musicians, assembled by millionaire patron of the arts Richard Gibson. In addition to playing classic jazz literature, the WGJ is attempting to interest both generations by rendering its own interpretation of today's material. In between the Moog and these traditionalists lies a vast area in which many musics are crossing and melding. Rock is here to stay for a while, even if a cyclical movement brings an earlier form of jazz rushing back into the rapids of the contemporary mainstream. No one can accurately predict what or when shifts will occur, but, as Dylan has stated, "The times they are a-changin'." ▢

# BELL reports

## Bubbles May Be New Breakthrough

Magnetic bubbles, smaller than the diameter of a human hair, may open the door to far-reaching advances in computer technology and telephone switching by providing swift, compact and inexpensive storage and processing of data.

Under development at Bell Telephone Laboratories, the bubbles are tiny cylindrical magnetic domains that can be formed in sheets of orthoferrite crystals, rare-earth iron oxides grown as crystals for the first time at the Labs.

These domains are moved around at high speeds and in precise patterns to represent coded information, do computations and switch signals—all on a small chip of solid material. They can be propagated, erased and replicated, and their presence or absence is easily detected. Memory densities of about one million bits of information per square inch are possible.

In present computer and communications technology, connections between electronic components are a major factor in costs, but in the new technology the logic component and storage component are one, with no interconnection needed. Moreover, the energy required to move or switch a bubble is only a fraction of that needed to switch a transistor. Data rates of three million bits per second have been demonstrated.

Bell Labs scientists believe the bubble technology may stand today where transistor technology stood when it was announced at the Labs in 1948. Like the transistor then, magnetic bubbles have great potential, but more time and hard work will be needed to make them practical.

## Closed Circuit TV in Living 3-D

A live television transmission technique devised at Bell Telephone Laboratories enables three-dimensional scenes in motion to be viewed without special glasses on some closed-circuit facilities.

The 3-D scene is transmitted as a series of slightly different 2-D images that convey depth information. These images are combined at the receiving end of the system to reconstruct the original 3-D scene.

Key to the new method is a pair of spherical mirrors, called varifocal mirrors because they are made of flexible mylar which enables their centers to move rapidly in and out, from concave to convex shapes.

Although the new technique requires several times more bandwidth than commercial television, it has potential applications for 3-D data transmission in specialized scientific and medical fields.

## DDT Out, Pollution Control In

The Bell System has discontinued the use of DDT in the 10,000 gallons of insecticide it uses annually in company buildings and other facilities. Another chemical, pyrethrin, is substituted in the formula used in producing the System's standardized insecticide.

Tests show that the new formula, which is slightly higher in cost, is often more effective than DDT and will be neither poisonous nor irritating to man when properly used.

Other forms of pollution control and abatement are also under study by Bell System companies, particularly Western Electric, the manufacturing and supply unit.

Western has begun waste treatment projects at eight locations, which, upon completion, will represent an investment of some $7 million. The company has also started two air pollution control projects that will cost about $4 million and, over the next five years, will spend some $10 million for water pollution control. ▢

*In an attempt to alleviate reverberation which sometimes causes telephone conference calls or speakerphone (hands-free) calls to sound as if they're being made in a barrel, Bell Telephone Laboratories scientists are investigating acoustical factors important in communications systems. Here two researchers have set up shop within a wooden structure inside an echoless test chamber at Murray Hill, N.J.*

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# BELL

telephone magazine

The Patent—The Inventors' Invention
Some Cities are More Equal
Broadway and the Balance Sheet
Voices Across the Generation Gap
Shedding Light on Fiber Optics



**Ron Abler** ("What Makes Cities Important"), Assistant Professor of Geography at the Pennsylvania State University since 1967, began life somewhat farther west, in Milwaukee. He lived there and in St. Paul, Minnesota until he moved to the Diamond State. He received his Ph.D in Geography from the University of Minnesota, in 1968. He has a wide general interest in the geography of intercommunications systems (postal and telephone), and has done much research in that field. His particular interest lies in studying the effects such systems will have on the spatial behavior of people and their settlement patterns in the future.

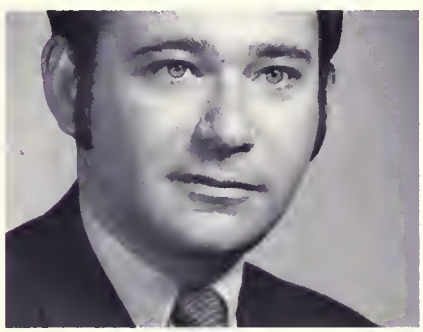
**Martin J. Sikora** ("Progress Through Patents"), a native New Yorker, has been a professional journalist for 14 years. Since November, 1967, he has been a member of the Financial News Section of the *Philadelphia Inquirer*. Prior to that he spent more than nine years covering politics with United Press International, first on the staff of the Harrisburg, Pa., Bureau and later as manager of the Trenton, N.J., Bureau. A 1956 graduate of New York University, Mr. Sikora says that for years he has been interested in patents and the patent process, and so found research for the present article both congenial and fruitful.

**Richard W. Hall** ("Business and the Box Office"), some time after being born in New York City, was graduated *cum laude* from Harvard College in 1948. He has viewed the performing arts dilemma from both sides of the fence: as a playwright, as a film-maker, as a music critic for *Musical Courier*, and also as a public relations man in several large corporations, including Western Electric. He has published articles in such general magazines as *Saturday Review, This Week, Nation's Business* and *The Village Voice*, and has authored two books, *How to Read the Bible* and *Putting Down Roots*.

**Saul David** ("The Lost Paradise and the New Liberation"), originated in Springfield, Massachusetts, and some years later, following an artistic urge, attended the Rhode Island School of Design. Subsequently the U.S. Army took him on a four-year tour of the Middle East, which included stints on both *Yank* and *Stars & Stripes*. Back in civilian life, he worked in newspapers, radio, and with Bantam Books, which he left, after a 10 year tour, as Editorial Director. Then came Hollywood, where, he says, he was "hired and fired by Columbia, Warner Brothers, 20th Century Fox, ABC and Universal Pictures — in that order." He produced *Von Ryan's Express, Our Man Flint, Fantastic Voyage, In Like Flint*, and the still-unreleased *Skullduggery*. His present major ambition is to be the first Hollywood archaeologist.

**Rita Fuhr** ("The American Dream and the World Imperative"), who points out that she hasn't "really had time in my 21 years to build up a large biographical background," was born and raised in San Francisco and is now a junior at San Francisco State College, where she is majoring in English. Working there as an honor student on scholarship, she intends at the moment ("it changes daily") to go on for her M.A. and teach at the college level. Her special interests include the dance, especially primitive jazz, and art—"I dig multi-media things." She now lives "in a crazy basement apartment with Merlin, my Texas desert turtle."

Abler



Sikora

Hall

David

Fuhr

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# Progress Through PATENTS

## Today's innovators, always seeking new additions to our material goods, benefit daily from an old invention—the patent.

Man, the questing animal, always seeks to improve his condition by refining or improving past breakthroughs, or striving to achieve new ones. The Indian who first waved a blanket over his fire or the African whose drum beat out the first long-distance message through the jungle, are as lost to the ages as the inventor of the wheel. But those nameless innovators' descendants in modern dress cannot only garner specific credit for their inventive genius, but can also trace the bases of their accomplishments and use them to press ahead to new conquests. The enabling device—itself a brilliant invention—is the patent.

Legally a patent grants its holder the exclusive right to use or license others to use his scientific achievement for a limited period—for 17 years in the United States. It gives the inventor protection, the relative peace of mind that others cannot safely pirate and capitalize on his hard work. But in a scientific sense, the invention represents the light at the end of the long road of research and development.

For inventions don't just happen. Despite the occasional happy accident or instant brainstorm, an invention usually is the conclusion of hard, painstaking work, using past achievements to score successes in untried territories. And the entire process starts with a definite goal in mind to fill a definite need.

In effect, this sums up the innovative process of the Bell System, one of the foremost corporate participants in the patent system. The Bell System in many ways owes its very inception to a patent—that granted Alexander Graham Bell for the telephone in 1876. As it has grown to operate the world's most extensive communications system, it has maintained a steady quest for ways to improve it. Herein lies the motivating force behind the constant flow of scientific achievements from the System's varied components throughout its nearly a century of existence.

In operation, the Bell System's innovative process is embodied in a chain of interaction focusing its considerable resources on the improvement of communications to meet the needs of an advancing mankind. Thus Bell Laboratories, the System's research and development arm, develops new products; Western Electric manufactures many of them and the associated operating telephone companies use them.

The entire process starts with a determination of need—need for a new product: a stronger one, a smaller one, a more efficient one, a more economical one. This need may be determined by Bell Labs or it may be handed up from the field.

"Our operating companies study what people need and want," says Dr. William O. Baker, vice president for research and patents at Bell Labs. "These needs are very exactly translated into scientific and technical terms."

With the need defined, Bell Labs sets to work.

Next link in the chain is Western Electric, which takes the Laboratories' development incorporating the invention and produces it economically for widespread use in the System. "We've got to find processes and apparatus for transforming laboratory practices into commercially feasible techniques," says Herbert J. Winegar, Western's general patent attorney.

Finally, there are the telephone companies who operate and maintain the finished products as part of the communications network.

As measured by patents, this system has produced impressive results. Bell System personnel have recorded over 30,000 United States patents, and more than 9,000 are still in effect.

As might be expected, Bell Labs is the biggest producer of inventions, accounting for more than 6,400 of the patents now in effect. The total, since its formation in 1925 as a company jointly owned by AT&T and Western, is more than 14,000 United States patents, or an average of approximately one for every working day of those 44 years. More than 2,300 unexpired United States patents are held by Western Electric — largely in the areas of production techniques and equipment. The operating companies—theoretically the users rather than the innovators—have contributed a number of patents also, chiefly

by Martin J. Sikora

*None of this would be possible without providing the proper incentive for technical personnel or creating the proper environment for their work: "It keeps these fellows going."*

in the fields of service and operating improvements.

More impressive than the sheer numbers is the revolutionary quality of the inventive output. From the Bell System have come basic inventions relating to transistors, talking pictures, high fidelity sound, laser devices, the solar cell, television, the communications satellite and many more, plus their offshoots which have drastically changed the shape of communications. Many have contributed greatly to technology only indirectly related to communications.

But none of this would be possible without providing the proper incentives for technical personnel or creating the proper environment for their work. Dr. Baker feels this is where Bell has a definite edge.

"It's the heart of Bell Laboratories," he says. "It's our major trade secret.

"We provide the opportunity to apply one's total and intense talent to a worthy aim—to socially significant national and international progress. It keeps these fellows going."

Dr. Baker says Bell's research people basically are challenged to look for innovation in a system that merges "the most remote science with the aims of the Bell System."

"Our whole theme is that these aims of systems operators, engineers and scientists are completely compatible and feed on each other," he says. "The dualism or schism which could be so disturbing—we don't find any basis for it."

Utilizing this approach, Bell Laboratories conducts a relentless hunt to adapt exotic, often untried, scientific theories to practical use, and to continually fashion improvements.

Dr. Baker cites the case of integrated circuitry and microelectronics, essentially outgrowths of the Bell Labs-developed transistor. The first rudimentary integrated circuits were Bell products. The science took another stride forward when Bell Labs came up with masking techniques for creating circuit patterns. Out of this came the beam lead technique, and other subsequent refinements which provide efficiency and reliability greater than that of much larger devices. In turn, the search led off in another direction—for better materials to do the job. One result has been development of new ceramic bases or substrates, and practical ways of making them in quantity.

To Dr. Baker this illustrates the endless trail that science travels, the employment of one achievement to reach another.

"The idea of a plateau in science is just nonsense," he says. "The vitality of this subject—the open-endedness and continuity — seems absolutely unlimited. There is no end, no tapering off in sight anywhere."

Keeping the inventive process going means putting all possible resources and support behind the scientist. But it also means knowing where to gently call off a project that is heading up a blind alley.

According to Dr. Baker, Bell Labs uses the "glassy eye treatment" when a project appears to be going sour. "We make it a community enterprise," he says. "The glassy eye is the most effective deterrent known. It's a tremendous help having a large enough community to do this."

Dr. Baker firmly supports the patent system, saying that patents exist to serve innovation and emphasize "merit rather than solely controlling innovation by just cost in dollars and cents. It would be very chaotic without such a system," he says.

"It makes it possible for the private enterprise to be a little bit crazy, to take risks. There's a payoff when it's successful."

Western Electric's Winegar, like most Bell System patent attorneys, a graduate engineer as well as a lawyer, thinks patents and inventions are fine but is more concerned with Western's traditional emphasis on "good engineering."

"Most inventions are spin-offs of good engineering," he says. "People in the process of trying to solve problems come up with inventions as by-products of their work. This is not a conscious effort to make invention; it is a conscious effort to solve a problem.

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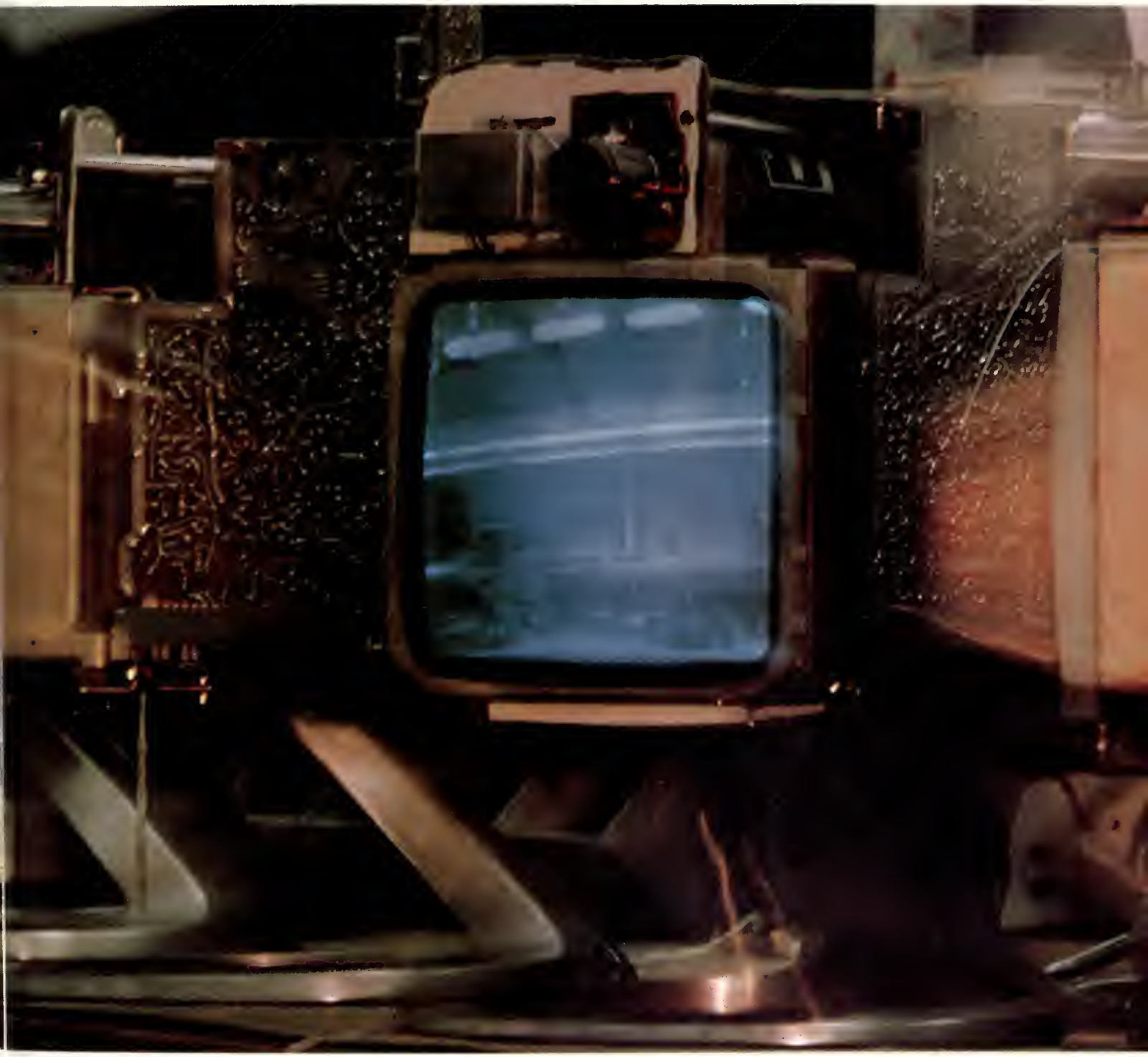
*The culmination of years of innovative effort, Picturephone® service is slated for the public in mid-1970. Western Electric's Indianapolis Works prepares to assemble the new sets.*



*"Development is a continuing process. We are always looking for something better. Nothing is stagnant. It seems as though someone is always coming up with something new".*

Good engineering is what we're really after."

For example, Mr. Winegar says the invention probability is much higher in the "new arts area" than in a relatively "well-worked field" such as wire and cable manufacturing. Yet, he says, the man in wire and cable manufacturing may come up with a "superb engineering approach" which may not be patentable.

But whether its work results in a patent or not, Western too must be continually striking out in new directions to develop new production techniques and refine old ones. Often it must be ready before Bell Labs has finished development of a new product. "We are given a charter that requires us to look out ahead," he says, "at what problems lie over the horizon.

"We have to anticipate the manufacturing problems of what Bell Labs has under consideration. We can't wait until the day Bell Labs comes up with it."

Guided by this objective, Western maintains a major facility, the Western Electric Engineering Research Center at Princeton, N.J., which is devoted to research and development.

However, work does not stop with the initial process and efforts continue to improve it, especially in the area of cost reduction. Mr. Winegar points out that each major Western facility has a group of engineers who work constantly on developing more economical production methods. He notes that, while rising copper prices exert a strong upward force on cable and wire costs, Western's prices for these products have risen at only a fraction of the increase in the prices of other manufacturers.

"Development is a continuing process," he says. "We are always looking for something better. Nothing is stagnant. Eventually, there may be no improvements needed in wire and cable but we just haven't reached that point. It seems as though someone is always coming up with something better."

Norval S. Ewing, AT&T's general patent attorney, says the present trend within the operating companies is to encourage their personnel to "work out for themselves the unique one-of-a-kind problems which do not have system-wide application instead of turning to Bell Labs. This should be the tendency," he says. "I feel there are many ingenious people around in this world. Invention often depends only on their exposure to a suitable problem and their incentive to solve it."

This division of responsibility should not convey the impression that each of the three major components of the Bell System operates in its own vacuum, unmindful of the others' problems or requirements. On the contrary, major developments increasingly are becoming joint operations, involving two, and frequently, all three arms. Bell Labs, for example, now has a facility at each of Western's major manufacturing installations.

But Mr. Winegar also notes that today's developments are so rapid and so sophisticated that Bell Labs must always consider the commercial feasibility factor of its products. In turn, Western's work may influence Bell Labs' design of a product to make it more manufacturable.

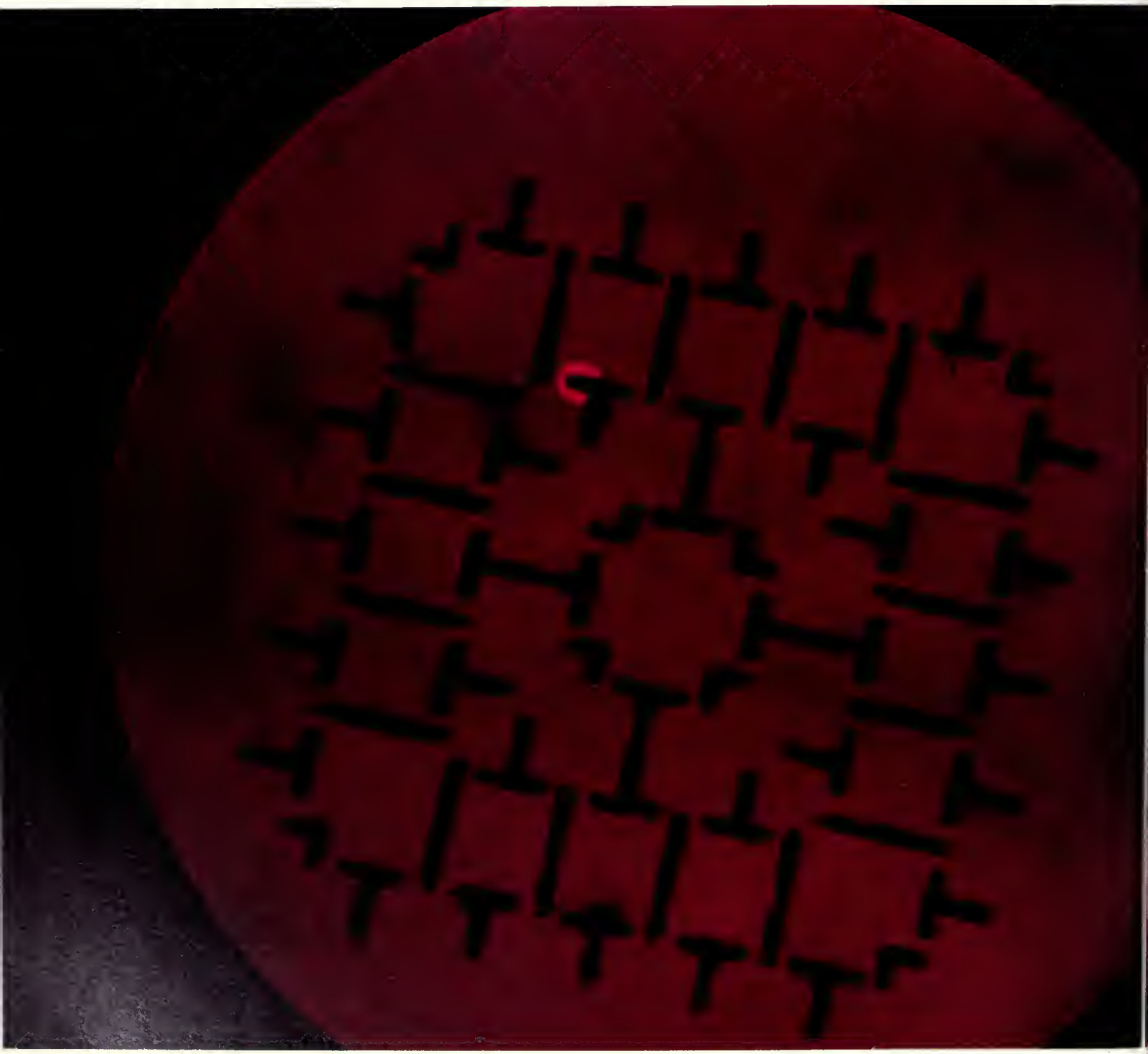
"You can't separate design functions from manufacturing," he says. "They don't fit into neat little compartments any more."

Similarly, within each organization there must be complete cooperation between the scientific and the non-technical personnel—particularly the patent attorney. For it is the latter who ultimately determines whether the invention is enough of an advancement to warrant the filing of a patent application.

"We maintain a close working relationship of attorneys to clients," says Rudolph J. Guenther, Bell Labs' general patent attorney.

Mr. Guenther's 84-man staff, all of whom have engineering degrees, including three Ph.D's, are deployed so that each area of Bell Labs has one or two attorneys permanently assigned to it. This permits the attorney to be available for consultation and provides the scientist a place to which he can bring his new

*Planning for the future is the essence of the task at Bell Labs. Here, a scientist studies key elements of a millimeter waveguide system, which, late in this decade, may transmit up to 250,000 messages—voice, TV, Picturephone®, data—all at the same time.*



Photography: Dave Thomas

*"Patents exist to serve innovation and emphasize merit rather than solely controlling innovation by just cost in dollars and cents. It would be very chaotic without such a system."*

development for immediate legal examination.

Generally, a device may be deemed patentable if it is novel and not obvious to one skilled in the art to which it pertains. To determine this, the attorney conducts a thorough search of U.S. Patent Office files, including the scientific literature.

Once past this hurdle, however, the new development must stand the test of whether it is economically important enough to warrant the sums that must be expended in the patenting procedure. While some are knocked out by this test, Mr. Guenther estimates that patents are obtained on 60 of every 100 new developments presented to one of his lawyers.

Mr. Winegar says his lawyers listen to all inventive proposals from Western's technical people, turn some down immediately, but retain others for formal study of their patentability. Noting that Western, too, requires economic justification for its filings of patent applications, Mr. Winegar estimates that about one of every three developments put under formal scrutiny reaches the patent office.

"Our job is not to flood the U.S. Patent Office," he says. "We have obligations as lawyers to protect the public and the patent system from worthless patents."

Still another dimension of the patent system is licensing and cross-licensing. It is through this procedure that innovative entities throughout the world exchange rights to use technical developments for the greater advancement of all concerned.

The Final Judgment of January 24, 1956, terminating the Department of Justice's antitrust suit against Western and AT&T, requires that any applicant be licensed for any equipment under all existing and future U.S. patents of the Bell System. Patents issued prior to the Judgment must be licensed royalty-free, and patents issued subsequently must be licensed at reasonable nondiscriminatory royalties.

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*Far out in new technology is a recent Bell Labs discovery: tiny cylinder-shaped areas of magnetism formed by a strong magnetic field in certain materials. As an information-handling device, this may apply in communications and computer technology.*

Dr. Baker notes that one of the key reasons for supporting the patent system is that it "guarantees free disclosure."

The Bell System is presently a party to about 1,100 patent licensing agreements—600 granting nonexclusive licenses under Bell System patents only, the remainder involving an exchange of nonexclusive patent licenses. The principal value to the Bell System is in insuring that it is free to use technology of others.

The roster of companies involved in such agreements includes those both large and small, among them a "Who's Who" of the world's most scientifically sophisticated enterprises.

Mr. Winegar says the Bell System maintains a "strong international patent position" by filing with foreign governments as well as the U.S. to provide an additional basis for the exchange of licenses with foreign companies and governments.

"It has given us through the years the assurance that we can put into the American telephone system the best technology available with a minimum of patent difficulty," he says. "They (other companies) invent things too."

Mr. Guenther cites the transistor, which was unveiled on a full-scale basis in the early 1950's and has gone on to revolutionize many industries, as an outstanding example of the benefits of making technology available to the world promptly through the licensing of patents.

All this points to a future of even sharper advancement than in the past and at a more rapid pace.

Dr. Baker, for example, notes that development time on some of Bell Labs' most sophisticated products has been cut to as short a period as from six months to a year.

"We've done everything to compress that period," he says. "We've revolutionized the process. The combination of telecommunications progress and need always exceeds the pace of science and technology. We always seem to be a little bit behind. Which may be another way of saying that we shall probably never run out of things to invent." □

# What Makes Cities Important

## by Ron Abler

Throughout history, people have lived in cities mainly out of necessity—to earn a living. Concurrently, the cities in which people lived were organized primarily to facilitate the activities of business and industry. The comfort, convenience and well-being of a city's residents were usually secondary considerations, overshadowed by the higher priorities of efficiency in business, industry and government.

All of this may be changing. We may, in fact, be on the threshold of a significant break with man's urban past. The day may not be far off when electronic media will permit us to have our urban cake and eat it too. Business and industry will be able to retain their efficiency, but not at some of the monetary, social and psychic costs which hit residents of today's high-density metropolitan areas.

Certainly, such a far-reaching overhaul in this country's living and working habits will not come overnight. A look, however, at the historical development of this country's urban centers and the reasons some have become more important than others suggests some intriguing possibilities for the future.

Ask anyone today to name the most important city in the United States and he is almost sure to answer, with little hesitation, New York, or possibly Washington, D.C. His reasons for answering so may be more reflex than conscious analysis, but the answers would be no less correct. The important question, however, is *why* have these cities gained their preeminence?

Population size is almost universally equated with importance, and in most instances measuring population is an accurate way of assessing the more general importance of metropolitan areas. Because our cities are in competition with one another for business firms, manufacturing plants, educational institutions, government bureaus and the people these activities employ, population is a good surrogate

measure of the relative importance of cities.

In any era, the cities which are the best locations for the dominant economic activity attract more people and rise in importance. Conversely, cities which are good locations for activities out of step with the tempo of the times become less important. Their populations remain stable or decline as people seek the greater opportunities available elsewhere. Population provides a measure of importance, but it does not fully answer our questions: again, the main issue is not the number of people in a city but *why* they are there. The best way of answering the question is to find out what locations are the best places to carry on the kinds of activities which are dominant today.

Until about 1840, the largest cities were great trading centers, and the importance of a city could best be evaluated by counting the goods which flowed into and out of its marketplaces. As manufacturing became the dominant activity in our national economy, the largest cities were the centers which collected raw materials and sent out the greatest quantity of finished products. During the last 40 years, services have become more important than manufacturing, and since 1950 information services have become the most important activities in the nation. Today, fortunes are made and society is managed on the basis of information and ideas. Our society cannot function without accurate and timely information, and our largest, most important cities are those which are major communication systems.

## Cities as idea interchanges

To put it simply: cities are communication systems. They are functionally identical to intercommunications media like the telephone and postal systems, because they make it possible for large numbers of people to have efficient access to each other's ideas and expertise. The decision makers clustered in large cities require data on the operations of the commercial, educational and governmental enterprises for which they are responsible. Thousands of employees are required to gather, summarize and analyze these data, and the same thousands of people disseminate the decisions and instructions produced by those at the top. Information and idea flows are the raw materials and finished products of the contemporary metropolis, and the size and importance of a city is determined by the amounts and kinds of information flowing into and out of it, and by the way it is interconnected with other cities in the national information flow network.

## Dominance and subordination

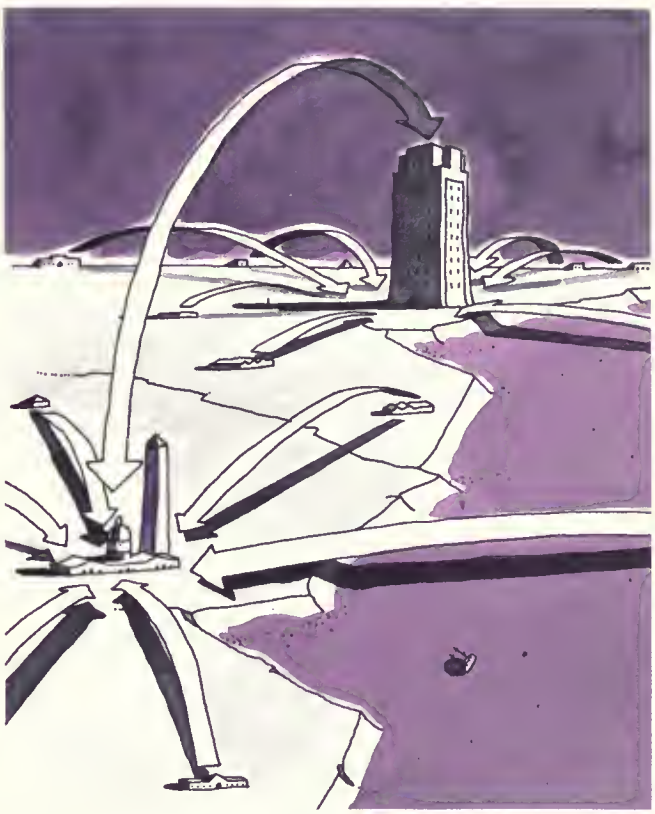
Some cities are closely tied by large message flows, whereas others find it necessary to exchange information less frequently. To a large degree, the intensity of communication between two places is determined by their size and the distance between them. We correctly expect that Atlanta and Miami will exchange more information than Atlanta and Denver, for example, because Atlanta and Miami have common regional interests. But in addition to being related to size and distance, information flows among cities are clearly also a response to relationships of

The table below shows average daily telephone messages between the six largest cities in the nation. The highest number of outgoing calls in each row identifies the place to which the sending city is most closely tied for information ideas. Bold figures are used where the highest number represents messages flowing to a *larger* city, in which case the larger city would be the dominant location. Size can be measured either in terms of population or by messages generated (the totals listed in the right column of the table).

| From: \ To: | New York | Chicago | Los Angeles | Philadelphia | Detroit | San Francisco | Total |
|---|---|---|---|---|---|---|---|
| New York | • | 21,105 | 10,484 | 27,359 | 7,790 | 5,320 | 72,058 |
| Chicago | **25,107** | • | 4,993 | 4,250 | 9,871 | 1,948 | 46,169 |
| Los Angeles | **11,841** | 4,475 | • | 1,305 | 1,755 | 16,616 | 35,992 |
| Philadelphia | **30,633** | 3,991 | 1,353 | • | 1,958 | 446 | 38,381 |
| Detroit | 7,623 | **8,676** | 1,759 | 1,526 | • | 349 | 19,933 |
| San Francisco | 6,173 | 1,869 | **15,767** | 513 | 456 | • | 24,778 |

dominance and subordination between these cities.

A study of the average daily telephone messages between the nation's six largest cities (see table) supports the oft-stated generality that New York is the national communications and information capital. Chicago and Philadelphia, since they send their largest message volumes to New York, are direct subordinates of the primary center. Though Los Angeles interacts most intensely with San Francisco, the latter is the smaller of the two cities, thus the important linkage is that between Los Angeles and New York. Detroit on the other hand communicates most intensely with Chicago and is therefore directly subordinate to Chicago and indirectly to New York. A similar analysis of the message flows among the nation's 30 largest metropolitan areas produces a somewhat broader picture of urban relationships. Most of the dominance relationships are what would be expected, except the surprising dominance of the Southern cities and Denver by New York rather than some other regional center.



## Management, information and expertise

The 30-city view makes New York even more obviously the national information center. Not only are Chicago and Los Angeles, the two secondary centers, subordinate to New York, the city also directly dominates numerous Eastern and Southern cities, as well as the Rocky Mountain metropolis. Chicago and Los Angeles dominate regional clusters of smaller cities, with the more solidly entrenched Chicago leading the sprawling California center in the number of cities subordinate to it. In the South, a regional clustering with Atlanta or Houston as a secondary center has not developed. Most of the cities of the South have joined the "Top 30 Club" only in the last several decades, and regional linkages have not developed.

Cities like New York, Chicago and Los Angeles became important information centers by a circularly casual process. Because they were places where important information was abundant, they were attractive locations for the management activities which required such information. The greater the number of management activities which clustered in these cities, the larger the amount of valuable information and expertise available there. Information centers create their own advantages, and it is difficult for lower level places to compete with those at the top. Because smaller places are relatively information-poor, they necessarily tend to remain that way, and cannot attract information-based activities.

Activities which rely heavily upon information are highly concentrated in the largest metropolitan areas of the nation. Every year *Fortune* magazine compiles a list of the 500 domestic industrial corporations with the largest assets, and five additional lists which tabulate the top 50 banks, insurance companies, retail trade firms, transportation companies and utilities. Of these 750 concerns, 194 (25.9 per cent) have

chosen to locate their headquarters offices in the New York City area. The Chicago metropolitan region has been chosen by 72 firms (9.6 per cent), and Los Angeles contains 32 (4.3 per cent) headquarters offices. Together, the 30 largest metropolitan areas in the United States are the locations of the headquarters of 563 (75 per cent) of the 750 enterprises on *Fortune's* lists.

To manage these giant organizations, those at the top require access to accurate and up-to-date information on the operations of their firms. Because business activities are heavily dependent upon general economic and social health, they also need abundant data and professional advice concerning society and the economy. The concentration of management activities in large metropolitan centers reflects the amount of information and the number of skilled analysts available in such cities. Only 25 per cent of the organizations on *Fortune's* list can afford locations outside our largest cities. To establish or retain their positions, most large firms feel they must locate their information-gathering and decision-making facilities and personnel in large cities.

## Information for everyone

Clearly, New York, Chicago and Los Angeles are the nation's most important cities. Certain people within them control tremendous amounts of wealth and productive capacity, and the decisions these people make on the basis of the information which flows into these centers affects us all, every day. There is, of course, one other very critical information center: Washington, D.C. Especially since the start of the economic depression of the 1930s, decisions made in Washington have had an ever-increasing impact upon the nation. In the 30-city study, however, Washington did not appear as a high-ranking information center because much of the information flowing into and out of Washington is confidential. It moves through government operated channels, and thus is not included in the statistical analysis. Nonetheless, because of its unique position as the nation's capital,

Washington is an even more intensive communications and information center than New York.

As a city which attracts corporate headquarters offices, Washington's influence is almost nonexistent. Only 4 of the 750 firms in *Fortune's* survey have their headquarters there. On the other hand, the offices of a very large number of national organizations such as the National Education Association and the A.F.L.-C.I.O. are located in Washington. Because of their vital interests in legislative and regulatory decisions, such organizations must be well informed, and only in Washington can they adequately assess governmental trends and make their needs known to political decision makers. Because of its importance as the *political* information capital of the nation, Washington, D.C., must be added to any list of today's most important cities.

Corporate headquarters cluster in New York, Chicago and Los Angeles, and government and related activities are concentrated in Washington, D.C., because communication is swift and important information is superabundant within such cities.

But that is the picture today. What it may be tomorrow is quite a different story—not in terms of any decrease in communications channels in the cities, but in the increase of information availability elsewhere. Advances in information transmission may soon permit us to disperse information-gathering and decision-making activities away from metropolitan centers, and electronic communications media will make all kinds of information equally abundant everywhere in the nation, if not everywhere in the world. When that occurs, the downtown areas of our metropolitan centers are sure to lose some of their locational advantages for management and governmental activities.

It is hard to predict whether we will take advantage of future opportunities to disperse information-based activities. Although these are the most important occupations in most large cities today, cities are based on much more than communications efficiency. They are important cultural and social systems as well, and the technological possibility of dispersal does not guarantee that we will choose that option. But the possibility of living and working in the Rockies or on the Florida coast and at the same time being as well informed as if one were in Manhattan will be quite attractive to many people.

## Toward a new freedom

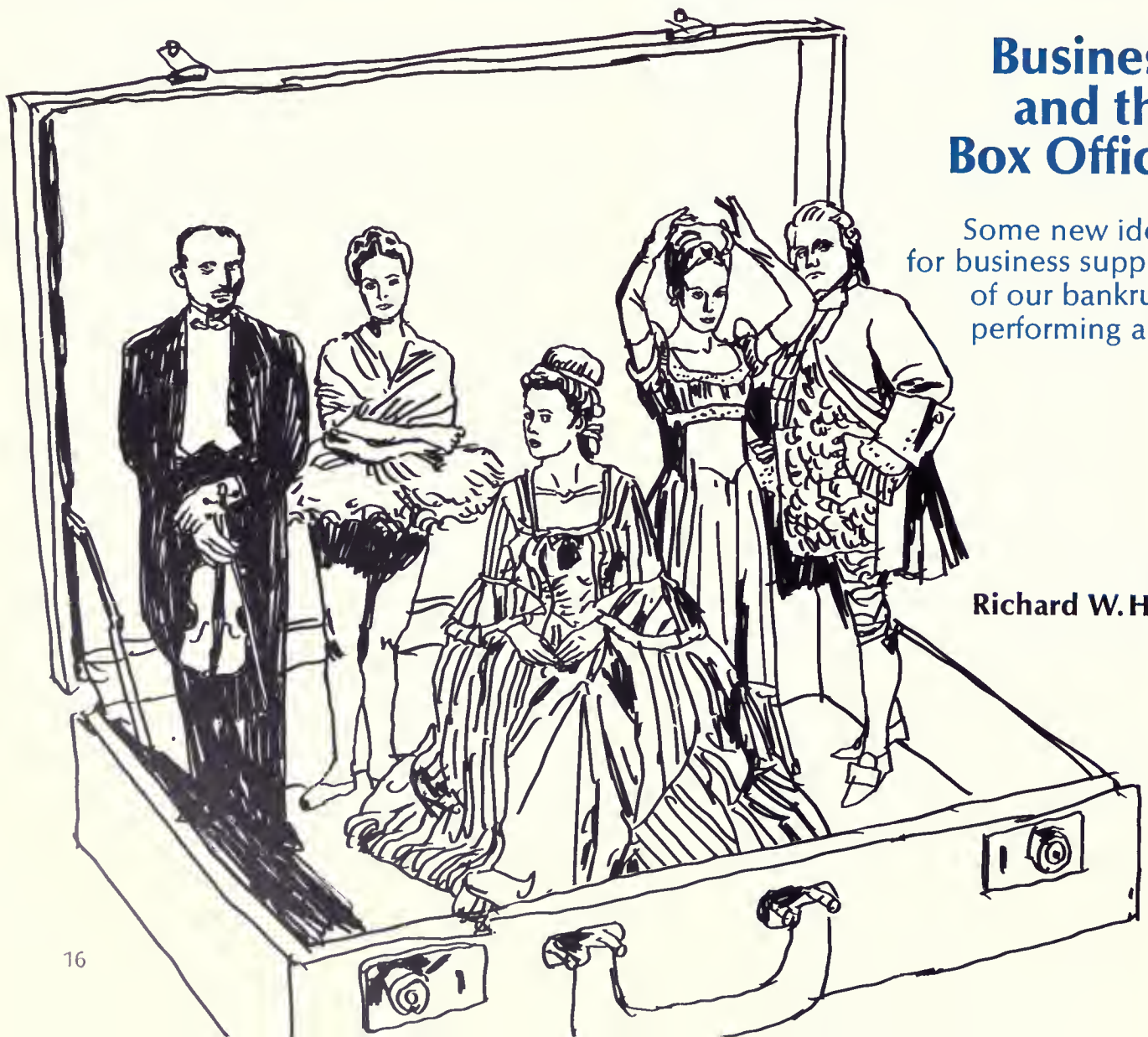
If electronic media succeed in making information and intellectual expertise equally available everywhere, a new set of places will become the most important locations in the national urban system. If information and ideas are ubiquitous, there is no longer a single best place for management activities. Every place is as good a location as every other. When they are no longer tied to the inhospitable climates of the North and East, people will increasingly be able to indulge their desires for pleasant surroundings when making decisions about where they will work and live. The cities of the Northeast began to give ground in the face of more rapid growth on the part of the cities in the South and West after World War II. There are a number of reasons for this trend, but certainly one of the important factors is the wish of many people to live at lower densities in the attractive physical environments available in these regions.

At one time, cities were primarily places to trade; the places which were the best locations for collecting and distributing commodities prospered and became most important. Later, cities became places to produce goods, and those with access to raw material and markets for their products became dominant. Today large cities are the best places to produce ideas, and the locations in which information and ideas are most abundant are most important. Tomorrow, information activities, management and education will continue to be important but telecommunications will free us—if we wish to be freed—from the high-density metropolitan existence we now find necessary. We are, for the first time in the history of cities, in a position to assure that the best places to *live* become our most important cities. ▢

# Business and the Box Office

## Some new ideas for business support of our bankrupt performing arts.

**by Richard W. Hall**



For the past year there has been a great deal of public handwriting over the financial plight of our major performing arts groups. The Metropolitan Opera, the Balanchine Ballet and some major orchestras have either faced strikes or just missed them. Deficit financing—of the kind that puts private companies and even national governments out of business—has soared. As one placard held by a Met picketer read, "It's time to pay the piper." Well—he's getting paid but no one is sure who's going to pick up the tab.

It's logical that a great many home remedies have been announced. President Nixon, in early December, asked Congress to double the funds available to the arts. In an unprecedented move in November, the presidents of 77 leading orchestras asked the federal government for assistance.

But neither prospect is encouraging. As a columnist observed in the N.Y. Times, "It is easier to get $54 million out of the House of Representatives for the Taiwan Air Force than a dime for a theater company."

Another remedy often suggested is increased support by business—and here the litany is fairly standard too. Producer Richard Barr *("Who's Afraid of Virginia Woolf?")* last spring demanded that business give more money to arts groups. In recent years two major studies—by the Rockefeller Panel Report and

the Twentieth Century Fund Study—have expressed pious hopes that corporate donations to the arts would expand. In fact, just about everybody is in favor of the idea except business.

The truth is that businessmen have taken a hard look at the social return on their contribution dollar and have chosen to support projects that promise to improve the material side of existence. By and large they have not bought the argument that the arts are as vital to the country as good schools, an end to ghettos or the Boy Scouts. Most businessmen see nothing wrong with working to improve existence materially, since most of our national discontents seem rooted there.

And yet, although the facts confute the expectations, the diapason of demand swells on. Give a producer or impresario a podium and chances are he will use it to explore the stinginess of business. His remarks may get a good press, his mail may be terribly flattering, and he may be asked to give the same speech elsewhere. But as for altering the basic pattern of business support to the arts, he's wasting his breath.

This is not to say it need always be so. But it will be until the boys in show biz revise some of their basic misconceptions and apply a fraction of their famous creativity to the problem.

The fact is, business is not likely—now or ever—to make major donations to the arts unless it can be demonstrated that some benefits will be visible in their balance sheets. Well-intentioned but token support will continue in the name of "corporate citizenship"—but any real marriage between business and the performing arts will have to wait on a closer meshing of interests. Even such a handsome benefaction as Eastern Airlines' gift of a new Wagner *Ring* to the Metropolitan Opera is only an exception that proves the general rule.

And yet—and yet. Business is perfectly willing to pay for services rendered, and the arts have much to offer. But so far there has been little hard bargaining between the two. Solicitors for arts groups are shunted to the Siberia of the public relations department, where they are kissed off with kind words and a small check. They have missed their real target—marketing—which is a key staff function. But it is only from the marketing/distribution boys that big-cash support will come.

Innovation has always been the key to American marketing. A country where you can buy books in drugstores, milk in gas stations and where your bank sends you a packet of zinnia seeds every spring is obviously unhobbled by ancient traditions.

For openers, let's try a very small innovation.

The great American "free" offer has flowered in many places—on the backs of cereal boxes, in the public prints and over the airwaves. Just suppose that instead of sending away for a metal tray or a plastic clock, the buyer could write for two tickets to a show or a concert!

Think of the advantages to both performing groups and business. The performance gets regular plugs as part of an advertising campaign. People hear about it whether or not they take advantage of the offer. Tickets distributed through the premium arrangement will increase audience sizes.

On the business side, the novelty of the offering may provoke a good response. In urban centers, where there are well-heeled and sophisticated consumers, the quality of the respondents will be good. If a company has a class rather than a mass product to push, audience targeting should be excellent.

Before skeptics start sharpening their knives on this scheme, consider the fact that it has already been tried and found successful. The Empire Savings Bank of New York, hardly a cultural rescue league, has offered new depositors ($10 or more in a new account) free tickets to Off Broadway shows. The campaign started in 1969 and continues into 1970. A half-dozen shows have been offered and a bank spokesman says they are "happy" with the response. The officiating medium in the affair is a classical music station—WNCN-FM which broadcasts the commercials, accepts listeners' checks, forwards them to the bank and mails a voucher to the listener, to be pre-

sented at the box office. A similar campaign has been run in Cleveland, featuring Zenith television dealers and the Cleveland Playhouse.

Now let's move on to another innovation — the house production.

## The royal private citizenry

In earlier centuries, many princely houses kept musicians or actors on hand to provide uplift on special occasions. The Comédie-Française began life by royal decree and was given an annual grant. The Esterházy estate in 18th century Hungary was a miniature Lincoln Center. The lucky heirs of this tradition have been outfits like the Royal Ballet of Great Britain and the Vienna State Opera, where the government has taken over where princely largess left off.

In America, of course, we have neither princes nor government subsidy. The arts must depend on the private citizenry. And yet, the corporate principalities which prevail in mid-century America could make excellent use of performing arts groups for their state occasions. One has only to think of annual stockholder meetings to realize that a little music or drama would do wonders to keep the audience awake. Sales conventions, new product kickoffs, press parties, plant dedications, trade fairs, recruiting drives—all these are state occasions when corporations must put on a show. Why not a "house" production—ready in the wings to entertain and enlighten whatever audience is assembled?

Before writing off the idea as harebrained, corporate planners should consider last year's road-show triumph, *By George*, presented not by David Merrick or Sol Hurok but by TRW Inc., a big Cleveland-based electronics company. *By George*, a one-man show that scored on Broadway and in London, starred Max Adrian and was based on the life and works of Bernard Shaw. TRW toured the package on college campuses—40 of them, where it was seen by 50,000 students—as part of its recruiting effort. Requests for stops at other campuses poured in and press-TV coverage was extensive. One TRW executive called it a "gold mine"—both in terms of publicity and recruiting results. Since then the company has been considering other shows.

Extending the idea of a one-shot house production a little further brings us to the resident troupe, nourished and nurtured by a company over a longer period. Here we might (but don't yet) have the General Electric Ballet, the Celanese Mime Theater, the IBM Children's Theater, the Boeing Repertory Workshop. (One step in this direction was the Grace Line Steel Bandits, a steel band that played at corporate galas as well as at Lincoln Center and Town Hall in New York. It was disbanded in 1968, when some key players were drafted.)

The arrangement has many advantages. For its money, a corporation would have first call on the group's services for its own live events and for TV specials. The corporate name would be part of the group's identity—a public relations plus. In exchange, the artists would be able to stop worrying about the sheriff and concentrate on their work.

Now let's up the ante and consider the possibility of a corporate-sponsored Festival of the Arts. This is the kind of fiesta that Rheingold Brewery ran in New York's Central Park some summers ago—an affair that lasted several weeks and drew on talents from the world of serious, folk and jazz music.

One object of many promotions is to lure customers into stores. There they check their lucky numbers, ask for contest blanks, cash in ad coupons, and so forth. How much more rewarding it would be if a trip to a store exposed you not to a poster listing the winning digits, but to a pair of tickets to the local arts festival! If costs were too high for a giveaway, the tickets might be offered at a discount, or with a purchase. No matter how it is arranged, the tie-in with a local retailer is sure to build traffic for him.

There are countless ways to merchandise an arts festival to pay off in sales—especially if the festival includes some rock groups. But however it's done, the principle remains the same. Business needs new

ideas for helping the arts and the impetus should come from both sides—from marketing men who appreciate show business and from artist-managers who understand the particular dynamics of history's first mass-market democracy.

The principle may require a certain tolerance from purists who detest handholding between art and commerce and who believe the arts should command reverence and cash without having to hustle for them. Before condemning the idea out of hand, however, they should remind themselves that there is no such thing as perfectly painless patronage. Every form of succor has some drawback.

## Pennies from Washington?

Support by the nobility, for example, used to depend on an artist's family, personal appearance or talent for flattery. Wagner had little luck with patrons until he met up with mad King Ludwig of Bavaria—demonstrating that a patron had to be literally out of his mind to think Wagner was worth helping. Since the number of rich, demented music lovers was limited at best, Wagner could consider himself fortunate.

Patronage by government, on the other hand, exposes a man to bureaucratic procedures and insensitive officials. The groups on whom government cash fails to rain down tend to wither away—making the Ministry of Culture, in effect, the final arbiter of which groups shall live or die.

In addition to the enterprises cited earlier and the many others not mentioned, the Bell System, through its operating telephone companies across the country, has implemented a concern for the plight of the performing arts with hard cash contributions. Support of such organizations as the Minneapolis Orchestral Association, the Denver Symphony, the Salt Lake City Symphony, the Cincinnati Symphony, the Seattle Symphony Endowment Fund, the Cleveland Symphony and the Center for Performing Arts in Milwaukee has accounted for about half of Bell System support of cultural activities over the past few years. H. I. Romnes, AT&T's Chairman, is a member of the Business Committee for the Arts, a national organization formed specifically to encourage business patronage of the arts.

## The itinerant symphony

In the Midwest, the Illinois Arts Council is now raising money for what may well be a unique purpose. Its object is to send the Chicago Symphony to colleges throughout the state as a kind of peripatetic resident, visiting one or two in a year and staying long enough to not only allow students ample time for extended and concentrated listening, but also to enable music majors specializing in certain instruments to study with members of the orchestra who are practicing masters of those instruments. Illinois Bell Telephone Company, as a regular contributor to the Arts Council, is thus supporting, at least indirectly, this new effort to reach the young people from among whose ranks musicians of the future must be drawn.

It might help, in closing, to put the financial needs of the lively arts in big-picture perspective. We are *not* talking about massive transfusions of cash. The deficit run up by 60 of our major orchestras in 1968-69 was $5 million; it will climb to $13 million by the end of the 1971-72 season.

This may sound staggering at first, but not when you find a scale for it. As the president of the New York Philharmonic pointed out recently, one new highway interchange north of the city is costing $25 million—and not a groan has been heard! That's about double the projected deficit for *all* our orchestras a year from now.

If you stop to think about it, there is really no reason why live performances, with a few major exceptions, could not go the way of the parlor stereopticon and tableaux vivants. The best way to avoid such loss is through a dose of creative innovation. There's really no limit to the wonders that can be accomplished if two natural allies—show business and industry—stop circling each other warily, and shake hands. ☐

a 21-year-old collegian views . . .

# The American Dream and the World Imperative

## by Rita Fuhr

I grew up in a world that was clean and well-lit, homogenized and pasteurized, vaccinated against polio and tetanus, properly nourished and adequately schooled. It was a world of order and certainty and there were good people like parents and teachers to teach you the rules and show you the way to the Good Life.

Had I been born 10 years earlier perhaps everything would have happened as planned. Maybe I would have been able to meet each new year confident that I indeed had a piece of the Good Life. But I wasn't born 10 years earlier. All of us who made our way into the world during the postwar baby boom were destined to see the end of this world of certainty. It saw us through to college age, and after that we were on our own.

What's it like to know all the rules for a game that's no longer being played? What's it like to be a 21-year-old college student caught in the middle of a world that seems bent on its own destruction?

One day you go to college and you find yourself one of 18,000 students attending classes on a huge, urban campus. You have one class in a lecture hall that holds 300 and another in a small classroom with the professor and 10 students sitting around a table having coffee. Football doesn't mean anything on this campus and graduation exercises are held in what usually serves as a livestock exhibition hall. You learn to remember your IBM computer sort number and you learn to be patient with forms in triplicate and computer errors that can erase your entire academic career with one wrong digit. You learn not to expect anything without having first to stand in line for it.

Things happen to you that leave memories of a different sort than those your mother has of homecoming. One day you watch the riot squad march down a campus walk and station themselves on the library steps. You go through a picket line to class and your roommate and your English professor yell "Scab!" at you as you do. You receive a letter informing you that any participation in student demonstrations will mean loss of your scholarship. You see people scared and hurt and bleeding. You see people angry and violent. Windows are broken, bricks thrown, chairs and tables overturned. You see three college presidents come and go in less than two semesters and you hear the college trustees laud what happened on your campus on a day you remember as Bloody Thursday. On some days your muscles tense and your stomach begins to hurt as soon as you get near the campus.

There are other things apart from school that you remember. Every day of your life in this age of instant communication, you live with what's happening in Vietnam, in Washington, D.C., in every ghetto, in

**Do we turn to revolution? That is probably the biggest question being tossed around.**

every neat suburb, on every college campus. Never before has man been able to know so much and hope for so little. And if you're young, you feel the weight of an approaching responsibility for a world that re-

fuses to act responsibly and you wonder again, what do I do now?

There are three assassinations in living color and a war that consumes an incredible amount of money and men, some of whom, like a onetime boyfriend, don't come back. There's man on the moon and man in the ghetto. There's air pollution, over-population, hunger, poverty and a whole list of social ills that make reading the morning paper less than an enjoyable task. And what you don't face everyday yourself, you see that night on the television at 6 o'clock and again at 10. And if you're young, you wonder, what do I do now?

Do we turn to revolution? That is probably the biggest question being tossed around on all levels of American life. The young use it as a kind of password among their peers. Newscasters analyze it in ominous tones. Blue-collar workers call it part of the "Red" threat. It is the axis concept of America at this time in our history. It affects us all differently but it affects us all. It contains the key to the rapidly closing door of our survival.

I learned early to believe in America. For a long time, the concept of America as a democratic promised land held true in my mind. All of the historical color was familiar to me, just as it is familiar to every American school child. American history was a glorious technicolor extravaganza, resplendent with archetypal heroes regretting in appropriate oratorical fervor that they had but one life to give for their country. All this emphasis on idealism led, as was intended, to a vision of America as a concept rather than a reality. I, by college age, reached the inevitable point when it was no longer possible to reconcile the taught concept of America with the experienced reality of America. The confrontation of this inevitable paradox drives one to the necessity of considering other possibilities of political action and social change. And so the "revolution" takes on a reality that the child's-history-of-America-complete-with-full-color-pictures never had.

There is an undercurrent of seriousness in all the student concern in the revolutionary motif that cannot be chalked up to a hard core of malcontents involved in a grandiose Communist plot to undermine democracy or passed off as a highly evolved form of the panty raid. As well as the rhetoric, one finds a new consciousness of social problems on the gut level. Many of us attending campuses located in the middle of a sprawling urban mess live, not within the safe confines of a college dorm, but in the middle of lower-class or ghetto neighborhoods along with a lot of other people who can't afford high-cost housing either and *not* because they are going to college. Lots of people in our colleges today grew up in what Intro. to Sociology politely terms "the inner city" and have no reticence in disclosing just what they think about the American dream. There is the paradox of a youth, largely disillusioned with conventional channels of social change, who can still find some relevance in working within those same channels. You've got kids working with organizations like VISTA, actually opting for slum living and starvation wages in their quest for a kind of intense personal involvement with what is happening to America. College life, at least on large urban campuses, has be-

**I will admit, having experienced it myself, that a large crowd of people waving clenched fists and yelling "all power to the people" is a frightening thing.**

come a whole new trip, based not on homecoming dances and football games but on gut-level personal involvement with the pressing social problems of our environment.

Because one has been able to make this personal application of Intro. to Sociology to what one is living in and experiencing every day, either personally or through the immediacy of the communication media, a new willingness to turn to previously untried ways of dealing with these problems begins to emerge. The revolution is a new tool, something youth has chosen in the face of what seems the gross

failure of the usual channels of social change.

There is one aspect of this press for change that seems really to tap the hidden fears of America. Popularly put, it is the concept of "all power to the people." I will admit, having experienced it myself, that a large crowd of people waving clenched fists and yelling "all power to the people" is a frightening thing. But it is strange that an idea which, in actuality, draws on what is supposed to be the traditional

**Actually, this concept of revolution is simply a contemporary development and refinement of the traditional Boston Tea Party kind of American revolutionary spirit.**

American consciousness of individualism can elicit such social paranoia. Has the idea of self-motivation become so foreign to us that we no longer are comfortable in its presence?

Actually, this concept of revolution is simply a contemporary development and refinement of the traditional Boston Tea Party kind of American revolutionary spirit. The fact that there was an American Revolution bears consideration by those who would put down revolutionary thought as un-American.

A positive example within my own experiences of the "all power to the people" revolution is the development of the Black Students Union at San Francisco State. Started several years ago, it originated as both a kind of protective union for black students in a sea of white faces and as a means of establishing a liaison between the growing number of black college students and their communities. Black students knew it was vital that they not, by virtue of their college education and their experience in what was primarily a white institution, lose contact with their people and their culture. For a while the defensive aspect of the BSU was most evident but the campus struggles of last year seemed to provide the catalyst for the organization's development into a strong source of racial and cultural identity for the black students on campus and a cohesive ground from which the black students are able to articulate their needs and ideas. I think that the San Francisco State Black Students Union represents the kind of revolution that youth really wants and the kind of revolution I can accept.

The idea of "all power to the people" demands we confront and acknowledge that somehow, somewhere along the road to our international prominence as a nation and our own individual rush to grab a piece of this prominence, each of us lost to some degree our roles and rights as individuals in our society. In our haste to build a nation, in our fixation with the concept of the American dream, we surrendered ourselves to the bigness of the task. Now we find ourselves locked into a life pattern that serves the task and is subservient to the task.

There is a remoteness that people feel between their individual lives and our decision-making institutions. In this remoteness we find people who have had to resort to basically a blind, mindless faith in the American way. It becomes necessary to surrender completely to the structure you have created. You *must* believe in Vietnam, in the President, in the government, "my country right or wrong."

Youth finds this kind of blind faith impossible, having grown up in a world where the only permanence is impermanence, where what we know today may well be meaningless tomorrow. We all know, as Dylan sings, that "the present now will later be past . . . the old road is rapidly aging." Change becomes the key word, perhaps the only word that has any validity for the future.

The question becomes, what do I do now with what I see? I see modern man as an integral part of a technological, as well as sociopolitical, environment.

I think we have been too slow in acknowledging our technology as the potential creative force behind modern life it can be, rather than as a pleasant but remote offshoot of the Industrial Revolution. We also have to deal with the fear that technology will reduce our lives to a state of programmed automation. To many of us, the specter of Hal the computer outthinking his human creators is much too real a

possibility. Not even youth has been able to reconcile themselves to a technological environment. Some youth, in the search for self-realization, have rejected all the trappings of a technological society.

I do not think that because we are a part of a technological society, we need necessarily to be a dehumanized, depersonalized society. Because we fear the changes technology demands we make in basic social constructs such as the work ethic, we relegate our technology to an enforced impotence. We embrace technology only so far as it serves existing

**We ignore the lesson of a true technology —that it, in its best sense, functions always to continuously incorporate an ever-changing reality.**

structures and concepts. But when technology begins demanding that we rethink the validity of tradition, we begin to run scared. We ignore the lesson of a true technology—that it, in its best sense, functions always to continuously incorporate an ever-changing reality. By helping us to live within the constant flux of contemporary life, technology can humanize and make visible and less frightening the forces of change.

There is an incredible beauty about a technology which can represent all the possible choices one has in dealing with reality and the continual conscious effort one must make to incorporate change into even the most basic life patterns. We must learn to apply, in a technological sense, the idea of working with all possibilities, all elements, all truth, all reality if we are to survive our expanded, intensified, mind-blowing environment.

We live in a world that offers us no illusions about our role in society; we must either take the responsibility for what we have created or become the victims of our own creation. Either we confront change or the dragon Change will devour us. We no longer have even Santayana's option of repeating the mistakes of history, for we in this nuclear age risk eliminating history altogether.

I know a lot of people—the president of my college and the governor of my state, for example — who would much rather I concentrate on something safe like the good-looking guy in my junior seminar than on something as risky as the future of the world. But the future of the world happens to be my future too. I'm getting a little nervous now that we seem not to have made the world safe for democracy or even for ourselves after all.

I do worry too much but mostly because a lot of people don't worry enough. A lot of people watch the news at 6 and again at 10 and feel nothing. A lot of people talk about Vietnam and poverty and air pollution in a strange, detached, uncaring way that seems more horrible to me than any college student calling a policeman a "pig."

I care. I care so much about what happens in this crazy global village of ours that I find it incredibly ridiculous that I be expected to sublimate my concern for some very real problems to a tradition that happens to have been around longer than I.

**Our task is to see and to see what is, not what we want to see or what we have been told we should see there.**

Our world is an imperative. In order to answer that imperative, we must have a hard, clear vision of the reality of that world—a vision apart from an illusionary heritage or the concept of an improbable American dream. Our task is to see and to see what is, not what we want to see or what we have been told we should see there.

This vision does demand a revolution. But revolution is neither an obscenity nor an epiphany but a fact of life. We are constantly a part of a world that is changing, moving, yes, *revolving* during every split second of time. The changes that wrench many of us are merely the natural movements of this revolving life force. Our technology is no monster but merely the manifestation of this same life force. And we are no strangers in a strange land but creatures of the living revolution of an imperative world. □

a middle-aged
critic compares . . .

# The Lost Paradise and the New Liberation

## by Saul David

While having a wisdom tooth extracted during WW II, I was told by a U.S. Army dentist that his profession depends on the human organism's inability to recall pain. This seems as rational a way as any to explain why we are so tireless in our rediscoveries of hedonism and communal joys. Every decade or so, we are roused and inflamed by the news that nondiscriminate and odd-numbered sexual and social relationships are—like wow. Shock is appropriately noted among the shock prone, and another thrilling and profitable Liberation gets under way, shattering custom, ripping the mask from agreed-upon hypocrisies and generally having a ball until embarrassment or even drearier consequences set in. Then Cavaliers become Roundheads and the knitting needles switch from tassles to shrouds without missing a click.

The duration of the festival seems to depend on the arrival of consequences, in whatever form. The extraordinary power and spread of the present celebra-

tion—assuming it's not really millennial—can apparently be credited to the strength of the society set up by the hypocrites, a world in which unpleasant reactions can be avoided and deferred for a very long time by a very large section of the revelers—the affluent young and their wistful supporters. For them, the playpen stretches from sea to shining sea.

A world ago, before television transformed all anger into Right, all passion into Virtue, the Old Left used to sell trial memberships by advertising what was called "free love"—a phrase which breathes the innocence of the time—and many of the compassionate-and-idealistic young were much attracted. A lot of people who had not really considered the socialist goal of sharing in the means of production had their eyes opened and the slogan "from each according to his capacity, unto each according to his need" took on a satisfying meaning. Although the girls were often more bourgeois than the slogans (the pill being more persuasive than the dialectic) and rarely even the pick of the litter, it was a powerful subtextual recruiting device. The combination was perfectly suited to the needs of youth—the reformer's zeal combined with a license to License, the right to hate wrapped in slogans of moral superiority and compassion. No revolution cries out for Responsibility—Freedom is the slogan, but Freedom *For* is usually vague while Freedom *From* gets savagely specific.

**Joy unconfined gets to be joy unconfinable, and the discipline needed to change the world is hard to maintain if the crusaders are tapping their feet and waiting for the meeting to break up so they can pair off.**

Still, the prime difficulty with Freedom, any variety, is that it's addictive and constantly needs more chains to break—otherwise, Freedom fighters run the risk of supporting some status quo. And since sexual customs and taboos, like the urges they limit, are powerful (if not necessarily rational) expressions of the way a society wants to see itself, an unbuckling of those customs tends to be an unbuckling of the whole works. Joy unconfined gets to be joy unconfinable and the discipline needed to change the world is hard to maintain if the crusaders are tapping their feet and waiting for the meeting to break up so they can pair off.

So, sometime before WW II, the Party sensibly blew the whistle and the years of prophet sharing ended. The buttoned-up faithful who remained turned to the real business of idealism—killing people who don't see the light, telling specific lies for the general good and falsifying the record. Meanwhile, the moralizing didn't let up for a moment, not then, not through purge and war and occupation and famine and the rest of it, convincing its victims often as not, and generally demonstrating that dreams are stronger than facts, no matter what Marx thought. It became clear that personal liberty and the doing of one's "own thing" (as youth and the Cosa Nostra have it) are incompatible with Utopian order and the uniformity of the Saved.

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All this was such a short time ago that the very sons and daughters of that Lost Paradise are the heralds and champions of the new Liberation. Educated in the accusatory lingo of the social sciences and the quantitative logic of all mass movements, they are convinced that they have only to stop society's clock in order to control time itself—this time they've got the numbers and the "power of good," this time there will be no consequences. And their parents, agreeing nervously to things they had not quite imagined back in the days of cold water flats and manifestoes, are

searching themselves for guilts and, of course, finding them.

Long before Freud or John Lennon, young people were embarrassed by adult imitations of their group frenzies. The sensation-greed of youth is matched only by the intensity of young revulsion from the idea

**The real horror of the Generation Gap is the look on a sixteen-year-old girl's face when her mother shows up in a mini-skirt, twitching her forty-year-old rump to a rock band.**

that their gross and unbeautiful elders should pretend to understand or share such mind-stopping pleasures. The real horror of the Generation Gap is the look on a sixteen-year-old girl's face when her mother shows up in a mini-skirt, twitching her forty-year-old rump to a rock band. Young people know enough about their own motives not to respect themselves or their friends too much, regardless of the slogans. They know. So the sight of their parents groveling before them tends to sicken and frighten them into frenzies of contempt and destruction.

The residue of a political century seems to be a sour skepticism about every faith but youth worship. In an increasingly secular time, when personal fulfillment is held to be not only the goal but the right of every man and woman, what used to be called maturity has come to seem the expulsion from the garden. Not only "the system" but all systems have failed their promises, which were called justice but understood to be happiness; and the only total passion, unshadowed conviction and bottomless sexual voracity in sight is a condition not of wisdom, but of youth. No wonder everyone wants it, no wonder it is the essential pitch of every sale, the justification for every wistful extravagance.

Worshiped, admired, imitated and quoted, why would any young person want to join an adult world which greets every accusation with a confession and

**If he were to appear in a hairy and mod version, Peter Pan would be anointed.**

which has practically renounced its right to judge, let alone govern? What's to gain by growing up? If he were to appear in a hairy and mod version, Peter Pan would be anointed.

The older generation, anxiously throwing human bridges across this Generation Gap is destined to fail as the young dig madly away at the far shore to keep the future distant. Of course, they have only stopped society's clock, not the whole process—and even from this side it's possible to see victims fall into the crevasse. It's hard to say what will happen as the leaves fall and nature remains reactionary. Perhaps suicide will remedy population growth. Probably not—probably war will seem better than a confession of failure, as it always has—even to the enlightened.

Meanwhile we are all in for a bad time. Mass higher education is coupling with other vast consuming blocs toward the creation of a new kind of society in which one fundamental law is being repealed—the law that he who pays the piper calls the tune. The democratic spread of the franchise combines with the lowering of

**Educators don't need to be trained in the virtues of the welfare state—they are its proudest embodiment.**

the voting age to place political control in the hands of the receivers of goods and services rather than the makers or the owners. What John Aldridge has called The Country of the Young is much more than an attitude, it is a collection of city states which are already real contestants for political power. Educators don't need to be trained in the virtues of the welfare state—they are its proudest embodiment. They quite naturally embrace the notion of a meritocracy shot through with hard politics—they live in one. There is no outrage like that of a junior professor of some social science when challenged by some chamber of commerce type to prove he's not wasting the taxpay-

er's money. Outsiders are constantly baffled by the way universities in bloody turmoil seem to close ranks at the first sign of outside interference, but the Generation Gap inside the walls is not as deep as the moat outside.

It must be a hard life for aging educational professionals. Already, symbolic parricide is the main feature of every campus disturbance, just as the standard demand for amnesty expresses not so much cowardice as the blinding self-righteousness of the group. Say what you will, they know that you know you're wrong. The administrators are perfect parent-substitutes and their anxiety to please and to understand

**Probably Higher Education would secretly welcome a series of harsh and repressive laws to get them off the hook.**

must give savage pleasure to people for whom the goal of turmoil is the satisfaction of turmoil itself. But it is just as hard to stop making concessions as it is to stop demanding them. Probably Higher Education would secretly welcome a series of harsh and repressive laws to get them off the hook. But they can't admit any such heresy and so the digging and sandbagging goes on. Student tribunals for faculty transgressions are perfectly predictable—with faculty blessings at the outset and confessions at the trials.

**If the young are against killing, why don't they burn their drivers licenses along with their draft cards?**

The young are probably liars and fakers, even as we were and are, but who cares? If it were possible to prove conclusively that their logic is absurd, their tastes barbaric and all their professions lies, what would be the use? If the young are loving, why don't their parents notice? If the young are against killing, why don't they burn their drivers licenses along with their draft cards? If the young are brave, why do they flee into drugs? If they reject their parents' vices, why do they cite them as bad examples to explain their own? The exercise is splenetic and pointless. In a more reasonable time it might be at least argued that the virtue of the child must reflect the uprightness of the parent—which would make the older generation

**Along with their catalog of sins goes the fact that these same people made an effort without precedent in history to be charitable to the defeated.**

the most upright group in history. But it doesn't play that way. The young are confessing to their virtues, the old to their sins.

In a recent issue of a credit card magazine, a young draft avoider living in Canada is quoted as saying that his group are too uptight—after all, they have only to wait until the World War II generation dies off to inherit the world and make it whole. To which a member of that generation can only add his hope that they won't push . . . .

That wicked generation, tired and frightened at the relentless sharpness of the serpent's tooth, are the same people who, starting way behind, nevertheless beat off real tigers—the Nazis and the Fascists and the Imperial Japanese. Along with their catalog of sins goes the fact that these same people made an effort without precedent in history to be charitable to the defeated. These howling hypocrites were mostly born with the first airplane and before television, but the moon landing is certainly as much theirs as the Bomb —and the ghetto, which is everyone's. Admitting every fault, these wretches managed, in the space of an incomplete lifetime, and along with the killing, to overthrow all the world's empires, free more downtrodden and feed and comfort more of the hungry and fearful than all the previous generations of mankind taken together. These are the dragons the young mean to slay. Frankenstein's monster is alive and taking a post-graduate course in the humanities. ▢

# New Path for a New Light

Christmas decorations have been made of glass fibers like these—tiny filaments fine as a human hair and smaller—which conduct light as a pipe conducts water. This property, however, makes them useful for many more serious applications. Researchers at Bell Telephone Laboratories are experimenting with these gossamer strands of glass, known as fiber optics, as a possible transmission medium for the laser beam.

Three main interests motivate the research: the use of laser-fiber optics in logic or switching elements of computers, in the line from your house out to the main telephone line, and in long-distance communications.

One of the primary problems in transmitting any kind of signal over any distance is loss of energy along the way. Consequently, one of the primary aims of the research shown here is to reduce loss of light in the laser beam as it passes through the minute glass rod. At present, about half of the beam's energy is lost after traveling through six feet of fiber optic. Among many Bell Laboratories people working on related parts of the project is a group developing a new low-light-loss glass to improve efficiency of the system. Others investigate means of modulating, or imposing information on, the beam; of getting the laser light in and out of the fiber optic, and means of amplifying it at repeaters. □

homas

# Bell Reports

### Bell System Story in '69: Growth

Records in telephones added, calls handled, operating revenues, and earnings per share, were chalked up in 1969 by the Bell System.

Some 4.7 million telephones were added to the Bell network, bringing the total to 92.7 million; about 19.5 million overseas messages were handled compared to 15.5 million the preceding year; an average of 350 million calls were transmitted per business day, an increase of 29 million per day; and 6.3 billion long distance messages were carried, a 12 percent gain. Data-Phone® data sets in service increased 56 percent to 131,000.

The largest revenue increase in Bell System history—$1.6 billion—was recorded, raising the total to $15.7 billion. Earnings per share were $4, compared with $3.75 in 1968.

### U.S. Tops Telephone Talkers

For the first time since 1951 the United States has outtalked Canada for the "Championship of Chat."

Americans talked their way to the top by averaging 701 telephone conversations per person in 1968, eight more each than their northern neighbors. To accomplish this, each U.S. citizen had to increase his oral output by 33 conversations over the previous year. Iceland, which reported 632 telephone conversations for each man, woman, and child, was ranked as the world's third most talkative nation.

The figures were reported recently in "The World's Telephones," annual review compiled by AT&T. They represent totals as of January 1, 1969, because it takes nearly a year to gather statistics from telephone companies around the world.

### Picturephone® Service To Start

Beginning in July, Bell System customers in the Golden Triangle area of Pittsburgh will be the first in the world with exchange only Picturephone service. This will be the first commercial offering permitting customers to place Picturephone calls from their offices.

Exchange service will be introduced in the downtown section of Chicago and an intercity Picturephone link will be established between Pittsburgh and Chicago in the second quarter of 1971. By 1973 the Bell System plans to have a Picturephone network linking more than a half dozen cities.

### Waveguide: A Pipe Dream Coming True

A field trial of a 2-inch pipe capable of carrying 250,000 simultaneous telephone conversations has been put on the schedule for 1974 by Bell Telephone Laboratories.

The hollow, copper-lined steel pipe —known as a waveguide—is part of an economical new communications system that figures prominently in the Bell System's program for meeting growth in long distance calling, data communications, and Picturephone® service during the next decade.

The system will exploit the high information-carrying capacities of little-used radio waves of short wavelength —called "millimeter" waves. These millimeter waves, carrying information coded in pulse form, will travel through buried circular waveguides.

These pulses travel great distances without losing much strength. This means they will have to be amplified or regenerated only once each 20 miles. Signals on coaxial cable systems that are now in service must be amplified every few miles.

Before the field trial, several technical procedures and certain equipment must be perfected. Techniques for the manufacture of straight lengths of uniform waveguide will be developed by Western Electric. Methods also must be developed for burying it with minimum bending about four feet underground, and for installing it along gradual route bends. This is important because imperfections in roundness or straightness decrease a waveguide's transmission efficiency.

It is expected that commercial service using the new system will be initiated in the late 1970's.

*Tuning in on the tiny electric signals emitted by muscles as they work is part of a Western Electric study aimed at improving the way employees do their jobs, and increasing their personal comfort at the same time. The approach to man/machine relationships, called electromyography, is being made with the participation of the University of Michigan department of industrial engineering, under a Western Electric Research grant. Direct reports of muscle fiber activity are made from the miniature radio transmitter pinned to this girl's sleeve to recording equipment as much as 100 feet away. These signals can show Western Electric engineers when her muscles are beginning to tire even before she is aware of fatigue.*

# Business Service and Society

*On March 31, Ben S. Gilmer retired as president of AT&T, ending a career that began with Southern Bell nearly 44 years ago. After serving as Southern Bell's president, Mr. Gilmer came to AT&T in 1965 as executive vice president. He was named president in 1967. In the following excerpts, taken from speeches he made during his years at AT&T, Mr. Gilmer comments on this business and these times.*

Service dictates the shape of our organization and the principles that guide its management. In our view, our responsibilities to employees and share owners do not limit or qualify our commitment to service. Rather they support and sustain it. Only so long as we maintain a highly competent and highly motivated work force can we serve well. Only so long as we can achieve good earnings can we continue to enhance our capability to serve better . . . .

*Testimony before the Federal Communications Commission, June 7, 1966*

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In the business I am in, I can assure you it is not the earnings we have produced that I dwell on in retrospect, it is the service provided, the contribution made by improving and expanding communications to all economic and social life. And if my associates and I have to give close attention to the problem of producing earnings today and tomorrow, this is not because we look at profit as an end in itself, but because profit provides us the essential material means to an end which is to serve the future.

Any business, any industry, just like any government and any school, not only can succeed — it can also decay. It can fail utterly. Every institution can fall to pieces. And in the last analysis, that is the great challenge to all management. For we can only prevent decay by generating new drives to the future. We can only avoid falling back by moving ahead . . . .

*46th Grand Conclave, Kappa Sigma Fraternity, Atlanta, Georgia—September 2, 1967*

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The social problems we now face, the crisis of the cities, the need for better education—these demand understanding, yes, they demand goodwill, yes, but above and beyond these essentials they urgently demand action.

. . . The action required must involve all elements in community and nation. It cannot be shunted onto government departments and ad hoc government organizations. Responsibility cannot be shifted from one section of the body politic to another . . . .

I think it is absolutely essential that we in business make this effort a success, for there is no question that the good health and growth and creative vitality of private enterprise depend on the soundness and health of developing urban life . . . .

We must each of us appraise what we are best fitted to do and then prepare ourselves. Intelligent selection and solid preparation — these I would say are the essential precursors to effective action.

We are, however, the largest employers in the nation, outside of government, and in the course of employing and training several million people through the years we have begun to learn something ourselves about problems in education.

Hence it is in these specific areas of education and employment that we believe we can make our own effort most useful . . . .

*Brotherhood Dinner, National Conference of Christians and Jews, Denver, Colorado—December 6, 1967*

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Business teaches a stern lesson: the consequence of attempting too much, like the consequence of doing too little, is failure. Finding what is right is an arduous process of matching needs with resources, of rigorously assigning priorities that distinguish between what must be done, what can be done and what had best be scheduled for tomorrow.

The lesson applies as well on the scale of our society. Youth, I know, is impatient of delays. But the promptings of the most urgent social conscience provide no warrant for abdicating what is the hardest duty of the responsible citizen, distinguishing between what we wish for and what we can reasonably achieve.

*Commencement Address at University of Tennessee, Knoxville, Tennessee—June 9, 1968*

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Today's world, stubbornly complex as it is and growing more so, will exact a hard discipline from those who seriously hope to have a hand in changing it. In short, it will take competence.

What satisfactions will derive from accepting the challenge of acquiring that competence will not include the satisfactions of self-dramatization.

Those . . . who do accept that challenge will be in fact the true revolutionaries — with a better warrant to that term than those (among the young) who have appropriated it for themselves . . . .

*Commencement Address, University of Georgia—June 7, 1969*

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Is there room in The Establishment —in my own business, for example— for adventure? If I say, yes there is, I must also remind myself that we have a continuing obligation to ask ourselves, is there room enough? We must and we do because our future depends in the final analysis on an asset that appears nowhere on our balance sheet, the innovative capacity of our people, their ability to sense and respond to society's new demands, their ability not merely to react to change but to lead it.

*Ibid*

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No matter how talented and innovative our engineers and scientists, no matter how much efficiency and know-how we exhibit in our production processes, and no matter how many dollars we pour into construction programs — it is our consideration for the individual customer—his needs, his desires, his right to be treated courteously — that will count for most in the long run. It is *his* opinion of *us*, not *our* opinion of *ourselves*, that will determine our success or failure.

*44th General Assembly, Telephone Pioneers of America, Minneapolis, Minnesota—September 23, 1969*

American Telephone and Telegraph Company
195 Broadway, New York, N.Y. 10007

May/June 1970

# BELL

telephone magazine

**Youth isn't educated to work.**
**Youth doesn't need to work.**
**Which is it?**

# Bombs, Business and Reasonable Men

Several years ago, when black citizens started following Dr. King and others into the fronts of public buses and into better public schools in the South, one's neighbors were fond of saying, in the North, "I've always been for Colored People, but now, with all these demands, I'm turning against them." One who did not say that was the president of Western Electric. Instead, he went to Washington as one of the first U.S. industrialists to endorse President Kennedy's Plans for Progress, which committed a business to equality in hiring people. Asked to comment then on his vanguard role, the president of Western Electric said, simply, "because it's right."

Today there are newer and probably equally urgent social forces demanding accountability from business and industry. As some 3,000 outraged


youngsters screamed and scuffled with mounted police outside the convention hall at AT&T's annual meeting in Cleveland, the same former Western Electric president talked of defense contracts, pollution control and consumerism with the same head-on earnestness he'd brought years earlier to the effort for equality in employment. He skirted no edges, passed no bucks. He didn't have to. "These issues," he said, "will test our capacity to govern ourselves and to live together as reasonable men." And he spoke, with the conviction of one who was there when it started, about jobs and minorities.

### Even More Punch

Ten years ago nonwhite employment in Bell companies totaled 29,000, he said, and today there are 100,000 nonwhite people in this business. Of 311,000 people hired last year, 22 per cent were black. Said the former Western Electric president, "We have committed ourselves to do our part in the nation's effort to overcome the effects of generations of discrimination and hopelessness. . . ."

It sounded like his same old line, and it was. And it carried even more punch. For one thing, the promise has been and is being kept. For another, the former president of Western Electric, who had signed for one company when he helped launch the Plans for Progress, now talked for many, because in Cleveland he spoke as chairman and president of AT&T, representing *one million* Bell System employees.

### A Feeling for the People

This business has been fortunate to have had during the last crucial decade, and to have now in its top mix, an ample representation of manager-humanists—men who, together with imposing credentials in such fields as finance, engineering

and operations, have in their b
a feeling for "the people." (Th
to suggest that there is a Bell S
officer out there somewhere v
doesn't like people. If there is,
it for us to discuss it here!) We
talking about those men whos
human interests transcend the
legendary and genuine conce
managers in this business to se
communications public. Man
humanists are, in addition, rec
people who are sometimes hu
or hairier, or less organized or
or younger than we are, and v
are collectively more controv
than, say, the Telephone Pion
manager-humanists are men
while they have a warm place
Pioneering, also think the bla
young, the critical academici
different-than-we-are people
expressing ideas we ought to

Because of such men, and
over the protests of other goo
with other good jobs, this bu
frequently has responded qu
other, smaller, seemingly mo
businesses to the social force

re prodding and pressing for
wers. How many firms, large or
ll, have a group akin to AT&T's
president-led Environmental
irs division, or the broader and
er Human Affairs organization,
ded by an executive vice president?
creation of such departments
his corporation, if not quite the
ver to all problems everywhere,
ns at least a more rational and
eful move than techniques being
loyed today by some of those who
ld bring the "power structure"
s knees.

### easingly Tragic Results

stunningly beautiful city of Seattle,
nstance, has suffered more than
ombings and countless bomb
es since the start of 1970. Not all
e bombs have been directed
nst the city's bankers and brokers
businessmen, but most of them
. In a mounting number of
us communities around the
try, bottle throwing and property
ruction seem to have replaced
sh and math as basic curricula,
increasingly tragic results.
cause we, personally, are essen-
a live-and-let-live sort of being,
aybe because we are just too
y-washy to have worked up a
vengeance over the rambunc-
ness of youth, we have tended to
the under-30 offense and the
-30 defense with about equal
unts of empathy over the last few
. Similarly, our own earlier
nal reaction to the blacks'
paign for seats in restaurants
"it's about time."
day, however, we reluctantly
as yet only intermittently) find
elves feeling, "I've always been
e kids, but now, with all the
nce. . . ." It's a disturbing shift of
tion to admit. But parts of bodies
; out of a Greenwich Village

*nued on inside back cover)*


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# FROM SCHOOL TO WORK

## by August C. Bolino

Persistently high unemployment rates for American youth have cast doubt on the adequacy of those institutions which are supposed to make easy the transition from school to work. In spite of the creation of a number of Federal education and training programs, unemployment rates for teen-age youth have remained at unsatisfactorily high levels throughout a long period of sustained economic growth. It appears they will continue to rise as current anti-inflationary policies slow economic activity generally.

These trends are paradoxical. The United States keeps more persons in school longer than any other nation, yet unemployment rates among our youth are much higher than in any other industrial nation.

The President's Advisory Council on Vocational Education in its 1968 report, "The Bridge Between Man and His Work," stated, "In a world where the distance between the experiences of childhood, adolescence, and adulthood and between school and work continually widens, the school must reach forward to assist the student across the gaps just as the labor market institutions must reach back to assist in the transition. It is not enough to dump the school leaver into a labor market pool. The school along with the rest of society must provide them a ladder, and perhaps help them to climb it." A number of related changes have caused this widening of the gap between school and work.

Technological change has created a rising demand for employees with relatively higher levels of education and skill and has correspondingly diminished employment opportunities for the unskilled in the U.S. Recently, ours has become the only major nation in the world which has more persons engaged in service-producing than goods-producing industries

*Mr. Bolino, an Associate Professor of Economics at Catholic University, Washington, D.C., is an authority on manpower problems. He has held key personnel posts in both government and industry.*

## The Bell System and the Schools

*The Bell System has long been involved in public education.*

*Traditionally, this involvement has had four basic objectives: (1) to help recruit new employees; (2) to create goodwill among teachers, students, administrators, politicians and the public; (3) to assist in special subjects by providing teaching aids requested by educators; (4) to foster proper telephone usage.*

*Traditionally, these objectives were—and still are—met by a variety of activities such as teletraining programs, aid high school science, films, book speakers and demonstrations, contr tions of money and equipment, w study programs and the sponsorin vocational courses.*

*A few years ago the Bell System be a new kind of involvement: a com*

and in white-collar than in blue-collar occupations. As a result, we have manpower shortages in occupational categories which require a great amount of education and training.

Unqualified young persons who look for jobs are victims of what Professor Charles Killingsworth of Michigan State University calls a "twist" in employment patterns. Automation, technological change and changing tastes, he says, have twisted the demand for labor from the nontechnical to the technical. This means that the poor, who are uneducated, are in a bind. In the past, they might have worked themselves up the occupational ladder by doing unskilled labor; today, much of this work is mechanized.

There will be no reversal of this trend toward a more technically oriented society in the United States. Future requirements in the service-producing sector (trade, finance, government, transportation and utilities) will show the most rapid gains in employment in 1975 and 1980. Shortages will continue in administrative, technical service, medical, manufacturing and construction occupations. For most of these jobs, employers are demanding (and getting) persons with education beyond high school.

Professor Killingsworth states that we must increase educational levels to reduce unemployment caused by this twist.

### "Vocational education still appears to suffer most in quantity and quality . . . ."

The declared purpose of the Vocational Education Act of 1963 was to provide persons of all ages with ready access to high-quality vocational training or retraining which would enhance their opportunities for gainful employment, and which would be suited to their needs, interest and ability. The second main objective of the Act was to offer more education for youth with special needs.

Five years after the Act's passage, the Advisory Council on Vocational Education could still say that "vocational education still appears to suffer most in quantity and quality for those who need it most." It attributed the deficient vocational offerings of suburban high schools to the mistaken assumption that all students will pursue a four-year college degree. It stressed that existing vocational systems largely ignored the needs of women and of persons with "academic, socioeconomic and other handicaps." These findings continue to hold true today.

### "Long-range, fundamental reforms are necessary if public schools are to succeed . . . ."

Elementary and secondary schools in the United States need to be reorganized to create a curriculum in which vocational and academic education are linked organically and reinforce each other. Some authorities have proposed that occupational education should be a part of the schooling of all students. They stress, correctly, that occupational orientation should be provided at the earliest possible time in a child's formal education. This will require a sharp break with traditional educational patterns.

Marvin Feldman of the Ford Foundation has said, ". . . vocational education is not a separate discipline and cannot be treated in the same way we approach mathematics, English or the physical sciences. It is, rather, an approach to the disciplines and the learning process which, properly used, could reconstruct the American educational system for greater relevance of general education and a renascence of liberal-arts studies."

U. S. Commissioner of Education James Allen says long-range, fundamental reforms are necessary if public schools are to succeed in their greatest tasks, especially in the teaching of urban youth. He favors tailoring instruction in the central city to the student, not to the school. This might mean that some pupils would spend as many as 10 or 12 hours a day in school, rather than the conventional six, while others might be assigned to a work program outside of the

*ment to help advance urban education. In making this commitment, it established some new educational objectives:*
*1. To motivate young people to remain in school.*
*2. To provide orientation to the business world.*
*3. To help students upgrade scholastic and related skills.*
*4. To help school systems in the development and enrichment of curricula.*
*5. To support legislation designed to provide aid to urban education.*

*After the summer riots of 1967 the Bell System entered into a brand-new kind of relationship with public education when Michigan Bell became a "partner" of the Detroit Board of Education in the operation of Northern High School. Michigan Bell's lead was followed a month later by Chrysler Corporation when it entered a*

school for most of the day. Still others might pursue independent study in libraries, museums or elsewhere and report to a school only two or three hours a week.

## "Vocational schools are still the dumping ground for unwanted pupils . . . ."

But change comes hard in education, as witnessed by New York City's great difficulties in high school reorganization. In 1965, the New York City Board of Education decided to combine academic and vocational studies in comprehensive high schools that would "improve education and enhance integration." Vocational educators opposed the comprehensive schools as a watering down and fragmentation of occupational education. Proponents of the comprehensive high schools charge that vocational schools are still the dumping ground for unwanted pupils. They point out that five years ago, when the combined plan was proposed, blacks and Puerto Ricans made up 48 per cent of the enrollment in vocational schools, whereas today they make up over 60 per cent of the enrollment.

In addition, there is an economic aspect which is largely ignored: the per-pupil cost of vocational schools is considerably higher than that of academic schools. For 1967 the figures for New York City were $1,766 compared with $1,164. The proponents of change contend there is no justification for this spread in costs because the vocational system is *not* meeting the needs of disadvantaged students.

Vocational education is passed up by increasing numbers of students because a college degree has become the most acceptable way to a white-collar occupation—which most students' parents desire if not the youngsters themselves. Adding force to this thrust is the fact that there are now many more ways of financing a college education than formerly, including numerous private and Federal scholarships.

Many young people are misled into believing that college is the only way to be a success. High school students are not being told of job opportunities that are available to properly educated men and women who have no college degree. As a result, private industry spends very large sums of money on training programs that teach aspects of work that could and should be taught in the schools. Some businessmen blame the failure of the schools to teach vocational aspects of life on poor communications between educators and industrial firms. Some businessmen claim that school guidance counselors are left unprepared by their own college experience to discuss the world of work as it really is in industry and, therefore, channel students indiscriminately into college.

## "Too many students fall victim to a 'white-collar complex'. . . ."

More and better counseling is required to properly bridge the school-work gap. Eighty per cent of school dropouts have never had any job counseling; only 56 per cent of high school graduates have. There are no counselors in 13 per cent of the nation's secondary schools and only one state—Massachusetts—meets the U. S. Office of Education standard of one counselor to every 300 students.

It is estimated that as many as 80 per cent of today's high school sophomores are uncertain about what courses they should choose in their last two years of high school. When they arrive at this juncture, it is often late to select a straight vocational program at a technical school. Left to their own devices, too many students fall victim to a "white-collar complex" that allows them to set entirely unrealistic job goals for themselves. Poor students, two or three grades below national achievement levels, invariably propose that they would like to be pediatricians or lawyers. When this happens, we are left with no other possible verdict than that they received either very poor counseling or no counseling at all.

There are many sources of better counseling. Some educators suggest that teachers be trained to give elementary job guidance. Others claim that parents, provided with adequate job information, can best

*partnership with another Detroit high school. Shortly thereafter, the Wisconsin Telephone Company and Illinois Bell established similar relationships.*

*Since then new partnerships have been springing up all across the nation. Many of these involve corporations outside the Bell System, but at least 19 partnerships have been initiated by Bell affiliates.*

*There are sound business reasons for this kind of involvement. Urban schools are a prime source of employees. In the next decade the Bell System will hire nearly 2 million people—about half of them the products of big city high sch*

*Business has a big economic int in schools. At present tax rates, more half a billion dollars a year of Bell Sy taxes go to the support of public ed tion below college level.*

communicate it to their children. For this approach to work, it would be necessary to convince parents that life as a good auto mechanic is more satisfying than life as a frustrated engineer.

## "Employment need not be related directly to the field of study."

Since the 1950s, many educators have realized that high school education along traditional lines has little value for several groups of students. For those with no interest or no ability in higher education, college preparatory courses are confusing and irrelevant. For those not of the middle class, middle-class norms and white-collar values can be strange and boring. For some, education is expensive and they would rather be earning income to assist family maintenance.

The work-study program of the Vocational Education Act of 1963 aids some of the above students. It is essentially a program of financial assistance for needy vocational students aged 15 to 20 years. Employment of up to 15 hours a week is provided after school hours, generally in some public agency. The employment *need not* be related directly to the field of study. Federal funds (up to 80 per cent) are used to compensate the states that employ these students in order to keep them in school. These funds are available for secondary and post-secondary students, if they are in an occupational curriculum and not working toward a baccalaureate degree. The schools counsel and advise the students of their options.

Ideally, vocational education should combine formal instruction with learning on the job. Cooperative education provides such a combination by extending vocational instruction into job-related employment. Students alternate between school and work. This alternation can be daily, with students in class one half day and on the job the other half, or it can be blocked, with the students in school for a solid week or a solid quarter and then on the job for an equal time in successive periods.

Cooperative education students must receive the minimum wage, although they may receive only 75 per cent of the minimum for any period in which they work under a learner's permit, a U.S. Labor Department device which takes into account the extended training required for the physically handicapped. Students generally do not combine work and study in excess of 40 hours a week; in most cases they work 28 hours a week—20 hours a week from Monday to Friday and eight hours on Saturday. Employers participating in this program pay the students' wages, but Federal funds (up to 100 per cent) are available to reimburse them for any *added* training costs incurred because the students' productivity is low.

## "The part-time cooperative education plan is undoubtedly one of the best in the field. . . ."

First applied to collegiate engineering, cooperative education has been adapted to high school vocational programs with some success. Inexplicably, it has rarely been used in junior colleges, although they appear to offer excellent opportunities for this program.

The part-time cooperative education plan is undoubtedly one of the best in the field of vocational education. It yields high placement records, high employment stability and high job satisfaction. It trains students very quickly and is popular with them. It may be too popular. Many more students apply than can be accepted in these cooperative plans. For this reason the Federal government is providing grants to encourage school and college administrators, businessmen and educators to increase their participation in cooperative education.

Cooperative education has been especially successful in the field of retailing because stores have always hired part-time workers for peak periods such as the Christmas shopping season, but manpower directors of leading corporations are coming to see its advantages. It gives their personnel departments a far better opportunity to study and assess students and helps build up a pool of prospective workers who are

*All businesses, including the Bell System, are interested in getting a better educated job applicant. There is growing evidence that it will take more and more time, money and manpower to train new employees because graduates of urban high schools are deficient in reading, writing and arithmetic.*

*So far, few signs of innovation have been seen within the partnership movement. Some partnerships are old relationships with new labels. Small work-study projects and other traditional forms of industry-education cooperation seem to prevail. But most of the partnerships are new and they may provide an atmosphere in which genuine innovation will occur.*

*Whatever the approach—and it varies from company to company—all partnerships have the same end in view: to help students understand the direct relationship between what happens to them in school and what will happen to them when they enter the world of business.*

knowledgeable about their companies before they commit themselves to full-time work.

A number of corporations have discovered that by opening up their own schools they can provide additional educational opportunities to youths, increase specialized manpower supplies *and make a profit* in so doing. In the last decade many industrial giants either absorbed existing vocational-technical schools or opened new ones. For example, Crowell Collier and Macmillan earns about 20 per cent of its profits from schools such as the La Salle Extension University, Berlitz Language Schools and the Katharine Gibbs Schools. International Telephone and Telegraph Corporation entered the education industry in 1966 when it acquired Howard W. Sams, Inc., a publishing company in Indianapolis. Many conglomerates have made similar acquisitions. ITT now has 33 schools that train students in technical fields, business, trade and fashion. U. S. Industries began its school business a few years ago by acquiring two secretarial schools in California—has operated profitably with these schools—and is investing in new facilities to meet demand.

## "We must learn to design programs without regard for administrative conveniences. . . ."

Another suggestion for easing a youngster's transition from classroom to job would be to place the secondary schools on a year-round schedule, thereby enabling them to graduate classes three or four times per year. This would eliminate the job crush in June and would relieve the U.S. Employment Offices of the nearly impossible task of placing thousands of would-be workers in a few weeks. One official of the U. S. Office of Education has said, "We must learn to design programs without regard for the conventional administrative (but not educational) conveniences of quarters, semesters, six-week or nine-week terms, Carnegie units and quarter-hour and semester-hour formulas. We must learn to design differentiated curricula so that persons may exit at any time for employment or may progress to advanced school work without regard for the school calendar or the college catalogue."

The United States Chamber of Commerce has suggested that one of the ways to lower barriers for first employment of youth would be to authorize special wage scales for inexperienced persons. Differentials between youth and adult wages are common in Europe, where they have been used for many years. In Belgium, for instance, collective bargaining agreements provide for lower wages for persons under 21 years of age. The wages vary according to age, sex, skill, industry and cost of living.

## "Subsidies would be paid only to employers who provide new jobs."

The Chamber of Commerce also recommends an outright payroll assistance payment to employers who provide new jobs for unskilled young people at the stated Federal minimum wage. The Chamber reasons that many persons are not hired at the minimum wage because they are not worth that wage in terms of their productivity. The subsidies would be paid only to employers who provide *new* jobs. No subsidy would be paid to employers who would hire youths to replace or compete with labor now employed at minimum wage rates.

According to the Chamber, the plan would be relatively inexpensive, especially if compared with relief or welfare costs. For example, if a subsidy of 50 cents per hour was granted to a million teen-agers who worked a 40 hour week, the total bill would be $1 billion annually, but a portion of this would be returned to the nation in income tax receipts. There already exists some precedent for such an idea in the sheltered workshops and learner's permits for the handicapped. Labor unions, however, are very much against this type of subsidy. As one union executive said in closed hearings of the U.S. Civil Rights Commission, "We can't see spending 100 years putting a floor on wages and then having a bunch of social workers blithely tear it down." ☐

# Poverty and Plenty

## Young Americans at Work and Elsewhere

by Edwin Harwood

Al Smith, some of us may remember, did very well for himself in the politics of New York State 50 years ago despite a childhood of great poverty.

Al Smith had to abandon his studies at 12, when his father died. He had contributed what he earned as a newsboy to his family even before his father's death. Now he had to work in earnest, in a man's job, if such could be found. By his midteens he was helping to support his mother as a laborer in an oil factory at $8 a week. Then he found a job in New York's Fulton Fish Market. The 12-hour workday started at 4 A.M. and paid $12 a week.

Al Smith was an atypical lad. He made it to the top in a field that was every bit as competitive and individualistic as the business enterprise of that era. But his experience as a teen-ager was common. Family tragedies like his own forced many teen-agers to take over part or all of the burden of supporting parents and younger brothers and sisters, before they could establish their own households. The motive for hard work at a tender age was not a soul-straightening Protestant Ethic. Al Smith was no Protestant. Instead, it was simple economic necessity that, building on the affection most boys felt for their families, called conscience to duty as an accessory.

Many blue-collar workers earned too little in the best of times to provide adequately for their families. Workers fell ill more frequently and more seriously than today. Unemployment and disability insurance did not exist, nor for that matter did Social Security, or company pension and hospitalization plans. Add the fact that many parents died before their youngest children matured and we have all we need to complete the picture: 19th-century poverty, though it ruined many families beyond repair, nonetheless muscled many boys into an early manhood.

This comes out clearly in an investigation of child labor reported by the Bureau of Labor in 1904. In that study, youths over 16 were found contributing their earnings to their families in a majority of the families with working children. Indeed, young men

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*Mr. Harwood, an Assistant Professor of Anthropology and Sociology at Rice University, Houston, Texas, says he is probably the only sociology graduate of the University of Chicago who entered a liberal and left a confirmed conservative. Research for his Ph.D. and work with the Youth Corps got him interested in the economic adjustment of young people.*

old enough to be voters were often still supporting their parents and younger siblings. The report goes on to point out that though child labor laws existed in many states, age restrictions could be waived for very young children under 12 if they had to work to support a widowed mother or disabled father.

## No Soft Sentiments

In textile factories, these children worked 55 to 60 hours a week for three to five dollars a week. In New York City, many of the youngsters employed by the telegraph and messenger services were under 14. They worked 10 hours a day, six days a week. Newsboys in New York reported to the circulation bosses on Park Row at 4 P.M. for a 14-hour day that netted three dollars a week. Those orphaned or abandoned—as many educated people assumed, by parents who had fallen victim to the grogshops—could pay six cents a day for room and board at the Newsboys' Lodging House. Others were shipped by the Children's Aid Society to Western farmers who worked them from sunup to sundown.

The tough times did not give rise to soft sentiments. Elite opinion was heavily conservative. Many educated people believed the poor remained poor because of individual moral and biological failings: sloth, drunkenness or inherited defects. The idea that society was deficient in certain respects, that public health, welfare and educational facilities were inadequate, or jobs lacking, or that many jobs did not pay enough to support a satisfactory standard of living for working families hardly registered on the social conscience of that era.

Perhaps we should say these conditions could not be allowed to matter to the 19th-century social conscience, because government lacked the wherewithal to act on them. To have proclaimed a War on Poverty then with the resources available to government at the time would have been dangerous folly. Only our economy's rising industrial productivity over the years could ameliorate the poverty of many urban working-class families, and this could only be an achievement of business, not government.

Of course we all know things are better today. Those who have drawn our attention to the problems of urban poverty in the last decade—joblessness, slum housing, rats, roaches and other urban ills—cannot deny the evidence of great economic progress since Al Smith's time, nor have very many done so. On the other hand, those who have helped to turn elite or "establishment" thinking in the direction of greater social concern—and I include not just the sociologists and free-lance militants in the Poverty War's praetorian guard but influential business and political leaders as well—failed in their diagnosis of some of our problems. Let us consider youth "joblessness," as it came to be called. Young adults, it was argued, were unemployed in large numbers during the past decade for reasons of poverty and the lack of jobs.

## Riots Better Than Letters

However, the facts say something else. First, we had very high rates of teen-age "joblessness" and no small trouble with youth during the 1960s. But consider: as business picked up rapidly in the 1960s, the nation had less joblessness and more money to spend on more goods than at any previous time in its history. Unemployment dropped as dramatically among black men as it did among whites, and the younger and better-educated blacks were advancing into jobs of which their parents never dreamed. More young people were going to school and staying longer, at a time when part-time jobs, the very jobs youths in school seek, had a faster rate of growth than full-time jobs, though the latter also grew rapidly. Despite this prosperity,society had to put up with much gaff and destructive behavior from young people.

Many a businessman, hard pressed for workers, could well wonder where young people got the time and money both to stay out of the labor force and raise a ruckus in the streets. Our newscasters believed they were "telling it like it is" when they kept inform-

ing us that ghetto youths were becoming restive because of joblessness. They added what seemed at the time a sophisticated but was in fact a dangerous item: that street rioting might well serve for the poor the same function letters to congressmen serve for middle-class Americans.

The statistics appeared to support their view of this particular urban problem. During the 1960s, teen-age unemployment increased despite the dramatic decline in the rate for the U.S. as a whole Among teen-agers 16 to 19 years old in the labor force in 1969, almost 13 per cent were unemployed. This was four times the national unemployment rate. Teen-agers in big city neighborhoods where, according to Bureau of Labor statistics, poverty was most concentrated, experienced much higher unemployment. A survey of six large metropolitan areas during 1968-69 showed teen-age unemployment ranging from 25 per cent in the ghetto neighborhoods of New York to 36 per cent in Detroit's low-income districts.


Crash government programs that would provide youths subsidized jobs and training—the Neighborhood Youth Corps and Job Corps were the most important—seemed fully justified.

## Statistics Are Deceiving

But the question remains: how many youths desperately need jobs and the cash that jobs provide, but are unable to find work? We know that many young people do not seriously seek jobs in the same way adult household heads do. Take the case of a young man still in school who wants a part-time job compatible with his classroom hours and accessible from the standpoint of travel time. If he does not find a job meeting his special conditions, he will be counted unemployed if the canvasser knocks on his door during one of the surveys carried out by the Current Population Survey every month in 50,000 U.S. households. Failing to get the right part-time job, he continues to live with his folks and go to school. He just puts off buying the accessories he wants for his car.

An unemployed man with a family to support is a very different matter. Yet the Bureau of Labor Statistics makes no distinction between the two sorts of unemployment. Edward Kalachek, a labor economist, says that youths had no more difficulty getting jobs than adults in the sixties. Their higher unemployment actually reflected their higher rates both of initial entry and of reentry into the labor force, which was three times that of adult workers. Mr. Kalachek notes:

"Youths, who in earlier periods would have entered the labor market on a full-time basis in their mid-teens, were now likely to enter and reenter several times during their school careers, each time running the risk of exposure to unemployment."

Another labor force expert, Hugh Folk, tells us that if the new entrants and reentrants were excluded from the teen-age head count, the unemployment rate of the "permanent" youth labor force would be much closer to the national rate. A simple analogy illustrates the point. Consider the behavior of adults

and children occupying seats on a passenger train. The children get restless and move frequently about the car, first occupying one seat and then another. The adults remain fixed to the seats they took when they boarded. At any given time the conductor is apt to find more children than adults out of the seats and in the aisles, not because of insufficient accommodations but because the children are hopping about to find a better vantage point, satisfy their curiosity about what's down the aisle, or make a new friend.

Representative of today's teen-ager out of work is the boy who leaves his job at the gas station because friends lure him off on a long weekend to the beach. He returns home, scouts around for a new job and is unemployed in the interval.

## Jobs Not That Important

Since his parents provide him with room and board in any case, his search is casual. After all, he works only to earn money for "extras." His former boss would prefer not to hire him back because experience convinces the boss that youths are unsteady workers. But the city's tight labor market gives no choice. Older married men cannot afford to work for the $1.75 an hour the boss can afford to pay. This boy's work discipline is lax *because he is under no compelling need to make a serious commitment to the labor force. He does not support a family.*

I believe this is the *typical* unemployed youth even among the poor. He has been liberated by our society's greatly increased living standard to come and go between jobs, school, and street corner associations as he chooses. A great number of such youths behaving in the same way helps account for the high rate of youth "joblessness."

While I was researching Houston's Neighborhood Youth Corps, a program that provided jobs and cash to needy youngsters, the counseling staff complained about boys who had just "taken off" from work because a friend needed help fixing up a hot rod or "the gang" had decided to take a joy ride to visit friends in a neighboring state. Such behavior hardly convinced me that their poverty was of the kind prevalent in Al Smith's day. Many boys frankly told the counselors they could make more money in a job they'd heard about in the private sector and were dropping out of the program for that reason.

## Just Enough to Get By

My findings were not unique. In other cities social scientists who researched the Neighborhood Youth Corps also found participants absent from the programs. Their conclusions were similar to my own: boys who *wanted* steady work could find jobs paying more than the work training programs subsidized by the Federal Government. Many apparently only needed enough cash to "get by," and had no compelling reason for a full-time job.

What is the difference between the job situation faced by teen-agers 100 years ago and those of our present time? We know that 70 years ago most marriages were ended by the death of one partner *before* the marriage of their last child, while today most parents can continue to support not only themselves but their adolescent children as well. This silent social revolution is significant because it means that more youths can simultaneously study longer and enjoy more leisure, and when they work they can spend much of what they earn on themselves.

Even though those youth we call "low-income" have not yet graduated to such expensive pastimes as surfing, sky-diving or skiing, they *are able* to find both the time and the money for hot rodding, car accessories, transistor radios, rock and soul concerts and a multitude of other youth-directed consumer goods and services. They have these things because we are richer and healthier as a nation. More parents are still self-supporting when their children reach adolescence. Even among those parents who are dependent, the main burden of their welfare falls increasingly on the state rather than on their children. When today's young person establishes *his* own

family, he finally makes the serious commitment to a full-time job.

The sharp drop in the unemployment of young adults by their midtwenties, even in urban poverty neighborhoods, suggests that the above interpretation of teen-age "joblessness" is a reasonable one, and that lack of jobs is not. It suggests that poverty warriors in the 1960s should have heeded the complaints of many businessmen, who had their ears as close to the ground as anyone else. Business needed but often couldn't find enough young workers in the tight labor markets of their cities.

## Efforts Well Meant

All the many government efforts of the last decade to eliminate unemployment were well meant, and no doubt some were fully justified by the circumstances. There were even some youths who had to leave school to support parents. Some proportion of those "jobless" ghetto youths really could not find full-time jobs even with much searching. And there were, of course, unemployed adult men caught in declining regions like Appalachia or in obsolete occupations, who needed jobs and new skills.

## Guilt Muddles Thinking

Yet, only our *mea culpas* over the poor and the minorities can explain tolerance for muddled thinking of the kind that caught my eye recently. One of the contributors to a collection of papers on unemployment had sought out minority youths to learn how they were faring in the prosperous sixties. When a 19-year-old told about his failure to get a gas station job, the writer asked the lad if he thought the color of his skin had anything to do with being rejected. The youth replied no, he suspected it was because of the ornamental ring he wore in one ear. Well, why didn't he get rid of the ring, the interviewer asked. To which the 19-year-old replied, "because the earring is me, man, that shows who I am."

The author gave this as an example of how "in the absence of an occupation, young people must seek other means of establishing their identity." Not only does the author's explanation reverse cause and effect here, but he seems totally unaware of the irresponsibility implicit in the youth's statement. If the young man had a desperate need to work we could hardly credit the excuse he gave.

Today we have the resources to help our disadvantaged youths to an extent not at all conceivable in Al Smith's day. But this does not justify trying to make a case for social action on a false premise—that youths we call poor today are jobless primarily for reasons of poverty, or circumstances similar to those faced by Al Smith and his peers, as the popular catchphrase "hard core" suggests. On the contrary, it is not the failure of our economy but its very success in creating more leisure, money and longevity, that explains the persistence of high levels of teen-age joblessness. □

Innovation is a "buzz-word" today. In both the popular and technical press we find with increasing frequency such topics as "What Is Innovation?," "The Impact of Innovation on Society," "How to Manage the Process of Innovation," "Innovation and the Money Market," and even "The Love-life of Innovators."

In all of these articles we are told *whether, when, where* and *how* to innovate, but little attention seems to have been paid to *what* to innovate. This important and intensely practical question is probably the most difficult of all to answer.

The manager of a technical enterprise who is trying to decide how to allocate his technical resources among various proposed projects finds himself confronted with an array of complex questions.

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Is it technically feasible? What will the development cost? Will people want it? Will it be socially desirable? In view of all these imponderables it is surprising that the rate of technical innovation remains so high.

Let us examine the tools and methods which the technical manager has to help him answer the question of *what* to innovate. He might start by asking a question: "where do new technical ideas come from?" The answer—from people. After all, every scientist, engineer, manager is a consumer. He is able to ask himself, "What would I like to have if it were possible technically?" The technical manager is given many suggestions by the marketing department, and even his friends, wife, and children. Out of these he must select a project which seems both desirable and technically feasible.

With this variety of subjective inputs the ability to objectively judge technical feasibility is perhaps the single most important talent an innovator needs. Every

# THE PRIORITIES OF INNOVATION

by George C. Dacey

prominent technical organization is flooded with "inventions" from would-be inventors.

One such invention reached my desk recently sounding something like this: "My invention is a telephone which displays the number you have dialed. It has a little window at the top of the telephone with numbers behind it. As you dial your number it comes up behind the window. Then, after you have made sure the number is right, you push a sort of little button down at the bottom of the telephone and the number is automatically dialed." The amazing thing is that the person who made the suggestion seriously thought he had made an invention. He had coped with the question *what* to innovate, but had no idea how to make the gadget work.

Other basic questions that must be answered about what to innovate are:

Is the product needed or desired? Is the basic science known? Can it be made economically?

For example, in 1877, a year after Bell invented the telephone, a picture depicting "see-the-person-while-you-talk"—a forerunner of Picturephone® service—was shown at the Paris World's Fair. Even then, the device was desired. It couldn't be made then, but could have been manufactured at high cost in the 1930s or '40s. It's only in the past few years that Picturephone service came into the realm of *technical* plus *economic* feasibility.

New products and services, however, are not the sole province in which to innovate. There are many existing products that can be made to do more and can be manufactured more cheaply.

Take the basic telephone handset. Over the past 70 years it has changed drastically in both function and design. This has been done to make it a better functioning instrument, make it more attractive looking or manufacture it at a more economical cost. Each was a result of innovation.

Sometimes the question of "what to innovate" is answered by the natural development of a new tech-

nology. A classic example is the transistor. In addition to its own success it has helped to stimulate the development of solid-state science, resulting in many additional devices. A departure from existing technology can also lead to innovation. The application at Bell Labs of transistor-like technology to magnetic materials instead of to semiconductors, for example, has led to a new technology called magnetic bubbles. A piece of magnetic material, one inch square by one-thousandth of an inch thick, may someday store a million bits of binary information for use in telephone switching equipment and computers.

Few innovations just happened, either in the "garage" lab or the highly sophisticated laboratory. They came about because they were *needed* and the innovator believed they *could* happen.

An example of need giving rise to innovation in transmission technology is millimeter waveguide. During the 1980s telephone transmission needs will be double what present facilities can offer. In the late 1930s, a group of Bell Labs scientists headed by George Southworth first found the answer.

These men started working with millimeter waveguide with the idea that someday it could be an economical and efficient method of transmitting communications. They periodically worked on their idea through the years. Only recently has the economics of the situation justified the full-scale development of this new communications system.

## Seeing the Need

The system focuses on a buried pipe about the size of a man's wrist which will someday carry a quarter of a million simultaneous telephone conversations. This system will help meet expected growth in long-distance calling and data communications service through the 1980s.

As this example shows, innovation can sometimes have a long "incubation" period. And what about the post 1980s? Today more than a hundred scientists and engineers at Bell Labs are working with lasers as a far-future communications medium.

Estimates of technical feasibility by an experienced engineer or technical manager may be highly reliable. Nevertheless, as in the case of the waveguide and laser examples, a large amount of development effort must frequently be committed before a feasible model is in hand. It is very desirable, therefore, to obtain an estimate of user acceptance of a product before committing substantial amounts of money and manpower to it. In recent years the field of user preference studies has grown to answer such questions.

For instance, in 1958, J. E. Karlin and his co-workers at Bell Laboratories developed a simulation laboratory called SIBYL—named after the sibylline oracles credited by the Romans with being able to foresee the future. An early use of SIBYL was to study user reaction to voice dialing.

## Human Being In the System

To make a call a user speaks the desired number into his telephone, whereupon a machine in the central office recognizes the desired digits and completes the call. A machine which can do this is even today beyond the state of technical art.

SIBYL was, however, able to simulate such a machine by using a human being in the system. An operator—acting like a machine—remained silent, listened to the number spoken and then dialed it with a speeded up finger dial.

A group of people used this "dialing machine" alternating between voice and finger dialing at weekly intervals. The system was used for some months until the people were no longer conscious of participating in an experiment. The group was questioned before and after the experiments. A poll of the group before the experiment showed that most preferred finger dialing to voice dialing, because of self-consciousness in talking to a machine.

Actual experience with voice-dialing revealed that the participants did not develop feelings of strangeness in talking to a machine. In fact, those who stuttered had much less difficulty communicating with what they thought to be a machine than with a live

operator. This is more evidence that stuttering is a social rather than a physiological phenomenon.

Another new tool in the user preference area is "Multidimensional scaling." Introduced by R. N. Sheppard and J. D. Carroll of Bell Labs, this method mathematically organizes such data as market surveys, customer polls and other service or product aspects to give it meaning. It appears that this may be a powerful technique in putting the analyses of large masses of subjective data on a more scientific basis.

The time comes, after the alternatives have been examined, the surveys and the analyses completed and the early technical feasibility established when a full-scale development must be launched. The questions now are: Did the project succeed? And should large-scale manufacture be initiated?

Where the new development is a replacement for an existing one, the economic criteria for success are usually apparent. The project was initiated in the first place because it promised to be cheaper, or less costly to maintain, or to have a longer life or some other economic advantage.

## Was It Worth It?

In those cases where a development represents something totally new, it is common in the Bell System to hold a "market trial" of a new product before committing it to large-scale manufacture. For example, in the case of the Trimline® dial-in-handset telephone, thousands of models were constructed in a pilot manufacturing line and introduced to service in two selected cities. The results showed that people from both average and affluent areas liked the telephone and were willing to buy it at a reasonable price. It was then possible to predict the probable usage of the phone on a nationwide basis.

I have been emphasizing so far the more quantitative and objective aspects of the decision whether or not to undertake a new project. These questions are difficult enough, but the social aspects are even more imponderable. When one attempts to face the question as to whether a new product or service will add to or detract from the quality of life or the environment, one rapidly becomes entangled in personal, political and social philosophies. I can, accordingly, only give my own viewpoint. In my opinion, the preferences of people, that is, the checks and balances of the marketplace—imperfect though these may be—are the best guide we have for social desirability.

## After Innovation, Then What?

In the first place, the social consequences of a new development are largely unpredictable. Henry Ford, when he was considering the mass production of automobiles, had no way of knowing the way in which life would be transformed by inexpensive, readily available automotive transportation. If he had thought about air pollution, traffic deaths and the like, he might have decided to give up the whole idea. On the other hand, had he foreseen the possibilities of suburban living, family vacation trips and the like, he might have been doubly enthusiastic.

The vast changes which the automobile has wrought upon our society have come about because people wanted automobiles and bought them in large quantities, and are still doing so. Society will evolve in desirable directions, in my opinion, provided that people are given a wide range of choice and the true facts about new developments to the extent that it is possible to know them.

Such a pluralistic approach, of course, is inefficient because, in order to have a wide range of choice, many projects must be offered and some will fail. Until our predictive powers are vastly better than they are today, however, I see no alternative. The planned society may represent an efficient use of human resources. If, however, the plan is wrong, or goes astray, we may have very efficiently manufactured a hell rather than a heaven.

We must have faith in the basic intelligence of human beings. If people are offered a wide range of choice and are informed about the potential side effects of new things, in my opinion they will choose wisely and well. ▢

# Who Gets Promoted?

**by Don Fyffe**

Who are the corporate promotables? Why are they promotable? What qualities do they possess? How high in the corporate structure can they rise with what qualities? Is promotability an accurate measurement of managerial ability? Or is it only a statistical measurement of personal advancement?

Promotability is the universal yardstick by which the value — real or assumed — of an individual to his company is measured. Most managers assume that promotability is based on such objective criteria as dedication, loyalty, technical knowledge and hard work. Yet if these are valid assumptions, how can we account for the opportunism so evident in many successful executives? Is self-interest a necessary ingredient for success? Should we consider the opportunistic group activities that exist in most organizations? Can we conclude that promotability is based on valid methods of measurement? These are some of the questions executives ask as they face the age-old problem of selecting employees for advancement.

When the various managerial approaches and personalities of typical executives are classified, their effectiveness can be objectively evaluated. Our analysis has produced five basic classifications of promotable managers.

We suggest that the reader evaluate his managerial personality by selecting the statement which is most descriptive of himself.

1. I think I owe my company my loyalty and best efforts. I believe my primary responsibility is to do the best possible job I can in the best interests of my company. I devote myself to hard work to ensure that my company's objectives are met.

2. I think I owe my company my loyalty and best efforts. I believe my primary responsibility is to lead my people in meeting our objectives, insisting that they meet them, and following up to see that we are successful. I devote my energies to obtaining or exceeding the results my company expects.

3. I think I owe my company my loyalty and best efforts. I believe my primary responsibility is in obtaining the best possible performance, and I've found that to do this you sometimes have to be just a little bit smarter and provide a little better leadership than others are capable of providing. I devote my energies to analyzing the opportunities in my company for outstanding contributions and leading my people to superior performance.

4. I think I owe my company my loyalty and best efforts. I believe my primary responsibility is in providing an environment that is conducive to cooperative effort and that will permit my people to meet company objectives. I devote my energies to leading my people through harmonious efforts to ensure that my company's objectives are met.

5. I think I owe my company my loyalty and best efforts. I believe my primary responsibility is in providing the leadership required to obtain the best possible performance through motivated people consistent with fair treatment. I devote my energies to constructive planning, development of managerial talent and guidance of my people.

## The Technician

Number One describes the Technician. He is company oriented and his approach is based on hard work, technical knowledge, experience and loyalty. He thinks in terms of what is good for the company. He is often found in the staff organization.

The Technician is common in all companies, and we might question whether an organization could

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HORIZONTAL CLIQUE
VERTICAL CLIQUE
PERIPHERY
MAGE
SOCIAL CLIQUE
ADOPTIVE NEPOTISM
executive
dictator
opportunist

operate effectively without these *workers*. Their efforts are usually directed toward work, often hard work, and they seldom attempt to develop themselves for promotability after employment, although college-graduate Technicians are common.

The term *Technician* is used as a personality type rather than as a definition of those people engaged in highly technical work such as chemistry or physics. Those so engaged may fall in any of the classifications.

The following comment illustrates the Technician's philosophy:

"I really dislike to see the way some people take advantage of the company, doing as little as they can. We're all in here to work; or we're supposed to be. I don't mind doing my share, but I think everybody else ought to, too. At least I don't have to back up to get my paycheck. I *earn* mine."

Probably his most significant trait is his general unwillingness to adapt himself to his organization's expectations or requirements for promotability. He does not attempt to adjust to the informal system of operations but usually prefers a straightforward and "by-the-book" approach. He normally has limited ambition and is unwilling to make the sacrifices required for promotability.

For these reasons the Technician is seldom found above the second level of line organizations and third-level operational staff assignments. Some Technicians reach the third level in staff organizations because of the need for stable, intelligent and highly skilled staff managers.

## The Dictator

Number Two is the Dictator. The Dictator steps on toes, is aggressive, drives his people, is interested only in production, may be inventive, shows initiative, and his image is of one who fights to win and, perhaps rightly or wrongly, wins. He stands on his results and may be credited with results not actually attained. People seldom want to work for him. However, he is often a successful manager.

The Dictator is interested in results, and his personal philosophy is directed almost entirely to obtaining the results expected or those he thinks are expected from higher management. He is ambitious and competitive and uses the results he obtains as a method of advancing in the organization.

The Dictator is sometimes prone to get results he knows are not in the best interests of his company, and in extreme cases he may be somewhat unconcerned about the methods. These results are, however, believed to be in his own best interests. He develops a reputation for action, for taking the initiative, which sometimes relieves his boss of the responsibility of personal involvement.

## The Opportunist

Number Three describes the Opportunist. He is usually intelligent and at least superficially personable. He is almost completely self-oriented, and results attained for the company are in his own best interest. In extreme examples, his ethics may be questionable. He is often quite adept and consequently promotable.

The Opportunist is found at the third and higher levels of management. He is in the lower levels, too, but is more difficult to detect there since his opportunism must be disguised if he is to survive. Those who display an appreciable amount of opportunism at the lower levels are usually separated from the company, both as a result of detection by higher management and by failure to get the desired results from their people, who tend to oppose their efforts. Consequently, the Opportunists who survive the lower levels are the more perceptive and able individuals. At the third and higher levels, the Opportunist usually progresses as rapidly as the Executives, Dictators and Noncontroversial Conformists.

The Opportunist's proclivity for self-perpetuation is evident in these comments:

"Bill has been in trouble off and on ever since he quit working for... (the Opportunist). He was held back a time or two, demoted once and almost fired the way I hear it. Then... (the Opportunist) comes back at a higher level and first thing you know Bill starts getting promoted again, bang, bang, bang, and

now he's the number two man. Figure that one out."

## The Noncontroversial Conformist

Number Four indicates a Noncontroversial Conformist. He is a friendly, likable, conforming, warm, intelligent, socially adept individual. He does not crusade for better management and often gets credit for abilities he doesn't always use or perhaps possess. He seldom sticks his neck out and consequently stays out of trouble. People normally like to work for him since he lets them produce. Therefore, he is usually successful as a manager. He is often highly promotable.

This classification is appropriate for a large percentage of upper-management people, especially in those large firms with less than total objectivity.

## The Executive

The manager who fits in the fifth classification is the Executive. His self-interest is constructive, and he is sincerely interested in the company. He is not a Dictator or Opportunist and may resemble a Noncontroversial Conformist except that he does something. He is the most successful and productive manager. He usually displays a flexible approach designed to meet the requirements of the specific conditions.

The Executive has a flexible leadership style. He considers the most appropriate managerial approach under given circumstances, the employees to whom it is directed, and appropriate timing. He relies on democratic methods but reserves the final decision for himself. He works through motivated people and promotes conditions that integrate high productivity and high morale through team action.

There are varying degrees of ability within any classification. For example, a Technician or a Dictator may be highly skilled or he may have lesser talents. A highly skilled Dictator may be more effective than an average Executive.

An Executive may act as a Dictator for a temporary period if the condition requires this approach. He will sometimes initially take a dictatorial approach when assigned to an operation requiring immediate correction. After correction, he reverts to more democratic methods.

Here are some factors affecting promotability:

PERCEPTIVITY The official or stated policy and the actual expectancy are often conflicting. Loyalty and hard work, for example, may be stated requirements, but opportunistic self-interest may be rewarded. Perceptive and ambitious managers adapt to the informal organizational expectancies.

THE PERSONAL IMAGE Showmanship is often essential. The image a person projects is often more important than his actual capabilities. It is the image, not the man, that is judged in terms of accomplishment and promotability.

HORIZONTAL AND VERTICAL CLIQUES In all companies, employees tend to form cliques both among peers and among managers at different levels. These meet social needs and further individual self-interest through group relationships. In companies with less than total objectivity, the promotability is much greater for clique members.

SOCIONEPOTISM Socionepotism is group oriented and contributes to promotability. It is directly related to opportunistic cliques since it is the interpersonal relationship of members which provides the impetus for nepotism. Members perpetuate themselves in their own image through selection of new members whom they have promoted.

ADOPTIVE NEPOTISM This usually involves individuals rather than groups and results from the natural inclination to assist one's friends. Self-perpetuation through adoptive nepotism may result from the selection and training of a replacement, in which case it is normally the individual's operational philosophy that is perpetuated.

Basic to promotability is a sound balance between self-interest and company interest. Ability, flexibility, the perception to determine actual corporate expectancies, and adaptability are the prime considerations of promotability—in any organization. ▢

# The Better To Grow On

The photographs on these two pages show some of the key people involved in corporate history's biggest financial venture. AT&T offered its 3.1 million owners 30-year debentures with warrants to purchase nearly 31.5 million shares of company stock. The goal: to raise over $1.5 billion dollars with which to build and improve communications facilities and services through 1970. A billion and a half dollars is a lot of money. It is more money, in fact, than 36 of the 50 state governments spend in a year.

By presenting 35 rights (one right for each AT&T share owned) and $100, a share owner received a $100 principal amount debenture, which has an interest

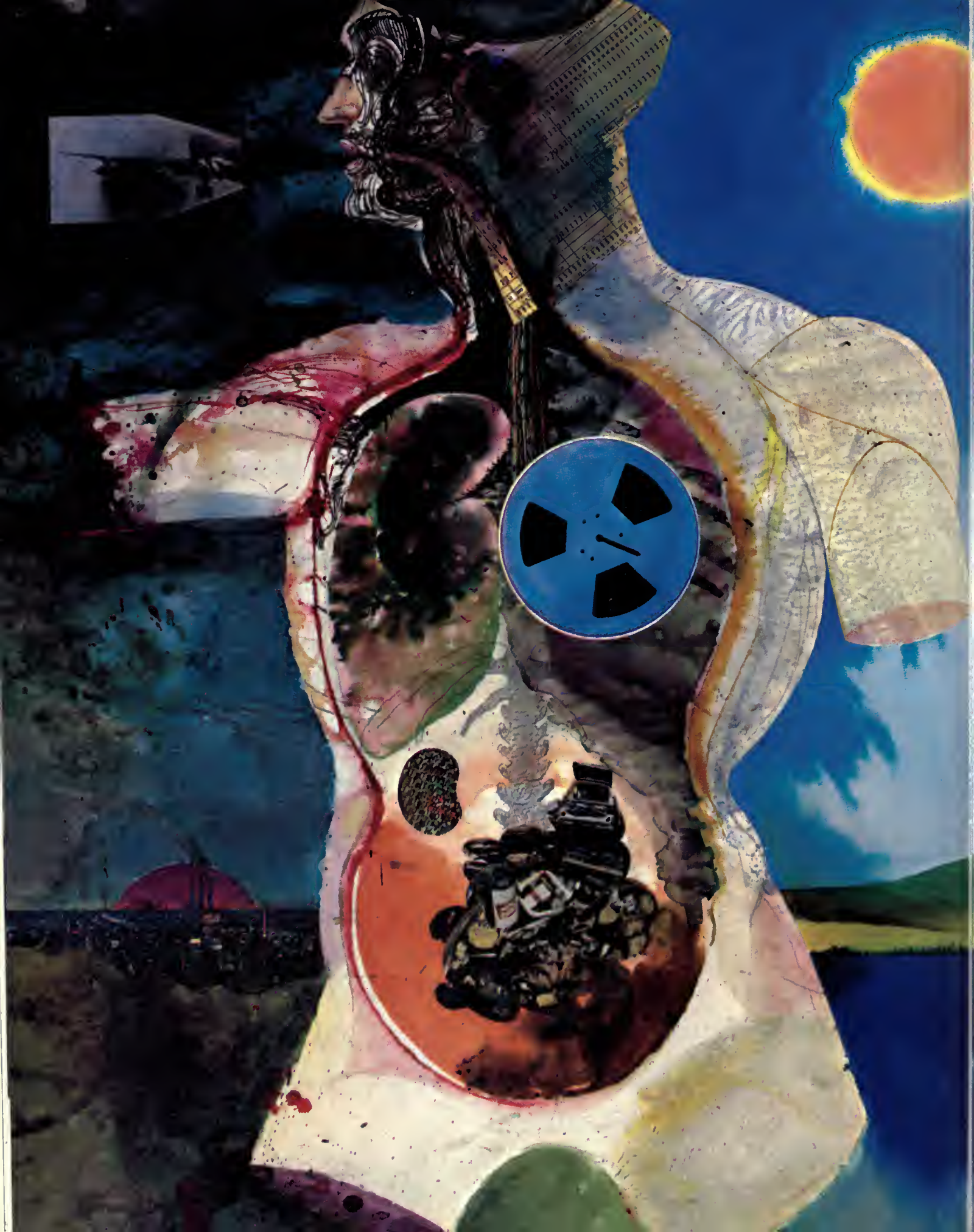
rate of 8¾ per cent. Each $100 debenture came with two warrants, each entitling the holder to purchase for $52 a common share of AT&T stock any time between Nov. 15, 1970 and May 15, 1975. The rights to purchase debentures expired May 18. As BTM went to press, indications were that subscriptions to the offering — about 50 per cent of which were by present share owners—totaled 98 per cent of the issue. The remaining two per cent was to go on sale at a later date.

The logistics and organization behind the offering were staggering. Some 4,000 people, both Bell and non-Bell, at 23 locations throughout the nation were involved in the preparation, processing of paperwork and the handling of share owner inquiries. Mailing costs for the 270 tons of material processed chiefly at AT&T's Raritan River Center in New Jersey came to about $1 million.

In addition, toll-free telephone information centers were set up in Chicago; Columbia, S.C.; Orlando, Fla.; Philadelphia; Boston; Sacramento; New York City; White Plains and Hempstead, N.Y.

A hub of activity during the offering was the AT&T headquarters lobby at 195 Broadway, New York (below), where share owners and those there to help them met to transact business.

In the left photo, three of those responsible for the massive financing operation accepted BTM's invitation to strike what the editors thought an appropriately symbolic pose at capitalism's crossroads—Broad near Wall Street. From the left, John J. Scanlon, AT&T Vice President and Treasurer; John D. deButts, AT&T Vice Chairman; and Robert N. Flint, AT&T Assistant Treasurer-Financial Division. In the background is the New York Stock Exchange, where the debentures, warrants and rights were traded. ▢

# A Booming Technology

# A Better Environment

# Can We Have Both?

by Morris Tanenbaum

Although, from a pedantic point of view, technological innovation began in the Stone Age, it is only in the past few hundred years that man has developed the ability to use technology to make major changes in his environment, and only in the last century that this control has gained global proportions.

Today there is little question that many of the dominant physical characteristics of the modern world are the direct result of technology. Thus, technological innovation is a major determinant of man's environment, and I use the term environment in its broadest sense, reflecting not only the physical sphere but the social, political and economic as well.

In addition, today the quality of our environment is a matter of increasing attention and concern in the public's mind. And, as the realization grows that technology is the dominant tool in man's ability to change his environment, public attention focuses on technology and the technologist in a manner which is new and unfamiliar in its intensity and direction.

This new attention creates new problems for the generators and managers of technological innovation. It produces fundamental changes in the boundary conditions which have guided innovation in the past. It creates new criteria against which innovation is judged. And these new criteria are different in fundamental ways.

Technological innovation is the novel application of physical knowledge and technique to make pre-

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"Even the most jaundiced critic of technological abuses and excesses would be unwilling to forego technology's contributions altogether."

"Of course, one solution to the problems of misapplication of technology is to decide that we've had sufficient technological change and halt or substantially retard future technological innovation."

meditated changes in the physical aspects of the environment.

By any measure, technological innovation in this sense has been one of man's most important and successful social inventions. Over the centuries we have developed a complex system of institutions and methodologies for probing and understanding physical phenomena, for developing this understanding into useful artifacts and systems, and for evolving social, political and economic methods for distributing and applying the products of technological innovation to major sections of society. Indeed, our *systems* for producing technological innovation are one of the principal successes of western civilization.

There are many measures of this success. The pervasiveness of technology throughout our everyday life is objective evidence of how successful technological innovation has been in gaining society's acceptance. In addition, an opinion survey of the willingness of individuals to forego past or future fruits of technology would show that relinquishing past benefits is essentially unthinkable and that the average person's future expectations are even greater than the benefits which he experiences today.

Even the most jaundiced critic of technological abuses and excesses would be unwilling to forego technology's contributions altogether. Those most concerned about the population explosion would be very reluctant to give up modern medical care. Those most concerned about water pollution would be loath to trade today's crop yields for ancient agricultural methods, or surrender the water closet for the privy. Those most concerned about the automobile's part in air pollution would be unhappy to return to the horse and buggy days.

However, the fact that we can identify major problems such as the population explosion and water and air pollution, suggests that all is not well with man's use of technological innovation—that there *are* technological abuses and excesses that are matters of growing concern in an increasing number of minds.

Man's ability to affect his environment has grown to the point where he can produce massive changes on a global scale. And in some cases the changes could be irreversibly damaging. Nuclear war is an obvious example, but there are more subtle possibilities of great concern. For example, a straightforward prediction of our power requirements for the 1980s indicates that with present technological trends about 25 per cent of the total surface water in the United States will pass through the cooling coils of our power generating plants. Without sufficient knowledge and foresight this could produce a significant change in the steady state temperature of our surface waters, with effects on biology and climate which are not readily predictable.

These hazards are not confined to political boundaries. As we increase the chemical and thermal pollution burdens of the atmosphere and the oceans, the problems become of international concern. We are reaching the point today when we must carefully think through the broader and longer-range consequences of our actions to change the environment in which we live, so as to assure that the changes which we produce are, indeed, the changes that we desire for the future.

Of course, one solution to the problems of the misapplication of technology is to decide that we've had sufficient technological change and to halt or substantially retard future technological innovation. To my mind—as a consumer as well as a producer of technological innovation—this is a completely unacceptable alternative.

Many of our present social and environmental problems such as under-employment, air and water pollution, can be corrected with the help of technology. Indeed, much of the basic knowledge and technology required is now available. What is lacking is the economic and political means to stimulate its further development and application.

"It is more accurate to say that in the management of our affairs we have too often been bad workmen and like all bad workmen we blame our tools."

If we wish to continue to solve mankind's problems, I predict there will be an increasing pace of technological advance in our future. However, it is also increasingly clear that this advance must be made with more care and forethought than in the past.

There are those who despair of our ability to guide technology. It is not uncommon to hear warnings that man has been enslaved by his technical creations and that he has lost the power to control his technological Frankensteins. These fears can be placed in perspective by remembering that although technology has created unprecedented power, the technology itself is only a tool. Sir Peter Medawar expressed this clearly in his Presidential address to the British Association for the Advancement of Science. He said, "There is, of course, a sense in which science and technology can be arraigned for devising new instruments of world warfare, but there is another and more important sense in which it is the height of folly to blame the weapon for the crime. I think it is more accurate to say that in the management of our affairs we have too often been bad workmen and like all bad workmen we blame our tools."

Obviously, technology in itself does not possess the ethical qualities of "good" or "bad." It is only in man's application of technology that these qualities arise. Determining how technology will be used has its technical aspects. However, it also has its economic, political and moral aspects. Thus, the decisions which guide innovation must reflect the viewpoints of many segments of society. The technologist and the entrepreneur play a critical role, but they cannot function alone in today's technology-dominated world.

The pace and complexity of our national growth call for modifications in the ways in which we establish standards and set priorities to guide the systems which generate technological innovation. Technology has become too important for us to ignore and its future growth too essential for us to deny the most careful and considered judgments.

"Because of practical limits in our economic and technological resources, emphasis on one area such as defense denies emphasis in other areas such as housing and transportation."

Of course, these matters have not been ignored. In certain major areas, such as defense and space technologies, there has been essentially complete control by our society's chosen instrument of public interest, the Federal government. In other areas such as foods, drugs, communications, power and transportation, special public agencies have been established which seek to assure that the public interest is dominant in technological evolution and application.

However, as technology becomes more pervasive, conflicts in priorities arise. Because of practical limits in our economic and technological resources, emphasis on one area such as defense denies emphasis in other areas such as housing and transportation. Because our natural resources such as water are limited, pollution by agricultural chemicals interacts with urban pollution, industrial pollution and the thermal pollution of power plants. We begin to realize that our past mechanisms for guiding technology were similarly limited in their focus of attention and have not been structured to react to this impinging of interests.

Simultaneously we realize the tremendous new complexity that these interactions have created. The ubiquity of technology creates a universal interest in its effects. This greatly complicates the tasks of assuring that all importantly affected people—both clients and creators, as it were—are heard and contribute to the decisions that determine the paths of technological innovation.

We cannot overlook the fact that the systems that create and apply new technology are complex and include many segments of society. They include the university laboratory and the retail marketplace, the international tariff systems and the municipal licensing agencies, the financial stockholder and the industrial employee.

These innovation-generating systems have evolved to accommodate themselves to the environment in which they must function. Indeed, just as there is a

"All Bell companies have been purchasing their motor vehicles equipped with devices that minimize the emission of carbon compounds."

"System companies are abreast of other leading U.S. businesses and industries in contributing to environment improvement. Some System companies are, of course, more abreast than others."

complex ecology of man as a biological creature in his physical environment, there is also a complex ecology of technological innovation in its intellectual, social, political and economic environment.

Significant changes in any part of this ecological system can have substantial effects on its input requirements and on its output. The limnologist knows that a change in the temperature of lake water can cause some biological species to disappear and others to flourish. Similarly, a change in market taste, in capital availability, in basic university research or in government regulation can emphasize one direction of technological innovation, perhaps at the expense of another. We must be aware that there are hazards as we develop new guides for technology.

The implications of these changes are vital, particularly in the developing affluence of our society. Today as man's age-old problems of food and shelter are disappearing from the conscious concern of the majority of our citizens, we are beginning to develop new definitions of the quality of our environment and life. We are beginning to suggest that we might accept some decrease in the rate of growth of our material abundance in order to retain and restore some of our

## What We're Doing

*All Bell System companies are involved with air pollution control. Some companies also have taken steps to reduce noise pollution. In addition, Bell Laboratories and Western Electric are investigating water and radiation pollution, and environmental control.*

### For Better Air

*The Bell System is the world's largest private auto fleet owner. Since 196B,all Bell companies have been purchasing their company motor vehicles equipped with devices that minimize the emission of carbon compounds. These changes were introduced by the companies a year before Federal regulations became effective. In all cases, new vehicles being ordered by the companies are being equipped with emission-control devices.*

*All companies using fuel oil for heating have switched to a lower sulfur content oil. Some companies have also installed air washing and/or filtering systems on exhaust stacks. In those few cases where companies use coal for heating, plans are under way for conversion either to low sulfur fuel oil or gas. Companies with building incinerators have either shut them down or are phasing them out.*

### For Better Water

*Some companies using water for their cooling systems have ensured that polluted water will not escape. As a precaution they have added inert chemical compounds that reduce scale, algae and sludge. At Bell Labs, water used in research projects is passed through a treatment facility which renders it safe before it enters the public waste disposal system.*

*Western Electric's Merrimack Valley Works has its own sanitary and industrial waste treatment facility—the largest in Massachusetts. The company has constructed facilities or developed plans for clean water facilities in Phoenix, Shreveport, Dallas, Denver and Atlanta. W.E.'s Indianapolis Works has carried out extensive testing of commercially available air fume scrubbers. As a result, Nassau Smelting, a W.E. subsidiary on Staten Island, N.Y., has reduced particles escaping from its stacks to an extremely low level.*

### For Less Noise

*Some companies are making internal noise measurements. A few Bell companies have installed carpeting, drapes and acoustical ceilings in central offices not only to enhance working conditions but to reduce noise levels. In several other companies, emergency generators have been equipped with baffles and silencers on air intakes and exhausts.*

*In general, Bell System companies are abreast of other leading U.S. businesses and industries in contributing to environment improvement. Some System companies are, of course, more abreast than others. Many opportunities remain for increased System participation in the urgent and increasing environment-control effort.*

"Fortunately, it is within the power of present technology to reverse these changes if we are willing to pay the costs."

natural inheritance, such as our water resources, our forests, the purity of our air.

In the eyes of many, our concern is overdue. It can be demonstrated that in important areas we have already caused undesirable changes in the condition of some of our lakes and rivers, our woodlands and atmospheres. Fortunately, it is within the power of present technology to reverse these changes if we are willing to pay the costs. However, we must also solve the social and political problems of determining what price we are willing to pay and, of particular importance, how these costs should be distributed.

Important as our current problems are, however, our major problems lie in the future. As our concepts of the quality of life continue to evolve, technological innovation will continue to be the principal tool for providing the material abundance necessary to implement changes in that quality. In the past this technological innovation in our society has been guided most effectively by economic imperatives associated with short-range economic rewards for innovators which were granted by a relatively free and individualistic market. Such imperatives will no longer serve.

Today there are new and crucial questions:

*Will small modifications in our present guides be adequate to encourage technological innovation in the directions that we wish for the future?*

*If not, what new kinds of guides will be required?*

*How will these new guides be developed?*

*And how will the new guides interact with the established ecology of technological innovation?*

To a large degree these questions place the proverbial cart before the horse. One cannot intelligently devise guides until one has determined goals.

We must first derive a consensus position on priorities. When that is accomplished, we must develop guides to lead technology toward these priorities in a thoughtful way. Guided by wise men, technological innovation will continue achieving a social milieu of increasing material abundance and expanded individual freedom and choice. ▢

# Bell Reports

### Hideaways Doomed to Extinction

Looking for some out-of-the-way spot where you can be incommunicado? Don't make it the Admiralty Islands, Nauru or Bougainville, nor the Ellice Islands, Saipan, the Gilbert Islands, New Ireland or the Chatham Islands.

These places are among many remote locations which are now part of the Bell System overseas communications network. Nearly a dozen such hideaways were added in 1969.

Nauru (pop. 6,000), for instance, is one of the most recent to join the network. One of the world's smallest nations, Nauru is 1,300 miles northeast of Australia and about 30 miles south of the equator. Your mother-in-law can reach you there for a day rate of $12 for the initial three minutes.

In 1927, overseas communications consisted of a single circuit between New York City and London. Today more than 200 countries and territories are within reach of 97 per cent of the world's telephones.

### Air Flow System Aids Patients

A highly effective weapon in the battle against leukemia may result from a special air flow system devised for industry by the Sandia Corporation, a subsidiary of Western Electric.

Medical personnel at the University of Texas' M.D. Anderson Hospital and Tumor Institute in Houston are using two "laminar flow cleanrooms" to provide an environment to guard leukemia patients against infection.

Laminar flow is an air system used in industry to keep tiny components free from contamination. At Anderson Hospital laminar flow cleanrooms have a wall of high-efficiency filters at the head of each bed. Air coming through the filters is distributed in parallel lines of flow across the room and then moved up to the ceiling and passed through return air ducts so the procedure can be repeated. Movement of air is barely perceptible.

Contamination-free environment is critical because two-thirds of all leukemia deaths are caused by infection rather than by the spread of the disease itself. In 29 clinical trials conducted at the hospital, 86 per cent of the acute leukemia patients treated in the cleanrooms survived, compared to 50 per cent in the non-protective units.

A hospital in Albuquerque, New Mexico, has applied laminar flow principles in surgery. Hospitals in Seattle, Wash.; Ann Arbor, Mich.; Bethesda, Md.; and the Bronx, N.Y., are also applying the technique to some aspect of their operations.

### Research Grants Continued

AT&T will continue to offer post-doctoral research grants in public utility economics, reserving neither ownership nor publication rights to the independent research which is supported by the grants.

The grant program, begun last year, is intended to encourage the development of a broader and deeper body of knowledge in the subject.

Grantees are chosen on the scholarly merit of their research proposals by an academic review board comprised of three distinguished economists: William J. Baumol, of Princeton; Otto Eckstein, of Harvard; and Alfred E. Kahn, of Cornell.

### Solid-State Lamps to Glow In Telephones of the Future

Synthetically-grown gallium phosphide crystal lamps that can emit light continuously for about 10 years are being developed at Bell Telephone Laboratories for use as indicator lights in future telephones and switchboards.

Gallium phosphide is a transparent solid material that resembles amber. A suitably prepared crystal of it—no larger than the head of a pin—will give off red or green light with almost no heat when a small electric current is passed through it.

The new lamps are expected to be much more reliable, efficient and economical than the incandescent lamps now used which require higher power and have a much shorter life—10,000 hours compared to 100,000 hours of continuous use.

*"When you hear the tone...."is a familiar phrase heard by millions of people in areas served by Bell System telephone companies. That time is kept correct by the Crystal Clock at the Bell Labs facility in Murray Hill, N.J. A system of four crystal oscillators ensures that the time is accurate to one billionth of a second, or to within one second every three years. And even the Crystal Clock is monitored 24 hours a day against the cesium beam clock at the National Bureau of Standards in Washington, D.C., which is accurate to one hundred billionth of a second.*

### "Continuing Education" Attracts 3,500

Almost half of Bell Telephone Laboratories professional and technical staff —about 3,500 scientists and engineers —are taking part in a "back-to-school" program—without leaving their jobs.

Students from 11 different Bell Labs locations are enrolled in "Continuing Education Program" courses offered by Bell Labs during normal working hours to encourage its professionals to keep pace with rapid technological advances. The new program makes it possible for scientists and engineers to continue their technical education, on a strictly voluntary basis, throughout their careers. The program is offered by Bell Labs in addition to its financial support of university study by employees.

"Continuing Education" is one of the nation's largest graduate programs in engineering and the physical sciences. Most of the courses are being taught by Bell Labs specialists, but professors from nearby universities also teach a few of them.

About 100 different courses are offered in six major disciplines. The fields of study are materials and devices, systems engineering and mathematics, computer science, physical design, switching and transmission.

*This young lady is focusing on the future a two-inch pipe, no wider than a telescope, that will some day carry a quarter million telephone conversations. She is reflected in the mirrored outer wall of Bell Telephone Laboratories at Holmdel, N.J., where much work on the system—known as waveguide—is done. The copper-lined steel pipe, when buried underground, will guide high frequency radio waves carrying voice, data, TV and Picturephone® signals. A field trial is scheduled in New Jersey in 1974.*

### Are the Days of the Meter Man Numbered?

Some time in the future it is possible that your electric, water and gas meters will be read automatically through your telephone without ringing your phone or tying up your line.

A trial to determine the feasibility of such a system is now being conducted by Bell Telephone Laboratories involving some 150 homes in Holmdel, N.J., being served by New Jersey Bell. Participating are a water company, a power company and a gas company—all using meters and data-encoding equipment which they have chosen themselves.

The system will allow the utility companies to gather electrically encoded information from meters in subscribers' homes and transmit it through telephone lines to their data collection centers, where it will be put into computers for record and billing purposes. The entire process will take only a few seconds.

The Holmdel Laboratory of Bell Labs devised some of the special experimental equipment being used in the trial. Other utilities and Bell Telephone companies will take part in trials later in the year in other parts of the country. AT&T is coordinating the trials and studying the economic factors involved.

### "Strong Box" Phone Foils Thieves

The Bell System's effort to reduce coin telephone larcenies continues to show encouraging results.

Recent figures indicate that in 1969 there were 22,810 larcenies as opposed to 33,530 in 1968 and 47,090 in 1967. Cash loss and plant damage resulting from larcenies were halved from the high of more than $1 million in the first quarter of 1968.

Bell System security people attribute the decrease in larcenies to the growing use of the new "strong box" coin telephone and the new coin box lock designed for it. The lock can also be installed on older model phones. Both were developed at Bell Telephone Laboratories.

At the end of 1969, Western Electric had shipped 800,000 new locks and 300,000 "strong box" coin telephones to Bell Telephone companies.

### Datrex Links Teletype to Computer

The Bell System has developed and is offering a new data communications service which allows lower-cost and more efficient access to time-sharing computers for large numbers of teletypewriters.

Called Datrex, the new service eliminates the need for direct linkage between the teletypewriter terminal and the computer, which is uneconomical when the teletypewriter is not in steady use. Instead, up to 128 teletypewriters located within a three-mile radius can be connected to a concentrator, which can be tied to the computer by up to 32 trunk lines.

Datrex automatically lets the teletypewriter wait for the first available opening in the event that all main lines into the computer are in use.

The new service should make it economically possible for greater use of time-shared computers by, for example, various departments in separate buildings on a university campus, an industrial complex, or various businesses in a large office building. ☐

# Business Service and Society

## Excerpts from recent talks by Bell System officers

"I know you hear it said by some these days that some telephone people don't care much about service any more, and that indeed there is even a lack of simple courtesy on the part of some telephone people who relate to the public.

"You also hear it said that some of our people are not as confident as they used to be and have deep reservations about the future because conditions, methods and philosophies are changing so swiftly and dramatically in our industry.

"I can't deny that some of these reports are true, but I do believe that such examples are very much the exception rather than the rule. I think the important thing is that the great majority of Bell System people are committed to giving our customers a full measure of service, and are confident their business is best equipped to do the job.

"As I see it, our biggest challenge in the Seventies will be to attract, train, develop and keep people who are motivated and dedicated to our service ideals."

". . . we face a far different challenge today in managing young people—inside and outside management—than we did 10 years ago. People today—or at least a great number of them—simply have a different perception of society and its institutions and disciplines than they did before."

"The people we serve are changing, too. They are better educated, more affluent, more sophisticated and more demanding. Over the years they have learned—and we have taught them—to expect nothing but the best from the Bell System. And anything short of that is bound to disappoint them."

*Angus S. Alston,*
*President—Southwestern Bell*
*(From a talk given while he was Executive Vice President—AT&T)*

"Certainly we can applaud the ideals of our youth. But at the same time we must explain the economic facts of life—something we apparently have not done very well. For too long, businessmen—preoccupied with their own affairs—have permitted the gap separating business and education to widen."

"... business must do a better job of informing the public about the workings of the free enterprise system. However, the kind of widely shared public confidence so necessary in our system is not won just by words. More fundamentally, it is earned through our performance."

"We know that the system in this country was designed to give business an unusual degree of freedom—and, with that freedom comes an unusual degree of responsibility—a responsibility not only to turn out the goods and services which are the outward symbols of our progress, but a responsibility to work to achieve the less tangible advances which add to creating a better way of life for our people."

*Jerome W. Hull,*
*President—Pacific Tel & Tel*

". . . is there discrimination in business? Yes! Against women? Yes! Against Blacks? Yes! Against the young, the old? Yes! Against many ethnic and religious groups? Yes! It's not the illegal kind of discrimination. It's not intentional. It grows out of ignorance and uncertainty.

"I'm sure we can discover enough reasons to explain why we have prejudices. But if we just admit it and let it go at that, we've only done half the job . . . .

"We all agree discrimination is wrong. And we . . . have sent this word down the line. Well, it's going to take more than good intentions. It means listening, looking and acting: listening to employees who may be legitimate victims of discrimination intentional or otherwise; looking within our . . . companies to actively encourage the hiring and promoting of individuals without regard to their race, religion or sex; acting to discover the little closets of hidden prejudice and airing them out.

"... it means getting the word down to everyone, most of all to the supervisor or personnel interviewer who says, 'Don't worry about me. I don't discriminate. I have no prejudices whatsoever.'"

*Jack B. Gable,*
*Vice President—Illinois Bell*

"Perhaps instead of worrying about how to suppress the youth revolution, we should be worrying about how to sustain it. And I am not talking here about those few who practice violence and destruction. *Strict* enforcement of the law is the *only* answer there. But the concerned, dissatisfied young, aching for some relevance, searching for answers, can perform a service by shaking us out of our complacency. I'd like to have more of them in my business. We need more of them in our society.

"I think we can get more of these kinds of young people to work with us, constructively, if we can convince them that we are as concerned about our social problems as they are."

*John D. deButts,*
*Vice Chairman of the Board—AT&T*

ntinued from page 1)

wn house because careless kids ere apparently wrapping bombs is sconcerting, too.

### nerica Is No Algiers

spite the convictions of so many ungsters, few leaders of American siness share the political and ilosophical stance of your everyday ird Reich SS career colonel. wever, even the sympathetic sinessman-father who has thought ough the pot issue, for example, d decided that pot should be alized because it is less lethal n gin, is not going to lend his mpassion, talent, money and vote a movement in which bombs plant debate, legislation and onal physical demonstration. It is e that bombs finally made their ody point for the Algerians against French, and that some young erican "revolutionists" consider impressive film, "The Battle of iers," their training manual. But erica is no Algiers. The people jobs in business, government, cation and law enforcement here not an uninvited minority con- ium from another nation imposing mselves upon the majority of ves.

he irrational, I-hate-you-more- -you-hate-me approach to making erica more loving cannot work. rror by whites or blacks, young- or octogenarians, gets much e of a grip than it now has on our onal neck, those perpetrating error will find the supportive ons who lend their clout to causes uiet ways (and they are not matically the same "Silent ority" of media fame) erasing names from the list of faithful. hey have not been brought up ombs, and they don't want their lren to be. They have been willing ange, and to help initiate change, but they won't budge an inch for a fire bomb.

### Both Good and Bad

This country, of course, is not as terrible as the noisiest Weathermen and Black Panthers say it is. Nor is this country as nifty as many self-satisfied businessmen, politicians, generals and admirals maintain. This country is judged largely from each individual's own perspective, and so this country is both good and bad. As Louis Banks of *Fortune* magazine surmised, one's age has a lot to do with the viewpoint.

Discussing the disparate views of youth and their parents toward Our Way Of Life, he wrote: "*We* saw the successful competitors, and gloried in the fact that opportunity was never so widespread nor reward so swift; *they* saw the fathers who came home, dejected, disillusioned, distracted, and—in most cases—devoid of any spiritual resources. *We* saw the triumph of technology in jet flight, convenience foods and the moon shot; *they* saw its degradation and defeat—sometimes firsthand—in a far country called Vietnam. *We* saw the gross national product; *they* saw the gross national by-product—of mindless urbanization, environmental pollution and the whole wasteland of public dereliction."

### Work Out the Future

Mr. Banks invited youth to come and help its elders find new values to replace the historic national obsession with a bigger GNP and damn the consequences. Said he, "In our search for reconciliation we can at least start with the fact that the business system is a formula for combining brains and machines to yield more goods for less work, and this is hardly an ignoble goal. In a collective sense, it offers up abundant resources that can be used

*as amelioratively and adventurously as youthful hands would use them."*

Mr. Banks is right. The people in charge of things and those who aren't must harmonize their goals and work out the future together. To do that, the kids—not just the ambitious B-school students and the solid fraternity men but the others, the forerunners who are often more critical and more original—must know that business leaders also seek to restore quality to life. Concurrently, those of us in business must not shun a thoughtful youngster just because his pants happen to be shaped like Popeye's.

We grew up on Popeye movies and know for a fact that with a can of spinach at just the right time, Popeye could become a powerful force for good. So can angry kids and angry blacks. The 1970s would appear to be just the right time. But the spinach with which to help fashion a finer life is not in bottles, bricks and bombs. It is, among other places, in business. It is in abundance in this Bell System. It is in reasonable men. ☐

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Engineers yesterday, artists today, creators always: innovation abides at West Street.

July/August 1970

# BELL

telephone magazine

# Can a Company Magazine be Both Right and Read?

*"Blessed be letters—they are the monitors, they are also the comforters, and they are the only true heart-talkers."*
*—D. G. Mitchell • Reveries of a Bachelor—1850*

We have never solicited letters from the nearly 100,000 Bell System and non-Bell "opinion leaders" who receive this magazine. Yet we are grateful, after each issue, to receive a thoughtful cross section of comments from readers. We hear from students and senators, corporate presidents and private citizens, judges and journalists, bankers, lawyers, educators and a lot of people who work for this big business in every part of the land. We hear mostly cheers and some jeers and we welcome both with, well, almost equal graciousness. We do not pretend to gauge the total success or failure of this journal by the number or content of such communications. But letters do help us feel the public pulse. And letters do help maintain a healthy staff morale. And those things probably help us do a better job.

A quick glance over our shoulder at the last year's output shows that certain stories have inspired a disproportionate amount of reader reaction. Two that did were Edward deBono's piece on lateral thinking, and Norman Cousins's ideas about the need for more rationality and less bombs among men, in the July/August 1969 issue.

The two-part report by Daniel Yankelovich about youth and business in the September/October and November/December issues drew a record number of reprint requests and many comments on the articles themselves. Two other pieces in the latter issue also stimulated letters—the one on consumerism by the Nixon Administration's Virginia Knauer, and the piece about moving employees from the city to the country by AT&T's Don Woodford. The story on Colorado's Outward Bound School in the January/February 1970 issue is another that attracted several letters, most of them wanting more data on the program. We put them in touch.

### Passionate and Partisan

The comments on contemporary America by Miss Rita Fuhr of San Francisco State College and film maker Saul David brought a greater number of passionate, partisan letters than any article in the last year. Here are some typical positive reactions:

". . . I would like to read it [the David article] or distribute it to an audience of thousands. It says so much in a beautiful style that it deserves the widest possible distribution."—*from a corporation head in Ohio.*

". . . thanks for giving her wider voice . . . read alongside this morning's story of Kent State University, Miss Fuhr's plea rings terribly loud and clear. . . ."—*from a newspaper editor in Connecticut.*

"Is it possible to obtain reprints of these two articles?"—*from the librarian at Kent State University.*

### Where Do You Get Those Writers?

Not all reactions were positive: "...his glib and flippant writing has earned a few tears from me . . . when one is involved politically with all the honest dedication that one can lay claim to, this kind of commentary brings not but helpless sadness."—*from a col student in New York City.*

". . . I do not know where you those writers and I do not remem everything being so dumb wh worked for the telephone comp . . ."—*from a housewife in Califo*

Readers aren't the only ones sometimes disagree with BTM's thors. As often as not the editors, differ with the ideas of the author select. Nor do the opinions expre in BTM articles always jibe with t of the top managers of this busi or of its board of directors. Sub and writers are picked by the ed because of their pertinence to phenomenal business and to thes credible times, not because som up there says, "Go write somet complimentary about the compa That would be neither right nor

To the contrary, the men who this business permit the editors a usual degree of autonomy. Wit of course, comes a satisfying sha responsibility—the freedom to b fective and the freedom to fail. result, the magazine is what it is *think* it's right. We *know* it's rea

### A Rationale for Readers

Every now and then someone clares his dismay not just with o our authors but with the editor with the Bell System for publi a particular piece. In such case reader usually feels the philoso espoused are inconsistent with business policies. We have a rati for such critics. It is that our pu is not to *direct* thinking but to s *late* it on issues of concern to th poration and to the individuals

We try to show that this busi a contemporary organization, on is innovative in spirit and actio try to portray this business as a

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ommunications service, science, art of management and in meeting increasingly complex needs of so-y. We try to further the manage-t objectives of this business by ecting its character and its integ-to influential people. And we try eflect the best interests of this ness in a readable, credible way.

**se Things Are Here**

" may not be the best word, for ask is not as difficult as might be gined. Unlike some less fortunate lic relations practitioners, our ge is not to make silk purses from ' ears. There is a great deal here which to work, many resources which to draw, countless accom-ments in which to share. Unless is simply convinced that corpora-are bad, that they are in fact the odiment of all the evil awash to-n American life (such sentiments ot unknown among BTM's cam-readers), one needn't search far character, integrity, innovation, tific progress and concern for s. Those things are here. They ere in this business and they are we hope, in these pages.

hether we succeed in reflecting est interests of this business to udience is hard to measure. But again, we receive enough letters limenting the business, as well as nagazine, to make us feel the is worthwhile. The following t comments are representative:

". . the provocative nature of the zine is certainly a tribute to the rd thinking of *your corporation.*" *a professor in Connecticut.*

". . it is refreshing to see the mod-inking of *your company* reflected l Telephone Magazine."—*from a paper editor in Florida.*

". . a company which approaches

*ued on inside back cover)*

# Parnassus on the Hudson

by
**Don Woodford**

An old building in New York, fountainhead of invention as Bell Laboratories' first home, continues its creative life as an experiment in housing for artists.

One rainy Tuesday afternoon last spring, an old building on Manhattan's lower west side began a new life. In a city where the razing of almost anything over 50 years old sustains a daily cacophony of demolition, this renaissance of a structure whose foundations were sunk in 1896 is itself remarkable.

The nature of the rebirth is even more remarkable, and was signified appropriately by a rechristening. New York's Mayor John V. Lindsay, sheltered from the gray drizzle beneath an orange-and-white-striped canopy, delivered brief remarks which formally dedicated Westbeth. His dedication officially identified Westbeth as the first FHA-sponsored artists' housing facility in this country and the largest of its kind in the world. One of the speakers on the program referred

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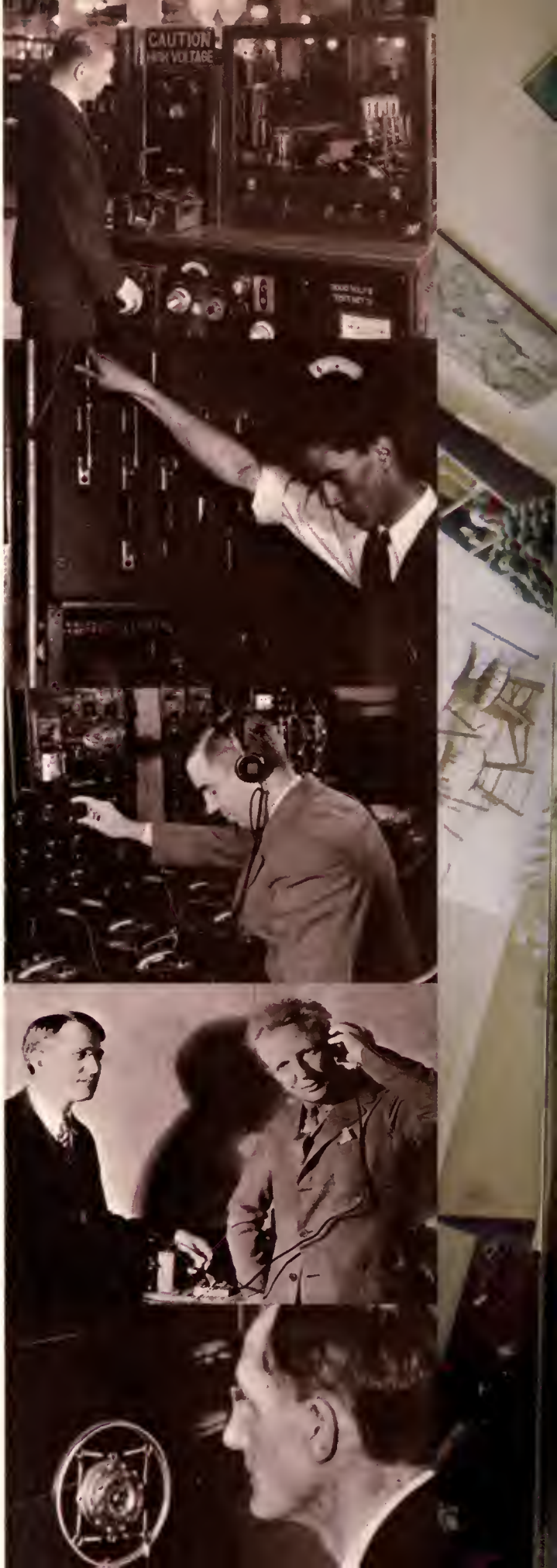
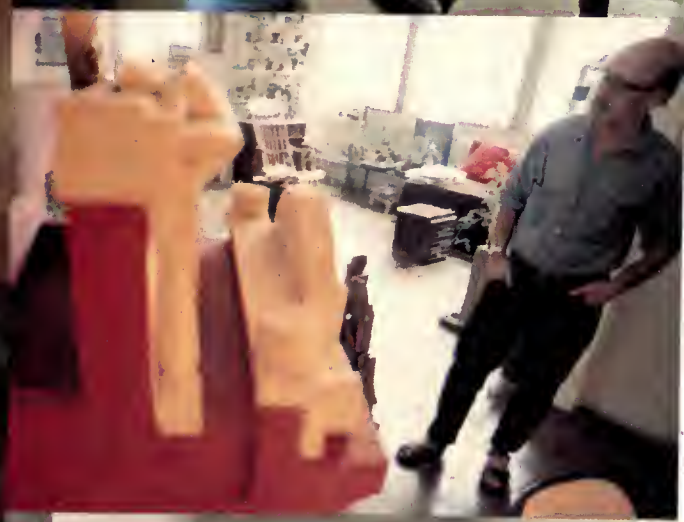
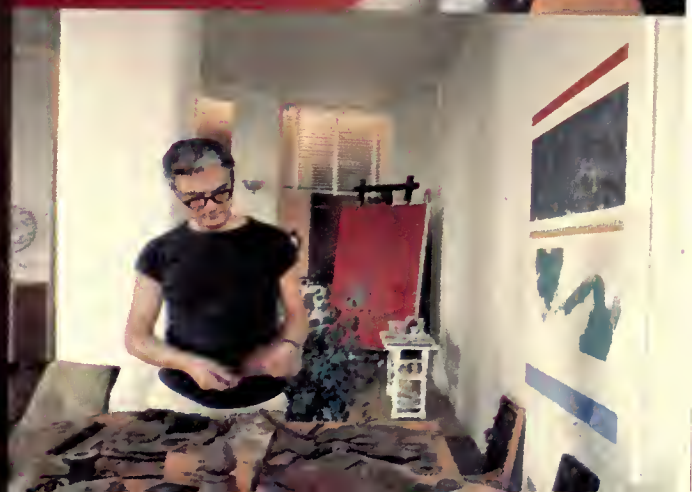
*Mr. Woodford, formerly managing editor of BTM, has had a long-standing interest in science generally, and particularly in the work and history of Bell Telephone Laboratories. He is the editor of a new publication,* The Bell System and the Environment.





to it as "this great peculiar lump of a building." One other speaker vouchsafed a nod to its original identity as the home of Bell Telephone Laboratories.

Westbeth was conceived because the lot of the artist in New York, as in most other cities, is a hard one. Many practitioners of the graphic arts — painters, photographers, film makers — as well as sculptors and dancers, need the kind of working space best provided by large loft-studios. Such airy, high-ceilinged rooms, preferably including living quarters, are either outlawed by most city occupancy codes or are beyond the reach of the average middle-income artist.

The dilemma of this creative segment of society has not escaped the notice of the National Council on the Arts. About three years ago, when availability of the old building complex at 463 West Street was announced, the Council and the J. M. Kaplan Fund joined in contributing $750,000 each as seed money to prime the financial pump. In July 1967, the Bell Laboratories building was bought for $2.5 million, and in September the nonprofit Westbeth Corporation was created to remodel and operate it. L. Dixon Bain Jr., formerly of Western Electric's and AT&T's Public Relations departments, was appointed administrative officer; and young, talented, New York architect Richard Meier, was commissioned to convert now-empty laboratories and offices into studios. The balance of the total of $13 million of financing for purchase and renovation came from the FHA.

## Cut and stretch

The project was completed in an astonishing and hectic two years, during which much red tape was cut and some rules were stretched. The cutting and stretching boiled down to a balancing act between the minimum size for dwelling units specified by the FHA and the minimum space needed by the artists for whom the idea of Westbeth was conceived. A working compromise finally produced 383 living-studio units ranging in size from about 600 square feet to over 1,300, and in rent from $110 for single occupancy to $190 for those with children.

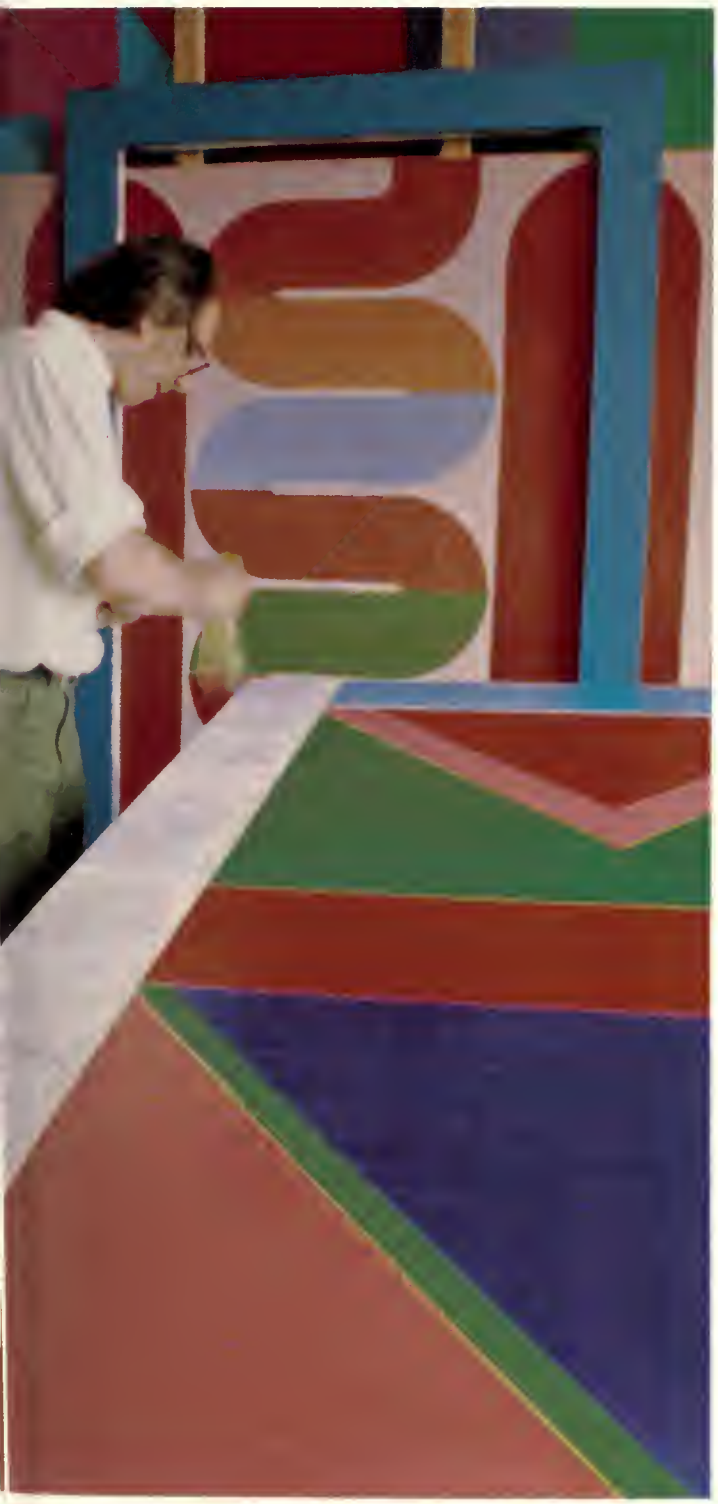
And there are lots of children. On dedication day what seemed hundreds of them, all apparently of about the same size, swarmed among the adult residents and guests, happily ignoring the ceremonies and protected from the weather only by clutches of brightly colored balloons labeled "Westbeth."

## Old beginnings for a new age

Children being much alike, those who ran through the corridors and rooms of 463 West Street one December night in 1966 paid little more attention to the grown-up goings-on than did their counterparts in today's artists' colony at Westbeth. The occasion, however, was quite different, for on that night more than 900 people came to bid their private and collective farewells to a building where many had spent their Bell System careers. When James B. Fisk, president of Bell Telephone Laboratories, spoke to them he remarked, "Many of you here this evening remember Bell Laboratories from the day it was founded. A few of you, as youngsters, saw them driving the piles that have held the building up for 70 years and will continue as the foundation for whatever enterprise takes it over."

Actually, the first home of Bell Laboratories could just as well have been called Westbeth 75 years ago, when Western Electric spent $119,000 to buy land for its manufacturing shop occupying part of the block bounded by West, Bethune — hence the new name — Washington and Bank Streets, a section of New York later described by an historian as "part of the tattered fringe of old Greenwich Village." After existing buildings were razed, wooden pilings were sunk into what a couple of centuries earlier had been Hudson River mud at the edge of green farmland. By April of 1897, steel framework was rising for the first two main sections of Western's 13-story plant; by June the girders were sheathed in buff-colored brick. Terra-cotta trim outside and maple flooring inside gradually completed what then was considered the best standard factory construction.

Although there was nothing novel about the build-



ing itself to give any hint of the startling things that were to come from it, prophetically it was first occupied at the beginning of a new age. The plant at 463 West Street, which eventually produced inventions that changed the world, was opened only eight years after Edison invented the incandescent light, and only five years after New York City's first central power station started supplying electricity commercially. Electric power, in fact, was scarcely out of its experimental womb when machines began turning at 463.

While cable, switchboards and other telephone paraphernalia were manufactured there for years, Western Electric's engineering department — at the same time and in the same building — was soon functioning as inventor and developer. With the telephone long out of the laboratory and on the way to becoming a national necessity, that research and development function garnered momentum from the needs of a growing communications system.

## Radio, records and radar

And, directly because of those needs, new things started happening — things which brought fledgling scientific disciplines out of the laboratory and put them to work for the common man. In the early 1900's the long distance telephone had gone about as far as it could with the techniques engineers then had for amplifying the human voice. In 1906, Lee De Forest, an independent experimenter, produced the world's first electron tube, called the audion, acclaimed the most important invention of the first quarter of this century. While the audion was excellent as a detector of radio signals, in its original form it could not be used as a power amplifier. But Harold Arnold, then Western's director of research, saw its possibilities. Working from basic research done by university scientists on electrons and their movements, he designed and fashioned the first high-vacuum tube at 463 West Street in 1912. Arnold's invention provided the stability and control needed for an amplifier, and enabled the telephone to cross the continent in 1915.

Just a year later, at the building on West Street,

Edward Wente demonstrated his condenser microphone, which became the "mike" of early radio, and, with the vacuum tube amplifier, helped produce electrically cut recordings and eventually sound motion pictures. In 1919, Lloyd Espenschied, working at 463 on a radio altimeter for airplanes, developed the principle of what later became known as radar.

## The silver screen gets its voice

Inventions are frequently piggyback phenomena, with one new achievement riding on the shoulders of one or more predecessors. During the 1920's at 463 West Street, Henry C. Harrison, using the condenser mike and vacuum tube amplifier, designed an electromechanical recorder for cutting masters from which records could later be pressed. Those records for the first time carried all the important components of the music; but they could not be properly reproduced until Harrison developed his acoustic phonograph. Then, the critical auditors at Bell Laboratories heard reproductions "which approached the original rendition in quality." The "Orthophonic Phonograph" was announced publicly in October 1925, by the Victor Talking Machine Company, which had been licensed under Western Electric patents to make it.

Meanwhile, this new means of recording sound was spawning another whole new industry. For more than 10 years, at 463 West Street, Western's engineers had been working to realize a dream as old as Edison's invention of the motion picture: sound movies. They gradually defeated formidable technical demons in recording sound that was synchronized with action as it was photographed, and, in the spring of 1923, Western Electric's first real "talkies" were made at 463. Before long, Hollywood executives and financial men arrived to view those experimental short subjects in an improvised projection room. Among them was Sam Warner, one of four Warner brothers, who immediately recognized that the turning point in the movie industry had come. He wired brother Harry: "Go to the Western Electric Company and see what I consider the greatest thing in the world." Harry came, saw, and agreed. So did a few stars of the still-silent screen, who suddenly started to worry more about their voices than their profiles.

Western Electric's engineers at 463 West Street, fully as aware as were the Warners of the talkies' commercial possibilities, had licensed one Walter J. Rich of New York to form a company to exploit sound films. Warner Brothers soon joined Rich to found the Vitaphone Corporation, which, by the summer of 1925, had elaborate plans for a complete program of sound pictures for the opening of the new Warner Theater on Broadway. Heading the bill was John Barrymore, playing the title role in "Don Juan." The doors opened for the premiere on August 6, 1926—and the silent movie became obsolete overnight.

## "You ain't heard nothin' yet!"

The rest of Hollywood's movie industry did not capitulate quite so quickly. In October 1927, Al Jolson secured a unique niche in acting archives as he sang and talked in Warner Brothers' "The Jazz Singer." Then, as one contemporary critic remarked, the lid was off. Although the film wasn't 100 per cent "talkie," it revealed once and for all the shape of a new entertainment medium and sounded the first notes of the death knell of vaudeville, the movie orchestra, theater organ and the lone piano player in the pit. Movie producers and theater owners alike scrambled frantically to escape from the trap of silent obsolescence, with the result that Western formed a subsidiary, Electrical Research Products Incorporated — ERPI — to engineer and handle all studio and theater installations. For many years, thousands of films carried the line "Western Electric Microphonic Recording" among their title credits. And it all came out of Room 1109 at 463 West Street.

While this furor was in the making, Western Electric's research laboratories and part of AT&T's engineering department had been consolidated on the first day of 1925 to form Bell Telephone Laboratories, Inc. With the creation of a formal research and devel-

opment entity for the Bell System, the stream of innovation flowing from 463 quickened. In 1927, a few months before Al Jolson shouted an unrehearsed but prophetic line from the screen, "You ain't heard nothin' yet!" the public saw the first demonstration of television by wire from Washington, D.C., to Bell Labs on West Street when Herbert Hoover, then Secretary of Commerce, talked with AT&T president, Walter Gifford. And, in that same year, shortly before Charles Lindbergh piloted the Spirit of St. Louis from New York to Paris and flew into history as the Lone Eagle, another kind of world-shrinking process began when radiotelephone service developed at 463 West Street first spanned the Atlantic from New York to London on a regular commercial basis.

Many of the people who worked at 463 spanned the Hudson River via ferryboat from New Jersey on a regular daily basis. One of these, a young man named Harold S. Black, for years had pondered a problem: how to rid amplifiers of distortion which accumulates as telephone lines lengthen over long distances. One morning in the late 1920's, while enjoying the river breeze on his way to work, he suddenly saw the answer in one of those flashes of clarity that sometimes reward men who labor entirely with their minds. Sketching rapidly on a page of his morning paper accidentally left blank by the press, he roughed in the principle known as negative feedback. This may sound an esoteric concept to the average nontechnical citizen, who doesn't know — and doesn't need to know — that Harold Black's invention helped make possible the high-fidelity music any citizen can now hear in his own living room. It has also become indispensable in today's proliferation of automation and in the control of guided missiles and space vehicles.

About a year after Harold Black's epochal ferryboat ride, old rooms in 463 were echoing to the new sound of something called "hill-and-dale" recording. Scientists were experimenting with grooves cut vertically in the record, rather than laterally. From these they

obtained better fidelity to the original sound than was possible from the best of existing records. Hill-and-dale discs turned at a slower speed, and this, coupled with narrower grooves, meant a longer playing time. There was also less surface noise — that plague of the old lacquer records — because Bell Labs was using a new nonabrasive material called cellulose acetate, a kind of plastic. The terms LP and hi-fi and stereo and vinyl hadn't yet entered our mundane vocabulary, but the basic work that finally led to modern long-playing high-fidelity records was being done then and there. The Bell Labs men at 463 even discussed the advantages of an elliptical stylus about 40 years before that elegant little device appeared on the market as the preferred means of playing stereo records—which, incidentally, combine vertical and lateral tracks in the same record groove.

## Fiddles on the left, drums on the right

Sound has always been at the core of the Laboratories' mission, and it was simply logical that its continuing experiments in recorded music should evoke the fervent participation of the practicing musical community. During the early 1930's, Leopold Stokowski — whom one Bell Labs man then described as "half musician and half engineer" — often came to 463 to work with Labs engineers on recordings of his Philadelphia Orchestra. Violinist Jascha Heifetz, too, came to record and listen, and said that for the first time he heard himself as his audience heard him, including "squeaks and scratches I never knew I made!"

Musicians and engineers alike were well aware, although for somewhat different reasons, that most people have two ears and, therefore, that sound recorded through one microphone and played back through one loudspeaker lacked the illusion of complete reality. In 1934, about 25 years before "stereo" became a commercial shibboleth, Bell Labs men at West Street perfected a stereophonic transmission system employing three channels which bestowed the missing dimension on recorded music with what one listener said was magical effect.

Another kind of magic was performed during the middle 1930's when the Laboratories first demonstrated color television at 463 West Street. And, at about the same time, the ancestor of the nine o'clock movie, the Late Show and Late-Late Show made its debut at 463 when films were first televised.

## Experiment without end

Naturally, not every innovation generated by the creative colony at Bell Labs shines with the glamour of talking movies, hi-fi and TV. But many have gone at least as far into the fabric of our society and some are fully as well known. One Monday morning in 1937, for example, mathematician George Stibitz walked into his office on West Street carrying a homemade breadboard contraption fashioned of metal strips from old tobacco tins, flashlight bulbs, batteries and discarded telephone relays. Not many of his colleagues who watched him demonstrate the apparatus knew they were looking at the prototype of the digital computer. The results of his weekend activity soon flowered into a formal project at the Labs, and, in 1939, produced the first operating electrical digital computer using binary number notation.

Few inventions then or now really partake of the classic image immortalizing the lone genius in his attic hatching miracles in incandescent inspiration. Even so, individual men do achieve breakthroughs that momentarily invoke that image. Most of what comes from Bell Laboratories, or from any other industrial research organization, in terms of sheer quantity, is the product of many minds laboring in concert. But it is remarkable that so many single intellects at Bell Labs can be identified as having opened new doors on the future.

If the creative act in science is occasionally solitary, it is almost always so in art. Poems are not written, nor symphonies composed, nor pictures painted, nor figures cast in enduring bronze, by task forces. The making of a sonnet or a statue is an elemental and private process. It rarely has any built-in assurance of pragmatic success, unless it is done under contract

or on commission. The man who applies pigment to canvas does not know, and may not live to know, whether that work born in passionate conviction will be dealt with kindly by time and the critics, one day to be sought by collectors or enshrined in the Museum of Modern Art.

But he must have a place to work. If science can change the human condition, art can mirror it. At the rechristening of 463 West Street, Joan K. Davidson, a daughter of Jacob Kaplan and Westbeth's president, spoke of the arts as primary evidence of man's rise from primeval savagery. She concluded, "Let us hope that Westbeth can sustain this reminder of a civilized society."

If there is more hope than certainty in that invocation, it may be partly because Westbeth is, in a sense, an experiment. The founders of Western Electric, back in the 19th century, perhaps had somewhat the same feeling when they described their new company as "a small venture into a new field of industry and science." Although Westbeth is the largest effort of its kind in the world, it is also a small venture into the new field of adequate housing and working space for artists — small, that is, in relation to the total artist community. But it is large in purpose, and to that extent, at least, seems certain to succeed.

## The Westbeth idea

Success indeed was immanent in the project from its inception, for there were 10 applicants for every one of the planned quarters. On opening day, there was a waiting list of 1,000; a fact which, if it does nothing else, attests to the need for decent, reasonable — and legal — artists' housing. The Westbeth idea of renovating large structures that have outlived their original usefulness could well be propagated elsewhere, either with a similar relaxing of some FHA room-count rules or through other forms of financing.

Whatever the approach to such future enterprises may be, Westbeth leaves some questions open. The playwright doesn't need much space in which to peck at his typewriter, but what of the sculptor who tackles a two-ton block of marble? Or the painter who's been commissioned to do a mural? Or the choreographer who designs a new ballet? At Westbeth there is studio space for the choreographer, now rented by dancer Merce Cunningham. There is theater space for film and drama. There are ground-floor galleries for permanent display of the residents' work. There is a large, communal studio for sculptors, complete with hoist and a floor originally designed to support Western Electric's cable presses.

## No Sunday artists

The questions are, as resident-photographer Ann Douglass sees them: What kind of communal spirit will evolve? How will sculptors who "work large," for example, take to chiseling and modeling and casting in one huge community studio? Will Westbeth sustain a real avant-garde or could it become an old-age home for lazy creators?

The latter possibility seems remote, since applicants (who came from all over the United States) had to have incomes under established maximums, had to furnish references from peers in their respective fields, and had to prove they were not Sunday artists. The dilettante or the amateur may visit Westbeth, but he may not live there. An historian, chronicling the past of 463 West Street in 1925, remarked rather plaintively, "Of late years Greenwich Village has gained a largely undeserved reputation as the haunt of pseudo-artists, would-be poets, freethinkers, and suchlike persons." Whatever the present-day reputation of the Village may be, there are no spurious creators in Westbeth. They are serious, practicing artists as their predecessors were serious, practicing engineers.

Those antecedents, however, are of small concern to Westbeth's inhabitants, for the time there is *now*, and that is probably as it should be. One artist, interviewed recently in his new quarters, was asked if he knew anything about the history of the place.

"Oh, yeah," said he, pulling an earlobe just visible above his beard, "it used to be Bell Laboratories. I think they tested something here." □

by Herbert G. Klein

**Are the nation's news media ignoring the ideas of most of its citizens? The Director of Communications for the Nixon Administration says they are.**

# Who Speaks for the Silent Majority?

"A popular Government, without popular information, or the means of acquiring it, is but a Prologue to a Farce or a Tragedy; or perhaps both."

This statement by James Madison is as applicable today as it was when it was made 200 years ago. The American system is dependent on an informed electorate making informed decisions, and thus, it is dependent also on a free flow of information.

There is no question but that today we have vastly improved our technical ability to communicate.

Television beams into our living rooms the pictures and sounds of man's first step on the moon.

Satellite transmission of action photography has made Vietnam the most thoroughly covered, and the most intimately understood, war in history. It has become common to see men shot and wounded or killed almost as soon as the event takes place.

Radio gives us instant news. And newspaper techniques, at a standstill for so many years, now are geared to the seventies with high-speed presses, color and electronic typesetting.

Two questions can be raised legitimately, however: Has our knowledge increased in comparison to these gains in technology? Do we communicate better?

It is obvious that we have our shortcomings. Even communication within a family today seems more difficult than in past generations. Government, along with the media, must question how to reach the young. And how do you communicate fully with the black community, the Mexican-Americans or even the old and retired?

Over the years, the major issue concerning Government information has been whether it has been accessible and credible. Before the enactment of the Freedom of Information Act in 1967, Government agencies had sweeping and unwarranted discretion to withhold information from the public in the "public interest."

All too often, the term "public interest" was used as an excuse for covering up irregularities or mistakes. The Freedom of Information Act requires that information may only be withheld under nine specific exemptions and places on the Government agency the burden of proving withholding to be necessary.

Another key aspect of the law is a provision for court procedure through which the public can obtain information wrongfully withheld.

The Freedom of Information Act has helped make Government information accessible. Yet, no matter how well drafted, legislation to protect the public's right to know is not self-executing. The President must provide the leadership.

When he took office, President Nixon pledged "an open Administration, open to ideas from the people and open in its communication with the people."

President Nixon has a deep confidence in the American people's ability to deal with the truth and believes that if you tell the American people the hard truth, they will make the right decision. He has pledged "to tell the American people all I can—not only what they need to know, but what they have a right to know."

He made good the pledge with his candid reports on Vietnam and the attacks against enemy sanctuaries in Cambodia.

There has been much discussion of credibility, the credibility of Government statements and the credibility of the press. Belief in the credibility of both is essential to a free Government.

On the question of Government credibility, the President has recognized the problem as critical and directed policy to remedy it. I believe he is succeeding. The basic premise of the Nixon Administration is not to promise what cannot be reasonably delivered.

The policy and goal of openness is set by the

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*Herbert G. Klein is the former editor of the San Diego Union, the morning newspaper which serves that city. He is a long-time friend and press advisor to President Richard M. Nixon. His present post is Director of Communications in the Nixon Administration.*

**We must make certain that we recognize the differences between opinion and fact.**

President. Published in-depth polls have shown that the candor of his reports to the American public through televised statements and press conferences has led to a reawakening of public confidence.

The President alone cannot carry the entire burden for credibility, however. During the first months of this Administration, we have sought to broaden the base of information through my office as Director of Communications, through the work of the President's capable press secretary, Ronald L. Ziegler, and through the executive branch leaders.

The President is seeking to take the Government to the people, sending more of his Cabinet out of Washington to communicate with the broad spectrum of the American public through dialogue, speeches and other public appearances.

How is the press meeting the challenge to communicate? Basically, I give it good marks.

A high degree of professionalism is characteristic of American journalism today. This professionalism must be continually developed, because today's world—in any field from science to government, from sports to education—is increasingly technical. We will have intelligent and strong Government only as long as we have citizens who understand its problems. And they will have that understanding only as long as there are reporters with the skills to present the facts and the objective background and the interpretation that is needed.

There has been much discussion of interpretative reporting. I believe it is essential in both broadcast and print media. It should be recognized, however, that as we depend more and more on this analytical help, the responsibility for objectivity on the part of the analysts becomes vastly more important.

Interpretation, background and editorials, in print and broadcast, have a powerful role which should be encouraged. As we grow in these fields, however, we also should view that power with caution. We must make certain we recognize and label the differences between opinion and fact. We have "truth-in-packaging" and "truth-in-lending"; we could do with more truth in editorializing.

Vice President Agnew's recent comments have pinpointed some of the dangers. His timing was good, and I believe that the resultant discussion has been healthy for Government and for the media. It has caused both to reexamine the means of education.

Basically, I see two major weaknesses in communications today, one governmental and the other within the media.

On the governmental side, no one has developed an effective modern technique for in-depth, two-way communication.

Government is learning how to get more facts to the American people, effectively. It is not progressing equally in its ability to understand the responses of the American people.

There are, however, some acceptable means of listening to the people. The White House last year received more than three million letters and telegrams from Americans. This is the largest volume in history, illustrating their desire to communicate.

Much can be learned from mail in this volume because it represents a cross section, not just the letters from the directed few. The President sees a representation of this mail. Key staff members see much of it. The effort is made to answer *all* of it.

Two-way communication can be developed also by checking with congressmen who are close to their constituents, by paying more attention to the questions officials are asked on their visits to various parts of the country than to what they are being told, by examining the content of editorials and by various studies—including polls.

We have experimented with "listening post" taping operations, recording interviews with people for condensation at some later time.

We have tried film on a few occasions.

All of these techniques give some insight into what the public is saying. But not enough.

The one major vacuum I see in reporting by the media is their coverage of the "silent majority."

The media have not developed a readable technique for gaining understanding of this majority section of the public. It is easy to pass this off by

**The news media should examine the question of whether they are too shallow too often.**

saying that the very silence of the majority means there is no news from it.

The news media should examine the question of whether they are too shallow too often, reporting the obvious instead of digging beneath the surface. They should be concerned with whether they are really chronicling what goes on in the nation if they fail to report and probe the thoughts and actions of the majority in either the black or the white community. For a good reporter, action need not be violent to be interesting.

When there is a demonstration or a riot on campus, those normally quoted are from the minority who have led the disorder. But shouldn't we also know about the students who made the decision not to participate? They are intelligent. They are articulate. What are their views?

When we neglect the silent majority in the black community, how can we pretend to understand the feelings of those who in the long run will be most likely to lead their neglected brothers to greater progress, economically and socially? Who understands the man who didn't participate in the Watts or Detroit riots, or the black, small-business man, or the silent black teacher?

Years back, many newspapers attempted to provide a forum for the views of the silent majority by running "voice of the people" columns. Most of those have been abandoned. Perhaps they became dull. If so, the fault seems more likely to have been the technique than the subject. Who says people don't make interesting news?

When Vice President Agnew challenged the networks to self-examination for bias, many broadcast officials were surprised at the volume of agreement and at the high education level of the formerly silent thousands who wrote protests. The measure of their surprise would indicate that ratings and readership studies do not provide real insight into the thoughts of the average viewer and reader.

The reaction of the silent majority to the major events of 1969, as illustrated by White House mail, frequently differs from the opinion of many of the nation's leading opinion leaders.

Today there is great interest in listening to the young, in seeking to understand them and in paying heed to the ideas of even the anarchists of both left and right, who are long on turmoil and short on answers to problems.

The young today are the best educated generation in all history, and they do have ideas worth examining and sometimes accepting. In the complex world of today, the old answers we have been giving for 30 years are more often than not inadequate.

But when we read the news today, or watch television, the young ideas we learn of are more likely to be those of the anarchists than those of the real thought leaders. Are we adequately reporting the ideas of the silent, thinking majority on the campus? What are their views on racial discord, poverty, war or the environment?

The views of both sides in the campus confrontation are necessary if we are to be able to analyze the unanswered question: Who will govern this country in the next generation—the informed or the uninformed, today's college anarchists or today's more reasonable students?

One of the greatest challenges to freedom today comes not from Government but from campus revolutionaries and anarchists who unlawfully disrupt our campuses, storm our streets and are intolerant of any voices but their own.

Not long ago, President Nixon presented eight Medals of Freedom, the highest of civilian awards, to seven newspapermen and one newspaperwoman for their contributions to this country. Most of those honored had served 50 years or more in the newspaper profession. Their experience added up to over 400 years, more than twice the years this country has existed. The singling out of these writers for a freedom award pinpoints the importance of great reporting and great communications to a free country.

The need for such reporting was great in the earliest days of our Republic. It is even greater as this nation enters into the decade of the seventies and nears the observance of its 200th anniversary. ☐

# TO COMMUNICATE IS THE BEGINNING

A candid statement of concern by the man who heads AT&T. Delivered originally as the commencement address at St. Louis University in June, it is reprinted here in full, a precedent for BTM, because the editors feel it fits. More than that, it is needed. What follows is a reasoned, seasoned, perhaps surprising view of today's turmoil, with a declaration that this, too, shall be resolved—people willing.

**by H. I. Romnes**

Last February, when I first received the University's invitation to speak at your commencement, I confess I was surprised. In my reply to Father Reinert, I surmised that there would probably not be many businessmen speaking at commencements this year—and events have borne me out. Among all my business acquaintances, I—as far as I know—am the only one. As the events of the Spring unfolded and the news came in of more and more unnerving campus confrontations, I couldn't help but ask myself, "Why me?"

For the first time in my life I fully understood the sentiments of the fellow in Abraham Lincoln's story

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that you have all heard so many times before—the fellow who was tarred and feathered and run out of town on a rail and who, when asked how it felt, replied that if it weren't for the honor of the thing, he'd just as soon walk.

A great many things have happened since last February. But even then it had been apparent for some time that a great many students have grown wary of business—and particularly big business. They appear to view the corporation as the embodiment of an Establishment that puts property and profit above human values, that somehow conspires to sustain a wretched and degrading war and stands in the way of an urgent reordering of our national priorities.

But back in February it was beginning to appear that the war was actually being wound down. And there was at least the beginning of hope that Americans, shocked by the news pictures of that demolished townhouse on West 11th Street in New York, might begin to ask themselves, "What are we doing to each other?" and seek more reasoned ways to solve their differences.

Then came a series of events that set us back.

The Administration's decision to send American troops into Cambodia, however earnestly intended it was as a move to save lives and shorten the war, appeared to a great many young people—and some not so young—as an escalation of the war and they reacted in numbers and with a degree of outrage that startled the nation.

Then four students died at Kent State—and two more at Jackson State. And six black people died in Augusta.

Across the nation colleges closed down—some for days, some for weeks. And some are still closed.

These have been strange and troubling times—and I, along with a great many other people, have found myself experiencing unaccustomed events, thinking unaccustomed thoughts.

For example, a few weeks back I found myself conducting AT&T's Annual Meeting in Cleveland while two or three thousand young people marched in protest outside, shouting their opposition to the war and our alleged complicity in it.

On your own campus, a number of your classmates took issue with my selection as your commencement speaker. In their view I was not a speaker appropriate to the times or a fit symbol of the aspirations of your generation. It is not for me to say that they are wrong. I would only ask you to grant that it might just be possible that a businessman, whether his views match yours or not, might be quite as concerned, quite as anguished over the events of the past few weeks as any of you.

In recent weeks I have received a great many letters, mostly from students and some of them deeply moving letters, asking me to speak out against the war in Vietnam. I have tried to answer every one of those letters. And it may surprise some of you who have the impression that business is comprised of people of absolutely identical views that just a little over two weeks ago I found myself in earnest and extended discussion with a group of AT&T management employees who had written to me urging me to make a statement of concern about our country's course.

I am afraid that in neither instance—either in my letters to the students who had written to me or in my discussion with our own employees—were my answers fully satisfactory. I can only tell you what I told them—and that is that whatever I might say about the war would be inevitably construed as the views of the business I head and that—on matters that are beyond our competence as a corporation—I do not believe I have the right to make such a commitment. The Bell System does—after all—employ nearly a million people and it is owned by more than three million—and I think it can safely be assumed that these people hold views about the war that are quite as various as those of Americans generally. By what right could I speak for them?

Furthermore, as a citizen, I would be seriously worried about the imbalance in our national decision-making process that might develop if corporations

exercised their influence—their alleged "power"—in political matters that are properly the business of the general body of citizens to decide.

"Crisis" is a word that I am most reluctant to use, even to describe so perilous a passage in our history as the present one....

Whether the urgency of the times permits my correspondents to heed—or even hear—these observations, I do not know. What I do know is that these discussions, distracting and demanding as they are, are not an empty exercise. For if there is a virtue in times of stress like these, it is that they force us to examine previously unexamined assumptions and test the reasonableness of what we have all too comfortably taken for granted. The questions I have been exploring with my young correspondents are not easy questions. They are at one and the same time political questions, economic questions and ethical questions. They force us to re-examine the role of the individual in relation to the institution of which he is a part. And—what is most discomfiting of all—they force us to re-examine our own motivations as well. I know that this kind of re-examination has been going on with a great deal of intensity on university campuses these days. I thought it might interest you to know that it is going on in business as well.

We hear a lot these days about the "crisis" in our society, about divisions so deep—between young and old, black and white, rich and poor—that they are almost beyond healing. "Crisis" is a word that I am most reluctant to use, even to describe so perilous a passage in our history as the present one—first of all because we have had so many "crises" in recent years that turned out to be simply problems and, second, because, however much the word might satisfy our own yearning for a unique place in history, it implies that somehow events have gone beyond our capacity to manage them. This I don't believe has happened

and—what is more—I don't believe we are going to let it happen.

There are a good many aspects of the current scene that I confess I just don't understand.

I do not understand, for example, how it can be believed that—in whatever cause they're used—shouted obscenities and mindless vandalism bring anything but discredit to that cause.

I do not understand how understanding is served by burning books or banks—or by flaunting the Vietcong flag while desecrating our own.

And I do not understand what it is that our society has done to some of its sons and daughters—very few, I am sure, but so often described as among the gentlest and brightest of your generation—that drives them to seek peace with the tactics of terror.

At the same time, I must tell you that I do not understand the members of my own generation who characterize—indeed stigmatize—yours on the basis of the actions of a tiny minority among you.

We had better begin to ask ourselves what is happening to our country before it is too late.

Nor do I understand those of my contemporaries who appear to equate dissent with disloyalty while at the same time they claim exclusive title to the badge of patriotism for themselves.

Finally, I do not understand those, whatever banner they march under, who use it as an excuse to vent their spite against ideas not their own, people unlike themselves.

What I *do* understand, however, is what every American must understand by now—and that is that we are a deeply troubled and divided country and that we had better begin to ask ourselves what is happening to our country before it is too late. We need—I think—if I may offer a modest prescription—three things.

We need to restore confidence in our ability to solve our own problems. In short, we need confidence in ourselves—and in each other.

We need, I think, to restore some measure of rationality to the processes by which Americans make up their minds on great issues and on small. And we need to communicate.

A new generation is demanding—sometimes stridently—a voice in the shaping of the world it will inherit.

Let me say just a few words about each of these needs.

For me, confidence that we can and conviction that we shall surmount our present difficulties comes from the reminder that this is not the first time in our history that we have been a deeply divided country. In my recollection, if not in yours, there has been violence in our streets before—and angry people watched by soldiers with bared bayonets. I am thinking of the 1930's when there seemed no answer but despair to the ever-mounting toll of lost jobs, lost farms, lost people. And there seemed no prospect either of resolving the sometimes bloody confrontations between management and labor. Then as now events seemed to be taking their own inexorable course and it appeared we had lost control of our own destinies. Yet somehow we found our way through—not by luck but because Americans had in that period, as I believe they have today, the will and the wit to renew their institutions—indeed to invent some new ones to match the challenge of the times.

There is one other lesson in that half-forgotten experience. Perhaps it is only a sentimental memory on the part of those of us who were young at the time, but somehow Americans seemed to grow closer together in those days and, when they were over, we were a stronger people as a consequence.

Once again American institutions are being challenged—this time not by the destitute but by the young. A new generation is demanding—sometimes stridently—a voice in the shaping of the world it will inherit. As I read it, the question that you put to us is

simply this: does the institutional framework of our society—this thing you call the Establishment—have the resilience to respond to the new needs of the times or are its purposes so limited, its processes so rigid that it cannot meet the needs of the more humane society to which you aspire?

The question, you must admit, is an arrogant one. But I happen to believe that you are in earnest. I

## What I would like to suggest is that there are limits to passion, however noble the cause that inspires it.

believe that you do in fact intend to change the world.

But what kind of a world that will be is going to depend in large measure on how you go about it. What I would like to suggest is that there are limits to passion, however noble the cause that inspires it. Sooner or later, when the last demonstration is done and the shouting is over, someone is going to have to apply himself to the hard tasks of building the new and better world you want. Someone is going to have to write the new constitutions that will open our institutions to the larger measure of shared decision making that your generation so clearly demands. Someone is going to have to devise the new technology it will surely take to mend the ravages of the old. Someone is going to have to address himself concretely to the task of matching our outmoded patterns of local government to the needs of a society whose problems do not stop at the town line. And someone is going to have to face the thankless task of reckoning the cost of what we want to do—and somebody is going to have to figure out who pays.

Obviously these tasks are going to take a great many somebodies. What I mean to suggest by this recital is simply that the achievement of your generation's aims, much as they depend on the conviction with which you pursue them, will depend even more on the plain down-to-earth competence you bring to

## The quality of our society will increasingly depend on the quality of its individual components....

the job. Developing that competence is lonely work, but how well you do it will determine, not merely your own satisfactions in life, but what your generation will have to show to its posterity when it comes your turn to make commencement addresses.

Through all of our country's history thus far, the individual has been the fundamental unit of value in our society—and I for one am not ready to grant that population growth or the massive scale of our problems have made the notion obsolete. Indeed, I would suggest that the opposite is true—that the quality of our society will increasingly depend on the quality of its individual components—the skills and energy that each of us brings to his chosen field of endeavor, the sense of responsibility that each of us brings to the tasks of citizenship.

Tomorrow's world, if we build it well, is going to be built, not in our streets, but in our town halls and city halls and in the corridors and meeting rooms of the Federal Government. It is going to be built in our schools and in our neighborhoods. And it is going to be built in business.

It is not my purpose here to recommend that any

## It is business that will provide the central testing ground of our ability to work together in dignity and mutual respect.

of you, if you have chosen otherwise, seek business careers. It will not surprise you, though, that I believe that business will in fact provide opportunities to shape the future as great or greater than some other pursuits that currently appear to offer more of the satisfactions of self-dramatization. In large measure

the resources we can apply to our social objectives and the opportunities our society will afford its people are going to depend on the performance of American business. And it is business, I believe, that will provide the central testing ground of our ability —the ability of all Americans—to work together in dignity and mutual respect.

But whatever path you choose in life, I hope you come to share what I deeply believe—and that is that what one man does—or does not do—even in a nation

## We appear to have lost the capacity to listen to each other with a decent respect for one another's opinion.

of 200 million people, a world of three billion people —can in fact make a difference. I recognize that I cannot urge this conviction on you without at the same time recognizing that those of us who are called leaders, if we would really lead, have a responsibility to do all we can to make sure that what I say is true, that our institutions do in fact provide freedom and scope for personal initiative and individual accomplishment.

And so what I have been saying comes down at last to a very simple injunction, perhaps too simple for an intellectual occasion like this one: Do a good job—and whatever you do, do it as well as you know how —as if the future of the world depended on it. Because it does.

Finally, let us communicate. Over the past year or so, my company has run a series of ads, illustrated with enigmatic figures in a strange and desolate landscape and bearing only these words: "To communicate is the beginning of understanding." I confess that when I first saw these ads I wasn't very enthusiastic about them. But somehow—if we can judge from the letters we have received from colleges all across the country—they spoke eloquently to a great many members of your generation. They said, your letters told us, something that desperately needs to be said—and I hope that, if we agree on nothing else, we can at least agree on that.

For surely, there is no more disturbing aspect of our times than that we appear to have lost the capacity to listen to each other with a decent respect for one another's opinions. Isn't it about time we restored some civility to public discourse? Isn't it about time that we abandoned slogans and in their stead addressed ourselves to the more constructive, if sometimes more painful, process of applying our rational faculties to the search for the right answers to society's problems—answers that, if they follow the pattern of the past, may never be fully satisfactory to anybody but that in the end may turn out to be best for everybody. And isn't it about time we stopped seeing each other as stereotypes and began seeing each other once again as individual human beings, all of us sharing the same human predicament, but each with his own hopes and anxieties, each with his own unique contribution to make in this world?

## There is a risk that in seeking to change others, we may be changed ourselves.

Perhaps a good place to begin would be to get rid of the notion that all the regiments of the concerned are ranged on the same side of age-30 and all the complacent and corrupt on the other. And should we not go on from there until at last we in this country no longer see each other simply as young or old, black or white, rich or poor, right or wrong but as particular human beings, each with ideas, feelings and aspirations to be judged not by their source but on their merits.

There are, of course, risks to communications. There is the risk that in the process we might discover that the world is a little more complicated than it seemed. There is the risk that we might discover frailties in our most firmly held convictions. And, finally, there is the risk that in seeking to change others, we may be changed ourselves. I think that these are risks worth running and I hope you do, too. □

The word "gap" came into prominence during the 1960 Presidential campaign, when John F. Kennedy accused the incumbent Republican administration of having ignored an invidious "missile gap" between the United States and the Soviet Union. The fact that it didn't exist seems, paradoxically, to have given "gap" a parasitic hold on our language.

Gaps abound. Credibility gaps yawn between politicians and their constituents, generation gaps divide parents and children, communications gaps frustrate understanding, value gaps distinguish haves from have-nots and whites from blacks and culture gaps aggravate tensions between East and West. The technological gap, product of still another imponderable, the "brain drain," has European businessmen wringing their hands. Life-style gaps pit Depression-raised parents against children of the affluent society. And now, according to experts who mine nuggets from this inexhaustible lode of misunderstanding, we have the ultimate gap: the gap gap, which separates my perception of a particular gap from yours.

There's humor here, to be sure, but it's curdled somewhat by the knowledge that many people believe, without examination, in the existence of those gaps, just as thousands of intelligent voters thought that "missile gap" described a very real weakness in America's defense system.

Political scientists claim that even without a missile gap, one had to be invented in 1960. That's not to say that John F. Kennedy didn't believe in the missile gap when he exploited it as a campaign issue; in fact, shortly after his election, he admitted that he'd been misled by inconclusive data, badly analyzed. But a slogan was needed, and the missile gap was waiting to be converted into political fodder.

We seem to live in an age of "overkill," an age when "tough-minded" men have "gut" reactions, an age gloomily reminiscent of 19th-century Germany, where philosophical romanticists preached the higher validity of feeling and emotion over the "cold" detachment of reason and logic.

And people who believe—who have been conned into believing—that raw emotion is somehow purer or more relevant than reason are people not unsusceptible to the nihilistic "logic" implicit in a remark


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# Understanding the Gap Makers

Gaps are special-interest projects conceived by people in pursuit of power. Their existence is an affront to the intelligence and maturity of man. They deny the quality of reasonableness as a human characteristic, breaking down every difference into questions that demand a "yes" or "no"—never a "maybe."

**by Donald H. Van Lenten**

made by one of Hitler's early admirers: "When I hear the word culture, I draw my revolver."

The culture and texture of life are undermined by gaps that separate parents from children, whites from blacks and students from teachers. That's true, whether the gaps exist or not—it's only necessary for uncritical people to believe they exist, and, out of that belief, the gaps will evolve, wide and very real.

Perhaps, as some people argue, we've been deliberately seduced into accepting the whole semantic stew of unbridgeable gaps. The language of the seducers is simple — it is the overkill jargon of pitchmen, sloganeers and counterrevolutionaries posing as saviours; devoid for the most part of analyzable content, its target is not the mind, but the gullet and the groin. What end does it have in view?

Power, it would seem.

Righteous intolerance, calculated affronts to human dignity, rhetoric studded with obscenities, half-truths, historical distortions—the whole mindless (intentionally so) cycle of supertaunts translates almost every form of human discourse across the gaps into exchanges of snarls and accusations.

In the political arena alone, as sociologist Daniel Bell said, such mindlessness can lead to the vulgarization of politics: "For if politics is seen as a case of either/or, one needs rhetoric that is simplified and does not admit of complication and compromise."

The experience of one student at an Eastern university typifies the tendency among some antiwar demonstrators, for example, to oversimplify efforts to end the war in Vietnam.

"People have a right," he said, "almost a responsibility, to make their opinions known. I don't think this demonstration (the November 15, 1969 march on Washington, D.C.) is anarchic. But I think there's a difference between making your opinion known and forcing it on others."

And what was the response to his reasonableness, his refusal to talk in "either/or" terms?

He was told by militants "Either [you're] for the war or against it. If you're against it, you protest. . . ."

Five people were arrested in New York City for a series of bombings allegedly designed to demonstrate the bombers' disenchantment with "Establishment" policies. A friend of the accused had this to say:

"Whether we like it or not, bombings are becoming a way of life in this country . . . some people, frustrated by long years of organizing and protesting, have begun bombing corporations and institutions which perpetuate and profit from the war . . . every American 'normally outraged' by the war is a potential saboteur."

Either/or. Either you see it my way, either you capitulate to my nonnegotiable demands, or I blow up your buildings. Anything goes.

Do you object to busing black children into your school district? Follow the example of white supremacists in a small Southern town: Wait until the bus is fully loaded, then tip it over.

Long hair distresses you? Follow the leader: Organize a band of spirited vigilantes, as some members of a Northern community did, and cut off any hair that offends you.

Or, if you're really ambitious — whether you're a racist, a Yippie, a member of the White Citizens Council, a Black Panther, a John Bircher or a dedicated militant (left or right) — follow the "recipe for violence" that political science Professor Aaron Wildavsky of the University of California sees, with despair, bubbling on public and private burners throughout the country:

"Promise a lot, deliver a little. Lead people to believe that they will be much better off, but let there be no dramatic improvement. Try a variety of small programs, each interesting but marginal in impact

and severely underfinanced. Avoid any attempted solution remotely comparable in size to the dimensions of the problem you are trying to solve. Have middle-class civil servants hire upper-class students to use lower-class Negroes as a battering ram against the existing local political systems. Then complain that people are going around disrupting things, and chastise local politicians for not cooperating with those out to do them in. Get some poor people involved in local decision making, only to discover that there is not enough at stake to be worth bothering about. Feel guilty about what has happened to black people. Tell them you are surprised they have not revolted before; express shock and dismay when they follow your advice. Go in for a little force, just enough to anger, not enough to discourage. Feel guilty again; say you are surprised that worse has not happened. Alternate with a little suppression. Mix well, apply a match and run."

Traditionally in the United States, political differences have been translated into economic terms to avoid self-destructive (either/or) confrontations between opposing ideologies.

Andrew Jackson's reconstruction of American democracy along populist lines, for example, took the form of an attack on the privately controlled Bank of America; Federal and state regulation of natural monopolies, a form of socialization implicit in democratic principles, has always been advanced as a measure to protect consumers and to conserve vital resources; Franklin D. Roosevelt's strengthening of Federal control over stock exchange practices was accepted as necessary to maintain public confidence in a business community shaken by the Depression.

Only once in our history have ideologies dominated the field: the Civil War. And we still bear the scars of that conflict. Civil War literature is studded with abstractions. On the one hand, the anti-segregationists damned the South as a perverted culture based entirely on slavery, and, on the other hand, the slaveholders cited Biblical and historical justifications for the South's "peculiar institution." America's racial problems were not solved at Appomattox; the rancor of ideology frustrates their solution today.

Ideologies are sometimes gross prejudices or grand deceptions posing as ideals, and the degree of prejudice or deception is directly proportional to the intolerance and nonnegotiability of the language used to express them.

In his essay, "The Age of Overkill," Benjamin DeMott imagines himself looking back on the 1960's from the gentler perspective of the 21st century. He quotes people who did not admit of complication or compromise and who characterized their time:

"The decade's steady hounding of people 'over thirty' was led, for the most part, by public entertainers, 'rock groups' and the like. Beatle Harrison spoke against 'all those old fools who are governing us and . . . bombing us and doin' all that.' . . . James Baldwin, the novelist and essayist, spoke authentic 'overkill' whenever he appeared in public. (The author of "Another Country" was given to describing his country as the 'Fourth Reich')...Susan Sontag, a writer well known in that day, was no less fiercely ignorant in her essays on history and race: 'The white race is the cancer of history,' she said flatly. 'It is the white race and it alone—its ideologies and inventions—which eradicates autonomous civilization wherever it spreads, which has upset the ecological balance of the planet, which now threatens the very existence of life itself'."

Given that sort of leadership—and, one should add parenthetically, the undeniable excesses and stupidities, if only accidental, of certain "Establishment" lifestyles—DeMott continues, "Youth inevitably respond-

ed with explosions of its own . . . and the result was that by the end of the sixties, the entire articulate Anglo-American community — young, middle-aged and aged people alike—was transformed into a monster-chorus of damnation dealers. . . ."

Many feel it is time to resign from that monster-chorus of damnation dealers. Slogans debase the human relationships they pretend to describe. Generation gap, ethnic gap, culture gap, value gap, the entire string of fierce ignorances contribute nothing to human knowledge and understanding. At best, they either offer the ersatz comfort of an "explanation" or lead to that even more subtle comfort, submissive despair. And, at worst, they are indiscriminate categorizations, cheap labels which, as the Danish philosopher Kierkegaard observed, deny the existence of the people labeled.

Gaps are differences escalated beyond reason. There *are* differences between generations, between races, between cultures, between political parties, but they are not congenital—they are differences of perception, a matter of history rather than biology.

Why do people allow themselves to be huckstered into despair (or inertia) over these differences by manipulators whose goal is power and control?

Jean Piaget, a pioneer in child psychology, may have provided a clue in his book, "Language and Thought of the Child":

"In verbal intercourse, it would seem that children do not understand each other any better than they understand us. The same phenomenon occurs between them and us: the words spoken are not thought of from the point of view of the person spoken to, and the latter instead of taking them at their face value, selects them according to his own interest, and distorts them in favor of previously formed conceptions. . . . This phenomenon occurs, it is true, among adults. But these have had at least some practice in argument or conversation, and they know their faults. They make an effort to understand and be understood, *unless distrust or anger reduces them to a childish state,* because experience has shown them the *appalling density* of the human mind. Children have no suspicion of this.

"They think that they both understand and are understood."

There is distrust and anger in America today, and several sociologists believe that many of us have been reduced to a "childish state" and have forfeited, or at least placed in escrow, our experience of the "appalling density" of the human mind.

For example, a recent film on youth has one young man saying, "You (the over 30's) can't climb into my frame of reference and I can't climb into yours."

Statements like these deny the fundamental commonality underlying all human perception, the continuous filament of "dailiness" that runs through all human experience, past and present, and they ignore the sense of community that is indispensable even to full realization. Their acceptance as "truths" is symptomatic of moral and intellectual laziness, an aversion to conscious thought and effort, an easy inclination to live with slogans and labels because they offer cheap "either/or" answers to hard questions.

In "The Uses of the Past," historian Herbert Muller said: "Whatever higher faculties man may have—of feeling, intuition, in vision, trance or ecstasy—can be trusted only after they have been interpreted and judged by reason. Otherwise, anything goes: the visions of Buddha, Christ, Mohammed, Marx, Whitman, Nietzsche, and Hitler are on the same footing; and what goes best is apt to be blind unreason or brute force. No product of social intercourse is more precious than reasonableness, or more essential to attaining and sharing the goods of life. . . ."

The whole argument for liberty, for freedom, for self-realization, for democracy, rests on Pascal's dictum that thought makes the whole dignity of man, and that the effort to *think* well is the basic morality.

And human history, if only because man has endured, seems to substantiate the notion that there is no gap, real or imagined, that cannot be bridged by people willing to make that effort. ▢

# Business Service and Society

## Excerpts from recent talks by Bell System officers

"Today, my company, Western Electric, has some two and a half billion dollars of assets. If, somehow, we were able to liquidate these assets, we could give to every man, woman and child in the United States about $12.50. Perhaps we wouldn't divide it evenly—but, let's say, give every poor person $100. In a week or so, the situation would be much the same as before except some 200,000 Western Electric employees would be out of work; about 48,000 other businesses that sell us things would lose some two billion dollars worth of business a year; they, in turn, would contribute perhaps another 200,000 people to the unemployment rolls; the government would lose a quarter of a billion dollars a year in taxes; and, of course, the country's primary source of equipment to fill growing communications needs would be gone, with consequences too chaotic to speculate on.

"The point of this rather farfetched hypothesis is, of course, that it is the *dynamic,* the *vital,* characteristic of any business enterprise which gives it the capability to contribute to the economic well-being of the nation and its people. It is the circular, compounding effect of imagination, innovation and investment which creates jobs—which provide buying power—which expands demand—which encourages further innovation. And these are the characteristics of business enterprise... [being called] on to attack the problem of poverty—a problem which, in my judgment, no amount of government subsidy, or relief, or negative income taxes can permanently solve."

*Philip E. Hogin, Executive Vice President—Western Electric Company*

"Science can now begin to take us where we will know enough about human expression, about the relations between seeing and writing and speaking and listening, so that we can make systems for the consumer that extend his personality, fit his moods, and preserve the variety of his perception. The crucial feature here is that the system is guided by the human nature of communication, not by what great leap we can make with electromagnetic waves, relaying signals through satellites, or globe-girdling cables.

"The Picturephone® set, for example . . . can pick up and transmit an image of the speaker's face . . . in the individual's own home rather than in the unnatural environment of a precisely illuminated studio.

"Developments such as this strongly contradict those who say that science has sold us out, and that we have had imposed on us a disjointed series of facilities, such as Nader-like monster automobiles, phosphate-foaming detergents, thalidomide soothers, or all-black-and-busy-signaling telephones.

"But we must, in the future, be able to show more fully how new systems fit human function. In fact, the widespread criticism of reckless materialism may be related to our failure to combine the individual components of innovation and merchandising into really satisfying systems. We need to approach new systems through more definitive studies of human nature, in which the relation of the organic system to styles, designs, transport, clothing, foods, entertainment, and above all, education is more fully revealed."

*William O. Baker*
*Vice President—Bell Laboratories*

"I think we must assign number one priority to giving greater consideration to the social and psychological implications of our technological efforts. We must think beyond the old concept of planned obsolescence and make more products that will last beyond their warranty period. We must build new machines and devise new techniques to operate efficiently and at reasonable costs without adding to the pollution of our environment. We must take steps to assure the success of minority businessmen. We must analyze our service policies for possible discriminatory implications—or applications. We must, as a society, stop providing disproportionate benefits to one group of people—whether they are motorists, home owners or businessmen—at the expense of other and generally less advantaged groups.

"But, most important, we have to recognize that 'the system' is being challenged . . . that we are being challenged. And our answer to this challenge must be our readiness and ability to anticipate the social needs of our customers and to give these needs our utmost attention in research and development programs and in marketing and sales efforts.

"In practical terms, we have to sort out the many possibilities open to us and choose the ones that have a high social value. I am not saying that we ought to discard sound business judgment and become philanthropic organizations. . . . we should assess the human effects of our decisions. Human dignity must become a prime input in our decision-making processes."

*Zane E. Barnes*
*President—Pacific Northwest Bell*

# HOW THE CITIES SOLVED THEIR TRANSPORTATION PROBLEMS

## A FABLE

BY WILFRED OWEN

There once was a nation of 200 million people that was the most powerful country in all the world. At the national level the inhabitants were very rich, but at the local level they often turned out to be quite poor. And as luck would have it, they all lived at the local level.

Seventy per cent of the population was crowded into 1 per cent of the land, which they called cities. One-fifth of the city people were the victims of poverty. Many of them lived in slums where housing was unfit for living, schools unfit for learning, the air unfit for breathing and grass and trees were a novelty. To top it off, they were always stuck in traffic.

Now the leaders of the people decided that what the urbanites needed most were expressways to get the rich through the blighted areas faster, and subways to keep the poor from seeing how bad things were on the surface.

But the cities continued to grow uglier and the frustrations greater, and while the people were moving more, they were liking it less. And there were riots in the street.

Now the trouble with the urbanites was that they never caught up with the problems because they were always caught up in the symptoms. Traffic congestion was one of them. The reason for traffic congestion was basically that too many people were crowding into too little space, and without the semblance of community plans. In addition, the cities had old-fashioned streets never designed to move traffic, and lined on both sides with parked cars to make sure they didn't. The urbanites left no open space to balance off the built-up areas that generated traffic, and they put their housing as far as possible from the places people worked. So the possibility of getting a job was often missed by the impossibility of getting anywhere near it.

The commuting problem was compounded by an ancient tribal custom. People with light complexions worked close in and lived way out, while people with dark complexions were expected to work way out and live close in. As a result, the urbanites were always trying to get from where they shouldn't be to where they shouldn't have to go, and they all tried to get there at the same time.

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*Mr. Owen is a senior fellow at the Brookings Institution and is a graduate of Harvard University. He has served as an advisor to a number of government agencies in this country and abroad. He has published numerous articles on transportation problems and policies. The above story was originally delivered as a speech at an Urban America Conference in Washington, D.C.*

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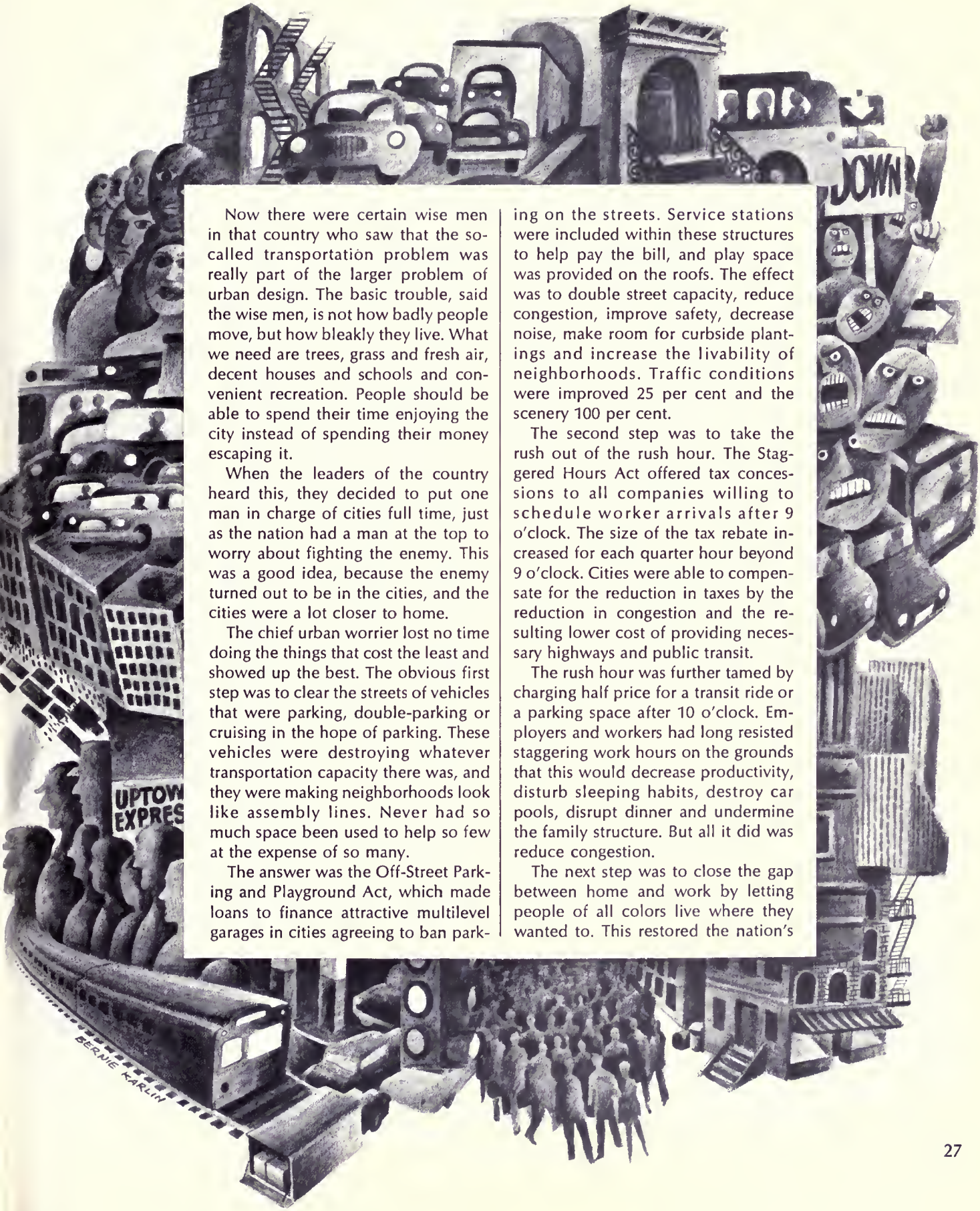



Now there were certain wise men in that country who saw that the so-called transportation problem was really part of the larger problem of urban design. The basic trouble, said the wise men, is not how badly people move, but how bleakly they live. What we need are trees, grass and fresh air, decent houses and schools and convenient recreation. People should be able to spend their time enjoying the city instead of spending their money escaping it.

When the leaders of the country heard this, they decided to put one man in charge of cities full time, just as the nation had a man at the top to worry about fighting the enemy. This was a good idea, because the enemy turned out to be in the cities, and the cities were a lot closer to home.

The chief urban worrier lost no time doing the things that cost the least and showed up the best. The obvious first step was to clear the streets of vehicles that were parking, double-parking or cruising in the hope of parking. These vehicles were destroying whatever transportation capacity there was, and they were making neighborhoods look like assembly lines. Never had so much space been used to help so few at the expense of so many.

The answer was the Off-Street Parking and Playground Act, which made loans to finance attractive multilevel garages in cities agreeing to ban parking on the streets. Service stations were included within these structures to help pay the bill, and play space was provided on the roofs. The effect was to double street capacity, reduce congestion, improve safety, decrease noise, make room for curbside plantings and increase the livability of neighborhoods. Traffic conditions were improved 25 per cent and the scenery 100 per cent.

The second step was to take the rush out of the rush hour. The Staggered Hours Act offered tax concessions to all companies willing to schedule worker arrivals after 9 o'clock. The size of the tax rebate increased for each quarter hour beyond 9 o'clock. Cities were able to compensate for the reduction in taxes by the reduction in congestion and the resulting lower cost of providing necessary highways and public transit.

The rush hour was further tamed by charging half price for a transit ride or a parking space after 10 o'clock. Employers and workers had long resisted staggering work hours on the grounds that this would decrease productivity, disturb sleeping habits, destroy car pools, disrupt dinner and undermine the family structure. But all it did was reduce congestion.

The next step was to close the gap between home and work by letting people of all colors live where they wanted to. This restored the nation's

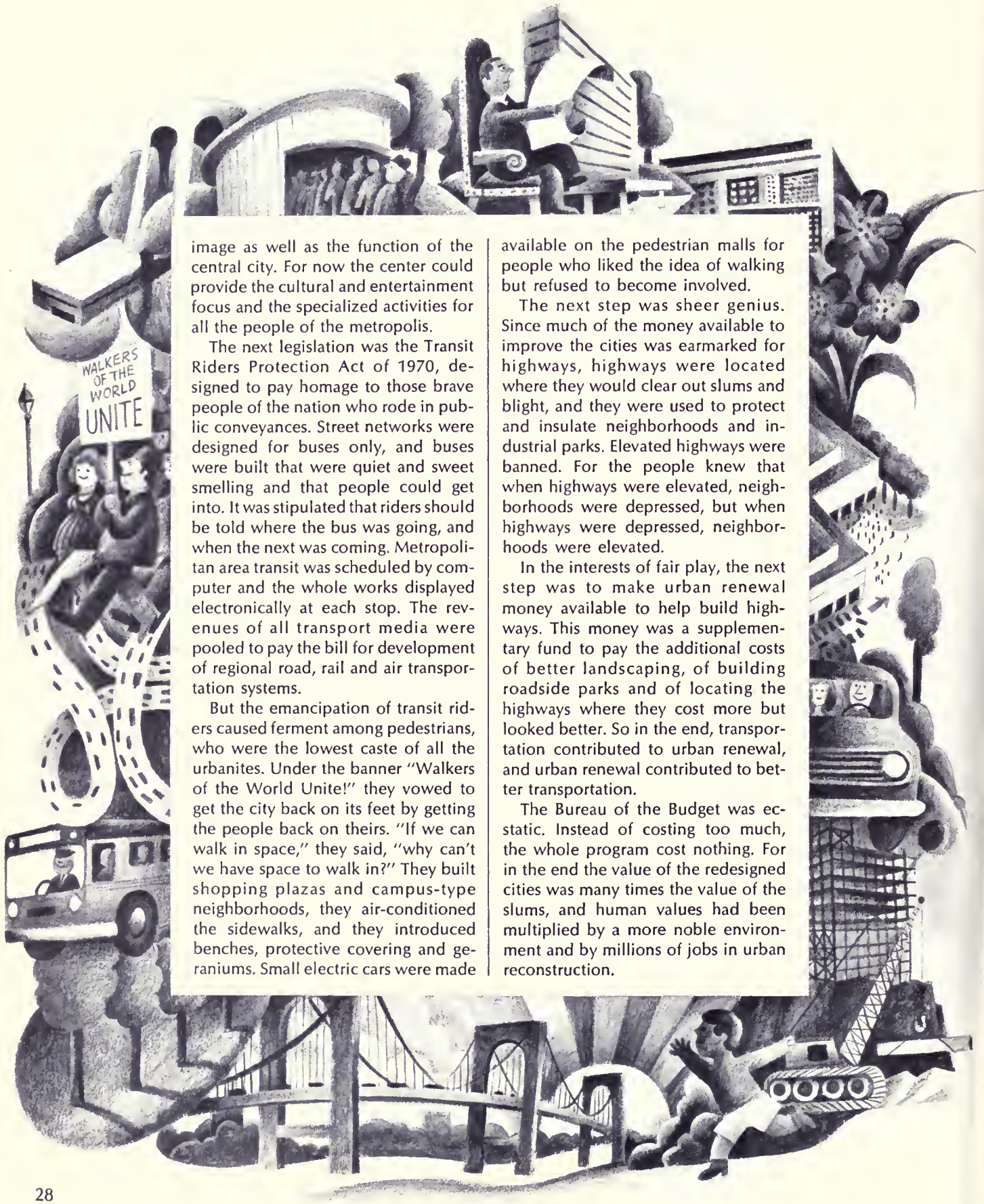



image as well as the function of the central city. For now the center could provide the cultural and entertainment focus and the specialized activities for all the people of the metropolis.

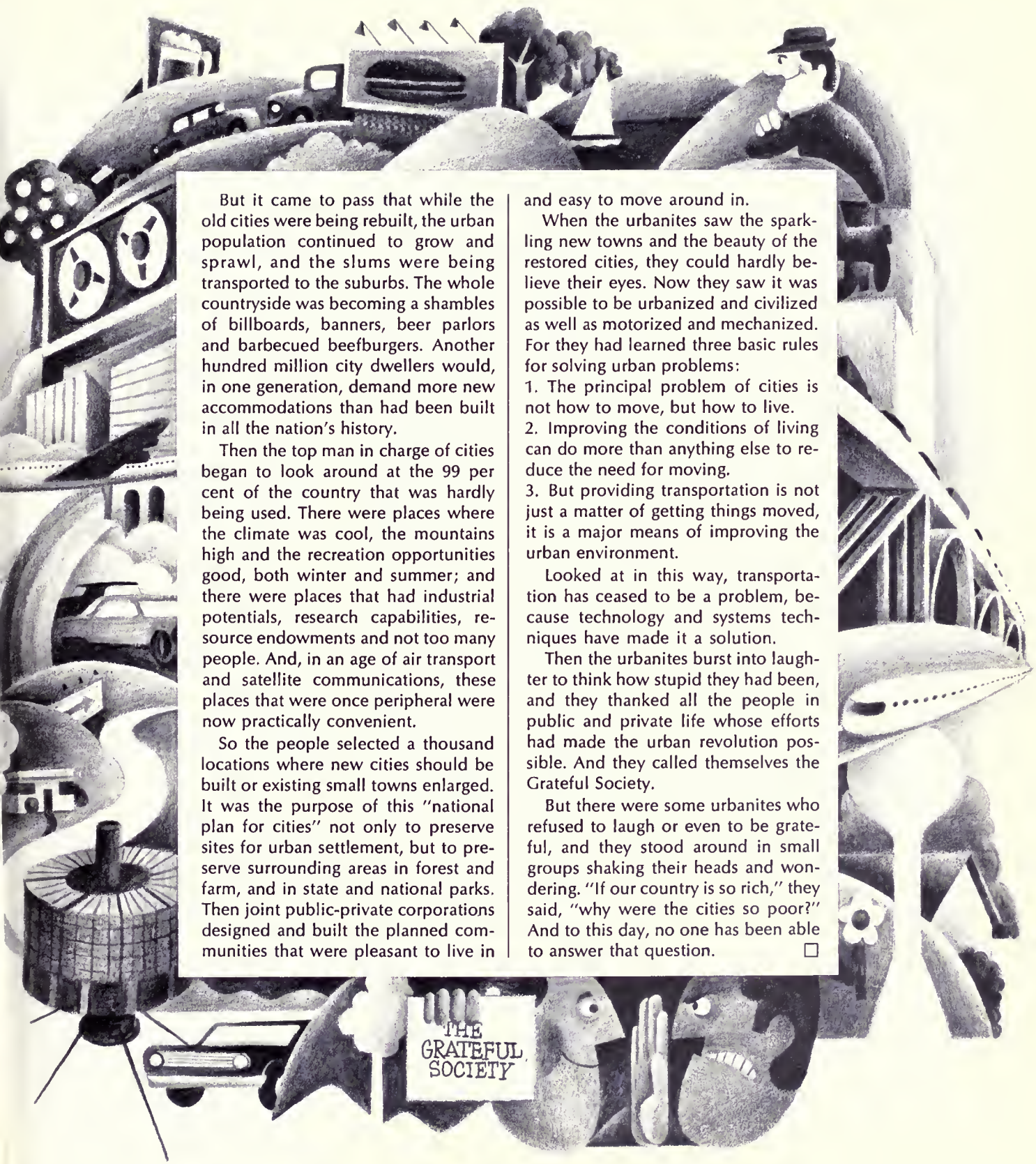
The next legislation was the Transit Riders Protection Act of 1970, designed to pay homage to those brave people of the nation who rode in public conveyances. Street networks were designed for buses only, and buses were built that were quiet and sweet smelling and that people could get into. It was stipulated that riders should be told where the bus was going, and when the next was coming. Metropolitan area transit was scheduled by computer and the whole works displayed electronically at each stop. The revenues of all transport media were pooled to pay the bill for development of regional road, rail and air transportation systems.

But the emancipation of transit riders caused ferment among pedestrians, who were the lowest caste of all the urbanites. Under the banner "Walkers of the World Unite!" they vowed to get the city back on its feet by getting the people back on theirs. "If we can walk in space," they said, "why can't we have space to walk in?" They built shopping plazas and campus-type neighborhoods, they air-conditioned the sidewalks, and they introduced benches, protective covering and geraniums. Small electric cars were made available on the pedestrian malls for people who liked the idea of walking but refused to become involved.

The next step was sheer genius. Since much of the money available to improve the cities was earmarked for highways, highways were located where they would clear out slums and blight, and they were used to protect and insulate neighborhoods and industrial parks. Elevated highways were banned. For the people knew that when highways were elevated, neighborhoods were depressed, but when highways were depressed, neighborhoods were elevated.

In the interests of fair play, the next step was to make urban renewal money available to help build highways. This money was a supplementary fund to pay the additional costs of better landscaping, of building roadside parks and of locating the highways where they cost more but looked better. So in the end, transportation contributed to urban renewal, and urban renewal contributed to better transportation.

The Bureau of the Budget was ecstatic. Instead of costing too much, the whole program cost nothing. For in the end the value of the redesigned cities was many times the value of the slums, and human values had been multiplied by a more noble environment and by millions of jobs in urban reconstruction.




But it came to pass that while the old cities were being rebuilt, the urban population continued to grow and sprawl, and the slums were being transported to the suburbs. The whole countryside was becoming a shambles of billboards, banners, beer parlors and barbecued beefburgers. Another hundred million city dwellers would, in one generation, demand more new accommodations than had been built in all the nation's history.

Then the top man in charge of cities began to look around at the 99 per cent of the country that was hardly being used. There were places where the climate was cool, the mountains high and the recreation opportunities good, both winter and summer; and there were places that had industrial potentials, research capabilities, resource endowments and not too many people. And, in an age of air transport and satellite communications, these places that were once peripheral were now practically convenient.

So the people selected a thousand locations where new cities should be built or existing small towns enlarged. It was the purpose of this "national plan for cities" not only to preserve sites for urban settlement, but to preserve surrounding areas in forest and farm, and in state and national parks. Then joint public-private corporations designed and built the planned communities that were pleasant to live in and easy to move around in.

When the urbanites saw the sparkling new towns and the beauty of the restored cities, they could hardly believe their eyes. Now they saw it was possible to be urbanized and civilized as well as motorized and mechanized. For they had learned three basic rules for solving urban problems:

1. The principal problem of cities is not how to move, but how to live.
2. Improving the conditions of living can do more than anything else to reduce the need for moving.
3. But providing transportation is not just a matter of getting things moved, it is a major means of improving the urban environment.

Looked at in this way, transportation has ceased to be a problem, because technology and systems techniques have made it a solution.

Then the urbanites burst into laughter to think how stupid they had been, and they thanked all the people in public and private life whose efforts had made the urban revolution possible. And they called themselves the Grateful Society.

But there were some urbanites who refused to laugh or even to be grateful, and they stood around in small groups shaking their heads and wondering. "If our country is so rich," they said, "why were the cities so poor?" And to this day, no one has been able to answer that question. □

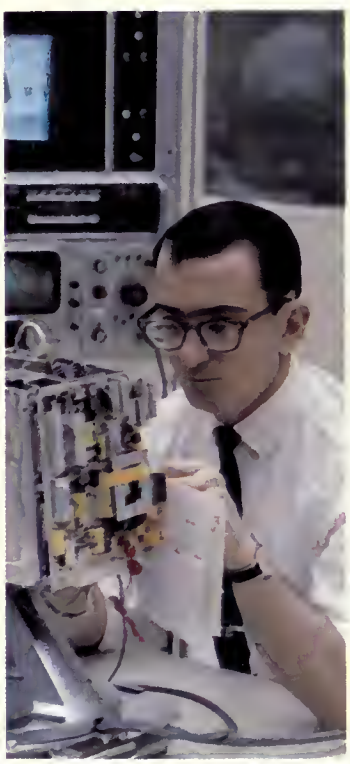
# Let's See Now

On July 1, the Bell System opened a new era in communications when Bell of Pennsylvania cut into operation the world's first commercial Picturephone® service in downtown Pittsburgh. The see-as-you-talk service initially involved 33 sets and eight business customers in the Golden Triangle area.

An inaugural call from Pittsburgh Mayor Peter Flaherty to John D. Harper, board chairman of the Aluminum Company of America, opened with, "Good morning, John, you're looking well. . . ." Appropriately, the conversation closed with, "Here's looking at you."

By 1975, most major cities will be part of the nationwide Picturephone network with nearly 100,000 sets in operation.

The photographs on these two pages show Western Electric people in Indianapolis assembling the sets. ☐



# Bell Reports

### More Cable Goes Sight Unseen

The Bell System is plowing right along in the effort to place more of its facilities underground.

In 1969, some 745,000 of 925,000 new construction sites in Bell operating territory were served with new buried distribution facilities. Another 180,300 locations, formerly served by aerial cable, were converted to buried distribution cable. This represents a 7 per cent gain over 1968.

Significant gains were also reported in the placement of duct miles of underground conduit, which rose 72 per cent from 12,494 miles in 1968 to 21,505 miles last year. It is estimated that Bell companies will place another 29,000 duct miles of underground conduit this year.

Despite the Bell System's effort to place more of its plant underground, there are still some places where physical and economic considerations dictate the use of aerial facilities. Aerial cable still comprises 57 per cent of the Bell System's total existing cable.

### Say 'Hello,' Mr. Computer

Machines that speak have been featured in many science-fiction films and stories. Until now no such machine has actually existed. But Bell Laboratories engineers have taught a computer to talk.

Nearly natural-sounding synthetic speech can be produced directly and automatically from ordinary English text. It's done by a computer that Bell researchers have programmed with mathematical approximations to the shapes and motions the human vocal tract assumes when uttering common sounds and common sequences.

In their experiments, passages are typed and sent to the computer from a teletypewriter. The computer analyzes the sentences, assigns stress and timing to each word, and finds a phonetic description of each word from its dictionary. Mathematical descriptions of vocal-tract motions are computed. These descriptions are used to generate electrical speech signals which may be heard over a loudspeaker or telephone. The typed sentence is stored for future use.

Possible uses for the new system could be in automatic information services which now generate "voice" answers from prerecorded tapes, or in systems requiring the storage of large amounts of data in textual form.

### Who Owns AT&T?

AT&T has more than 3 million owners, which makes it the most widely held security in the world.

Seventy-one per cent of its 549 million shares now outstanding are held by some 2.7 million investors in individual or joint accounts. The next largest category of shareholder is fiduciary accounts—estates and trusts—which number 300,000 but which control only about 3 per cent of the shares outstanding.

Institutions—banks, mutual funds, pension funds and insurance companies—are big investors in AT&T, and in the past two years have increased their holdings from 18 to 22 per cent of shares outstanding.

Brokers and security dealers are the remaining large group of AT&T owners. They hold the company's stock in "street name" for thousands of individual investors. These holdings total about 4 per cent of AT&T's shares.

Almost anywhere you go you will find someone who is an owner of AT&T—in each of the 50 United States, in all U.S. possessions and in 128 foreign countries and territories. But the owners of nearly half of AT&T's shares outstanding reside in just four states: 618,000 New Yorkers hold 144 million shares; 281,000 New Jerseyites hold 42 million shares; 237,000 Californians own 40 million shares, and 245,000 Illinoisans have 39 million shares. ☐

*A ball that can be heard provides blind children enjoyment and the motivation to move freely and self-confidently in a variety of games. The Audio Ball is the brainchild of Ina Guyer, a Mountain Bell employee, and was developed after six years' experimentation by the Colorado-Wyoming chapter of the Telephone Pioneers. The ball, which looks like a regular softball, emits a constant beeping noise from a battery-operated sound chamber buried deep in its protective stuffing. It is rugged enough to withstand being thrown against a concrete wall at full force by an adult male. Audio Balls are being made by 17 Pioneer chapters in the United States and Canada for blind children in their areas.*

ontinued from page 1)

me of our country's most pressing roblems with the objectivity and at e intellectual level reflected in these ritings has my respect and admira-on."—*from a power company official Illinois.*

". . . I would like to take this oppor-nity to compliment you *and your* mpany on a job well done."—*from a arketing manager in Pennsylvania.*

"The magazine . . . is outstanding d *Bell Telephone* can be proud of sponsorship of so excellent a pub-ation."—*from an oil company exec-ive in New York.*

"I wish to compliment you . . . as ell as *the American Telephone and legraph Company,* for publishing s fine magazine. . . ."—*from a banker California.*

## ligators at the Window

ost missives we receive are serious. t every now and then a letter ar-es that is not profound and not rtisan. It is merely fun to get. Here, instance, is an excerpt from a note m Mrs. Dorothy E. Mathews, who ns and operates a nursery school in dford, Indiana:

"After the family has read Bell Mag-ne, I take it to the schoolroom. I oose a page, I have my children ited on the floor, and for one min-: they study the picture. Then each ld describes what it looks like to n. I impress upon them there is no ong answer, and encourage each ld to 'see' something in the picture. er each child has shared his idea, plain, as much as they can absorb, out what the picture really is, and laugh about some of our ideas. . . ."

he full-page, color photo Mrs. thews wrote us about was from the rch/April issue, and showed a se-ius Bell Labs scientist conducting a sitive experiment with glow-

ing, gossamer strands of glass called fiber optics. Not all of Mrs. Mathews's scholars saw it that way. Among the descriptions:

"Half a butterfly's wing"—"A high-heeled shoe"—"Man sitting on a candle" — "Man, a little red, trying to see if his head is on fire"—And, "An alligator looking in the window."

Alligators, indeed, Mrs. Mathews!

## To Bangalore and Beyond

Should some reader suspect for even a second that Bell Telephone Magazine is read only by Hoosiers in the American heartland, that we lack a truly international style and cosmopolitan clientele, let us cite some of the cities, villages and hamlets on our regular mailing list. Not unexpectedly, we're read by one or more people in most of the population centers in Canada, Mexico, South America and Europe. But BTM is also mailed to a galaxy of destinations whose labels might well provide the text of a geography book by Dr. Seuss.

For example, we go to Ndola, Zambia, and to Suva in Fiji. They get us in Durban, South Africa, and in Bangalore, India. Accra, Ghana, is on our list, as are Addis Ababa in Ethiopia, and Mbabane, Swaziland. We also go to Port Louis on the Indian Ocean island of Maurititius.

And that's not all. Were Bogart alive today, one might imagine him scanning his copy of BTM under whirring fans in a white linen suit in a palm frond bar in Port Moresby, New Guinea; in British North Borneo; in Shanghai, Malta, Madagascar, Rangoon, Bombay, Calcutta or Gibraltar, for BTM goes to opinion leaders in those places, too. While we have no hard evidence that the magazine has influenced international economic and social policies, BTM nonetheless reaches readers in such active foreign centers as Cairo, Jerusalem, Saigon, Peiping, Istanbul, Havana, Budapest, Prague, Karachi, Bucharest, and Moscow (both Russia and Idaho). And we also go, with a flourish, to the shores of Tripoli.

## Think, Talk and Act Positively

Can a company magazine be both right and read? Can it pull together information of such relevance, originality and balance that readers feel that "this organization is sound, this organization is moving ahead, this organization is leading in ways and things that count, this organization is the very best of its kind, anywhere?" Can a company magazine vie successfully in the information explosion of commercial media, the trade press, memos, meetings, movies, books and TV for the precious time of busy people? Can it move them to think, talk and act positively toward a business?

Mr. H. W. Froehlich, general manager of the Diamond State Telephone Company, a Bell partner, thinks so. Because he feels this publication is right, he sends it to Delaware's Congressional delegation, to the Governor, and to his company's directors. Subsequent correspondence and conversation have convinced Mr. Froehlich that the publication is read.

"You frequently offer an abundance of material which can be used in helping to shape attitudes and to deal with our changing customers and employees," Mr. Froehlich wrote BTM. Then he said, ". . . our magazine does make an impact."

"Our" magazine. Nicer words were never written. At least not by a company manager about his company's magazine. ▢

AT&T

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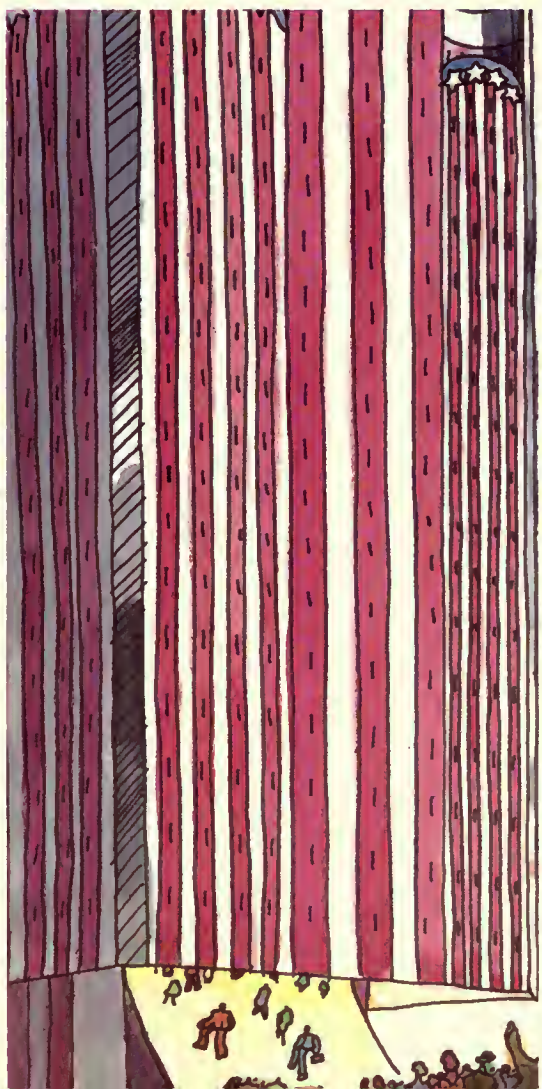
September/October 1970

# BELL

telephone magazine

How Technology Helps Them Heal and Teach

More Females and Less Formality for Business



# At Work In Maine And Minnesota

A recent issue of a Bell Telephone Laboratories publication reported that Alton C. Dickieson, long a vice president of that esteemed organization at Murray Hill, New Jersey, is retiring to a new home he's named Sky Mountain Ranch, in Arizona. As is the altogether appropriate custom when a Bell System company bids adieu to one of its stars, he was asked to comment on his past and on his plans.

Said Dickieson, among other things, "what really impresses me is that I've always enjoyed the people, the work and everything about it."

Such thoughts were perfectly suited to the occasion and to the man. For Dickieson was himself a mainspring in one of the most inspiring people projects the Bell System or any business enterprise has ever organized.

Eight years ago Alton Dickieson had the overall responsibility for the Telstar® communications satellite experiment. He gathered together from all over the Bell System one of the most astounding assortments of scientists, engineers and technicians assembled anywhere up to that time. In a nonstop, 21-month effort they designed and produced the first active communications satellite capable of two-way telephony and television transmission, a 380-ton horn antenna and associated computer complex in Maine, and a similarly imposing collection of instruments in France.

The test came on June 9, 1962, deep in the crisp pine forests of upper Maine. Most men go up there to catch big fish. Dickieson and his men did too, in a way. But their task was more akin to Ahab's pursuit of the great white whale than to some city dude's search for Rangeley Lakes bass. As the satellite, fired from Florida, arched overhead on its way around the earth that evening, the big horn a half mile down the lane "turned like a ballet dancer," caught it, and Dickieson's men in the control room made history before the critical ears and eyes of much of the world.

Much was written about Telstar, at the time — about the economic system, the business organization behind the venture, and the many men who made it work. And properly so. For it isn't often that the public and the press have the opportunity to see so many really outstanding people pulling together against such odds, people such as those coolly manning the control apparatus at the space station on that day in those verdant woods, and to watch them bring off a miracle there.

Every Bell System man and woman, in spirit, was in the bunker with them when the historic contact was made. Each of us stumbled out of the complex with them when the first experiment ended, heard and felt the whoops of joy, the claps and thumps and exuberant shouts. There was nothing calm, collected and cool about that team then. They made so much triumphant clatter coming out of that control building they must have frightened moose for miles around.

As Alton Dickieson has said, in a masterful understatement, "it was a unique experience."

There have been other extraordinary events in which this Bell System has had a hand over the last few years. For epic drama and achievement, there were the first words from the moon, in July of last year — "Houston — Tranquility Base here — the Eagle has landed." And the subsequent telephone call from the President to the three men who made the trip, and who took the call on the moon. It had been a long while since any feat had lifted the nation as that flight did, communications permitted the ear bound majority of us to share the perience.

A few years ago, another Bell tem unit, put together from ev company in every part of the cou — different yet so similar to the Tel team—fashioned a special network tween the White House in Washing and the executive mansions and st houses around the nation. In c memoration of the 100 millionth t phone, the President held a simu neous conversation with 10 gover as the chief executives of the o states listened in on the wire. The work was so flawless, so infallible technologically perfect that some lookers found themselves awestruc the ceremony progressed from Cabinet Room to the capital citie

Yet, to some who have serve many a mighty communications p ect, there was never an event in w the emotions ran so high, in which feat was so fantastic from a comm cations viewpoint, where the pe were quite so superb as they wer that great day in Maine.

One tends to forget, of course cause in itself the performance not qualify as news, that the same men and women who made Te work eight years ago, and many, r thousands like them, have been d oping, operating and improving country's communications net right along, day by day and every before that singular event and since. A reminder of this occurre cently when a colleague returned a summer-long Bell System semir Minnesota.

"What did you think of your as ates in the session?" he was ask

"There was not an average among them," he said. "They wer brightest, most competent grou

eople that I've ever seen."

They were, it seems, yet another eam of Telstar types—still with us, still aking modern miracles, or prepar- g to, just as original, as inventive, as ble as the achievers who wrought ch wonders in the woods in Maine.

The man who spent the summer in linnesota and the man who asked m about his associates in the semi- ar have been friends for two decades. r many of those years they have een Bell System employees and rough those Bell System years their endship appears not to have just en- red but to have grown and ripened, so many seem to do in this business. t it is just as obvious that many cupations, many companies, cause ch serious strains among men that ce strong personal ties are often eparably ruptured.

This is not to disclaim those pres- res in Bell System work and life that st a man's sensitivity and durability. ere are tensions, conflicts, competi- e situations, deadlines and demands re that make a man face up to him- lf and to his associates and show, er the long run, what he can and nnot accomplish. But the service nction and operation of this busi- ss appear to bind men together her than pull them apart. It has quite ot to do with the purpose, the mis- n, the precepts of the enterprise it- f. People take on the tone of the als toward which they work. If those als are quality goals, the people rise match them.

Robert Frost wrote that good fences ke good neighbors. For our pur- ses here, it might be said that a od business makes good friends. d, conversely, good friends make ood business. That's what Alton C. ckieson meant, we suspect, when said, "I've enjoyed the people, the rk and everything about it." □


# BELL
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# CALL THE DOCTOR!

## As the supply of physicians and surgeons lags, bold new uses of communications help meet the nation's burgeoning medical needs

by
**Carter F. Henderson**

A young Claremont, N.H., mother, home after delivering a baby, complained to her family doctor that she easily became fatigued and seemed to be having great difficulty caring for the child. In addition, she was depressed and had expressed thoughts about suicide to her husband.

*Mr. Henderson is a management consultant who specializes in health care. He directs medical services at the Preventive Medicine Institute-Strang Clinic in New York. A graduate of the Wharton School of Finance and Commerce at the University of Pennsylvania, he was formerly London bureau chief of the Wall Street Journal and manager of public affairs at IBM.*

The family doctor, after an examination, ruled out major physical causes for her symptoms of fatigue and then made a telephone call.

A short time later, the young mother was in a small television studio at Claremont Hospital being interviewed by a psychiatrist 20 miles away at Dartmouth College's Hitchcock Medical Center in Hanover. The family doctor watched the interview in a room adjoining the hospital's television studio.

The young mother was convinced by the psychiatrist that suicide was not the answer and the psychia-

trist further reassured her by discussing tentative plans for immediate psychiatric care. Following the interview, the family doctor and the psychiatrist, via the same closed circuit television system, reviewed the patient's problems and concurred on both medical and psychiatric treatment.

A medical-sociological team at the Hitchcock Medical Center has been operating the 24-hour consultation service between Claremont and Hanover for nearly three years under a grant from the National Institute of Mental Health. It was the nation's first community-based closed circuit television and its primary objective is to enable family physicians to care for patients with emotional problems without sending them away from their homes and communities. The television consultation service is one of many examples of how modern medicine is suddenly and dramatically rediscovering the power of communications and the telephone network in the nation's unceasing quest for good health.

Since its invention nearly a century ago, the telephone has been an integral part of health care, as anyone knows who has ever raced for the phone in a medical emergency. It might even be argued that the first words spoken over the telephone — "Mr. Watson, come here, I want you!" — were prompted by a medical emergency: Alexander Graham Bell's fear that the battery acid he had just spilled on himself might burn his skin. (It didn't.)

## Computers Join Network

Today, however, totally new ways of using the telephone to improve our medical delivery system are being developed throughout the country. Kidney transplant candidates are being selected, brain damage and thyroid disease are being diagnosed, hearts are being examined, respiratory diseases are being detected, doctors are being educated and lives are being saved — with the aid of the telephone system.

University of Wisconsin Medical Center cardiologists, for instance, recently announced a system to enable every hospital in the state to use the telephone and computer facilities for electrocardiogram (EKG) analysis of heart disease. The system initially will read EKG measurements phoned in by technicians, and later accept data transmitted directly without human intervention. A computer will examine the EKG for each of the many types of cardiac disorders, record any abnormalities it detects and finally print out a simplified report containing patient and EKG data, diagnoses and suggestions for additional tests.

## Cardiacs and Communications

Lee Hospital in Johnstown, Pa., has just set up what it calls an "electrocardiograph network" which will permit heart patients to receive immediate treatment at night, on weekends or on holidays when there are no cardiologists on duty. The network consists of the hospital's four heart specialists who take turns at being "on call" in their homes during these periods. The duty physician has an EKG machine in his house which is connected to the hospital by telephone. Emergency EKG's are transmitted to the doctor at home who reads them and immediately telephones the hospital to discuss the patient's care with a physician or registered nurse.

Diagnosing thyroid disease has always been a difficult and time-consuming job. The thyroid is a small butterfly-shaped gland which straddles the Adam's apple, and its job is to accumulate the body's scarce supply of iodine and synthesize it into a hormone known as thyroxin. An insufficient supply of thyroxin causes the body's machinery to slow down. Too much thyroxin causes physiological overactivity that can lead to severe strains on vital organs.

A computer at the University of Florida Medical Center can now detect most thyroid conditions with great accuracy in the space of a heartbeat. Information on a suspected thyroid patient is keyed into a typewriter-like terminal and carried by telephone line to a data processing machine located across the campus at the university's computer center. The com-

puter compares the patient's condition with known diagnostic findings on 2,000 thyroid cases. And three minutes later a complete report is printed out on the terminal, listing diagnostic probabilities and a conclusion. Thyroid reports are made for the medical center's own patients, and for patients at a Veterans Administration Hospital some miles away.

Up until a short while ago, residents of Magic Valley, Utah, who were suffering from brain damage or nerve impairment had to travel 240 miles to Salt Lake City to be examined by a neurologist. To eliminate this journey and the risk to patients that goes with it, Dr. Donald Bennett, assistant professor of neurology at the University of Utah, has set up a "Telemedicine" system which makes it possible for these individuals to be examined by telephone.

The patient's electroencephalogram (EEG) is transmitted from the Magic Valley Memorial Hospital, and then transmitted over ordinary telephone lines to Dr. Bennett in Salt Lake City, who reads and interprets it. If a medical problem is uncovered, Dr. Bennett phones the patient's physician in Magic Valley, consults with him on the patient's medical history and then works out a diagnosis which might be anything from a migraine headache to cancer of the brain.

## Telephones Aid Transplants

Another recent advance is a computer communications network that within seconds will determine which patients are most suitable for kidney transplants among candidates available. "Since no more than six hours can elapse between removal of a kidney and completion of the transplant operation, the time factor is a critical one," said Dr. Robert K. Ausman, deputy director of the Florida Regional Medical Program. "With the computer system," he added, "the physician can match a kidney against hundreds of potential recipients in *seconds*, compared with the 10 to 12 tissue matches an *hour* that are possible with conventional manual methods."

The fastest-growing new killer in America is a lung-ravaging disease called emphysema which causes a deterioration of the lung's tiny air sacs. This makes it increasingly difficult for the person to exhale, causes stale air to build up in his lungs and makes him gasp for breath. Early diagnosis of this incurable disease is vitally important if it is to be controlled.

## Lung Tests Via Long Distance

Now a simple lung function test for emphysema and other respiratory diseases such as chronic bronchitis has been developed which can instantly detect these killers, and can be given to people in remote communities via long-distance telephone lines. The University of Nebraska Medical Center in Omaha and the Latter Day Saints Hospital in Salt Lake City offer these examinations. The Latter Day Saints Hospital recently staged a "health fair" in several communities some 60 miles away in the Kamas Valley, Utah, in which nearly 300 people were checked for emphysema. The presence or absence of emphysema was determined by a spirometer which measures the volume and rate of air leaving a person's lungs. This data was transmitted over telephone lines to the hospital's computer center where it was compared with normal exhalation volumes for persons of the individual's age, height, weight, sex and other variables. The computer instantly calculated the extent of the damage from emphysema, if any, and relayed the results back to Kamas by telephone within two seconds — compared to hours or weeks using prior methods. No agonizing waiting period was necessary before getting the results, and the residents of the Kamas Valley either walked away free of worry, or if emphysema had been detected, at least encouraged by the knowledge that treatment to control the disease could begin immediately.

An even more dramatic use of the telephone can save people from all manner of accidental tragedies. Medic-Alert Foundation of Turlock, Calif., for example, supplies each of its 325,000 members with a metal identification bracelet with the number to call for a

computerized file on his medical history. "A few months ago," recalled one of Medic-Alert's members who suffers from diabetes, "I was visiting a group of friends when I went into an insulin reaction. I became very wild and violent and ran out on the lawn just as a police patrol car drove by. The police thought I was intoxicated and were going to take me to the station. My friend could not convince them that I was a diabetic and needed medical treatment until he remembered my Medic-Alert identification which he showed to the police who immediately phoned for my medical history and took me to the hospital." Laugh-In's Dan Rowan wears a Medic-Alert bracelet to inform others about his diabetic condition, as does the New York Mets' Manager, Gil Hodges, because of a heart problem.

While the telephone system is directly improving medical treatment for the patient, it's also helping him by bringing new sources of medical knowledge to his physician. Physicians have a Herculean task of keeping up with the explosion of new medical knowledge which is growing so fast that today's medical school graduate may find that 75 to 90 per cent of his observational and treatment armamentarium has become obsolete by the time he's 45.

To cope with this problem Ohio State University's College of Medicine, under a grant from the U.S. Department of Health, Education, and Welfare, launched a program of computer-based medical instruction to help physicians and other health professionals in remote communities keep abreast of new developments in medicine.

## Updated Information Handy

Computer terminals were installed in four outlying Ohio hospitals and linked via telephone lines to a computer at the College of Medicine. Physicians working at these hospitals can use the system to receive the latest information about medications and treatments available for a particular disease, or to take refresher courses in their area of specialty. The system will also offer specific courses of instruction to nurses, physical therapists, dietitians and other health professionals. Each participant proceeds at his own pace, and is guided to correct answers if necessary.

Here is a typical exchange which might take place between doctor and computer:

Computer: Erythroblastosis fetalis is a hemolytic disease caused by the incompatibility between the blood groups of the mother and child. The RH factor is the most important cause of most such incompatibilities. What must be the RH factor of both the mother and father before such incompatibility can take place?

Doctor: Mother RH negative; father RH positive.

Computer: Correct. If the mother is RH positive and the fetus is RH negative, incompatibility can develop. If the fetus and mother are both RH positive, both RH negative, or the fetus is RH negative and the mother is RH positive, no incompatibility will arise. Since this incompatibility will not arise until the mother is sensitized (so that she makes antibodies against her fetus), when does the incompatibility usually occur?

Doctor: In the second or third pregnancy with an RH positive baby.

Computer: Correct. In order to sensitize the mother it usually takes one or two pregnancies with an RH positive fetus, or a transfusion with RH positive blood. In other words, the disease usually occurs with two or more pregnancies.

"One of the traditional problems of medicine," said Dr. Lloyd Evans, of Ohio State, "has been the time required to disseminate new medical developments and techniques to practicing physicians. This system should do a great deal to relieve that problem."

Another pioneering approach to continuing education for physicians is developing in a number of states. The Wisconsin Regional Medical Program offers the state's doctors over 350 different telephone lectures to refresh and update their knowledge on subjects such as allergy, blood and lymphatics, cancer, gynecology and obstetrics. These 5- to 6-minute taped lectures by leading medical authorities also

cover the emergencies including cardiac shock, kidney failure, pulmonary edema, anemia, penicillin allergy, bee-stings and even aspirin poisoning. A similar lecture bank at the University of Missouri Medical Center in Columbia, Mo., offers 500 telephone lectures on a wide range of subjects 24 hours a day, 7 days a week. "Ultimately," said Charles Sargent, assistant director of the program, "we plan to increase the number of taped lectures to 5,000."

## Easy Access to Experts

One of the most impressive examples of advanced medical communications occurred earlier this year in Davas, Switzerland, when 2,000 doctors attending the 18th International Congress for Postgraduate Medical Instruction were linked by closed-circuit television with the National Aeronautics and Space Administration's facilities in Houston and San Antonio, Texas. The doctors saw American specialists discussing the latest developments in early cancer detection and the relationship of space medicine research to everyday medical practice. The "Medicine from Continent to Continent" program, using satellites for relaying the live telecast to theater-sized screens in Europe, was sponsored by the CIBA Corporation of Switzerland, and seen simultaneously by 25,000 additional physicians in 10 other Swiss, West German and Austrian cities.

One exciting new development which goes a step beyond pure medical education is a new system that allows pediatricians to privately consult with a board of the nation's most distinguished authorities in children's diseases any time of the day or night without ever leaving their offices. The experts are men such as a professor of pediatrics at the University of Pennsylvania Hospital, and the physician-in-chief at Philadelphia's Children's Hospital, whose knowledge and experience in diagnosing congenital and acquired diseases in children is contained in the memory bank of a computer system introduced last year.

These experts constantly update the data in the computer's memory bank to reflect important new things they've learned in their daily practice of pediatrics. Physicians connected to the system can now examine sick children brought to them, and key their findings (i.e., elevated temperature, systolic heart murmur, etc.) into a teletypewriter terminal which relays them to the computer over telephone lines. The computer compares these observations with those stored in its memory, and responds with a printed listing of diseases or syndromes which the experts have decided are compatible with the examining physician's findings on the child's condition.

One interesting advantage of a computer-assisted diagnosis system is that it may help protect physicians who are sued by their patients. Something like one out of seven physicians is being sued these days, and the doctor's position would be strengthened if he could show that he had "consulted" with experts.

All of these important new ways of advancing the dissemination of medical knowledge will free the physician to practice medicine on a much higher plane than he can today. These communications-based networks will undoubtedly spawn whole new fields of life-giving medical expertise, as happened with the electrocardiograph. In the meantime, these new uses of the telephone network are helping to relieve the current shortage of physicians by extending the individual doctor's scope and reach.

## New Era in Medicine

Where is all of this new medical technology leading? Part of the future is discernible in the experimental programs at the National Institute of Health's Division of Computer Research and Technology in Bethesda, Md. Much of this work utilizes the regular 12-key push-button telephone which Dr. Arnold W. Pratt, director of the division, believes will provide the cheapest and most efficient way to plug the nation's physicians into the growing number of medical communications services being made available to them. Some of the division's programs were described

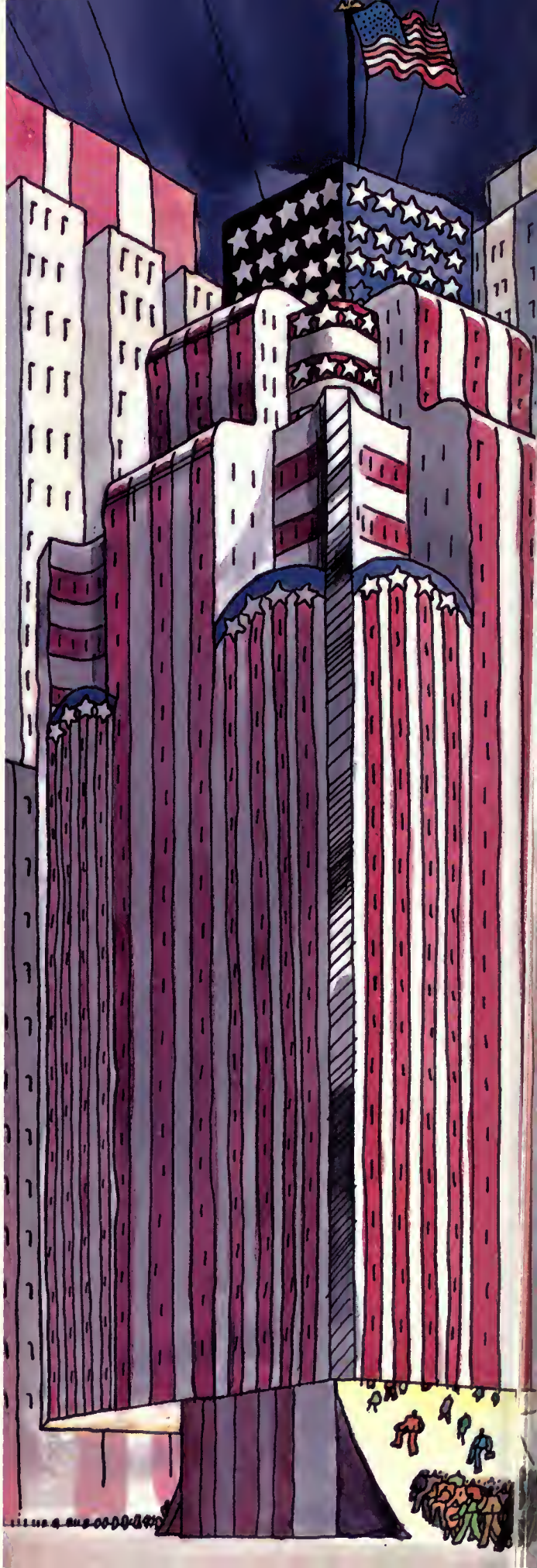
in the *Journal of the American Medical Association* by Scott I. Allen, M.D., of the division's computer systems laboratory.

One of these programs, for example, can help a physician diagnose a patient's symptoms, while another prescribes the proper medication and treatment. Suppose a seriously burned baby was rushed to an emergency clinic. The doctor could pick up the telephone and punch in coded information on the baby's size and weight, along with how much of its body was burned. Seconds later he would get back treatment advice including proper quantities of saline and dextrose solutions, blood transfusion requirements and the need for tetanus shots. Precious time saved on working out these elaborate calculations could save the infant's life.

Dr. Pratt and his associates have developed a prototype system which will shortly enable physicians from anywhere in the country to receive computer-assisted diagnosis data on a wide variety of diseases, as well as information on drug compatibility and toxicity, by simply pushing buttons on their telephones. Answers to the doctors' questions will be delivered by the new system's automatic voice response unit.

The contribution which the telephone system, the computer and other advanced instruments can make to the practice of medicine is profound in its implications. There will be problems, of course. These systems are costly, and medical care in America is already too expensive and becoming more so. Physicians responsible for the care and preservation of human life do not rush to embrace untried new developments of any kind. And there is still a question as to whether the suppliers of these new medical services could meet the demand for them if they suddenly caught on within the medical community.

But these problems must and will be overcome because today's society simply cannot accept the old ways of practicing medicine. New medical knowledge is growing too fast. The supply of physicians is growing too slowly. And a rising population is demanding better medical care. ▢



# Who Should Participate?

**by John J. Scanlon**

*Corporate spokesmen have been writing and talking about "The Management of Change" ever since, probably, the first rustic entrepreneur sold the first crude wheel to a less opportunistic and footsore fellow primitive. But rarely, if ever, in the history of commerce has a decade dawned with so many new demands from so many different directions upon the once relatively insulated institution of Big Business. If 1970 can be interpreted as a microcosm and a harbinger of the decade it introduced, then it is likely to be a tough 10 years for many business organizations. Indeed, such industries as aerospace and securities have already suffered mightily in this, the lead-off year of the seventies.*

*With new pressures — from women's liberation to ecological accountability — being brought to bear upon business, alert corporations are tooling up for these new times. The conventional profit incentive remains, as it always must. But the goals of business are broadening. The conventional values are changing.*

*To accomplish new goals and honor new values, and so continue to grow and to contribute its products, services and jobs, Big Business will be doing things differently from here on out. Looking the protesting, promising, precedent-setting Seventies squarely in the eye, a senior AT&T officer predicts some significant shifts in business management in the years ahead.*

No one can specifically predict what changes will take place in basic corporate philosophy and objectives. However, we already have witnessed growing trends by business management in becoming increasingly more responsive to the needs of society. The recent commitment by businesses to provide work opportunities for the previously unemployable is one example. Others include today's corporate concern in consumerism, anti-pollution and women's rights.

With this responsiveness, however, corporations and society face a challenge: that of melding those groups—ranging from welfare recipients to graduate students—who are demanding a greater participation in decision making with those who traditionally have played the major role in our policy making. The latter are generally thought to be experienced and highly knowledgeable about the present technological, economic, social and political factors involved.

The corporate structure also has been changing because of this responsiveness. It seems fairly certain that participatory management will grow and — as a result — there will be a lessening of authoritarian action by management. Corporations, in effect, will be more open — more like large social organizations than militaristic institutions — as they attempt to respond more effectively to community pressures. These pressures, in part, have resulted from management's failure to adequately judge the depth and significance of public opinion on certain issues.

Hopefully, new management techniques will help provide more reliable indicators of the ramifications of corporate actions. The ability to gather more accurate and meaningful data, and the knowledge to process that data against a series of variables, will provide management with a range of options that would otherwise not be possible. Such possibilities, however, may tend to centralize decision making unless management makes a concerted effort to remain close to the society in which it operates. Efforts toward greater contact and interplay of ideas among leadership of various public and private institutions are among the things that will be basic.

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Within the corporation, it seems apparent that we must move gradually toward organizational forms that will:

Give employees at all levels more personal command over the shape and pace of their own work. (We have, in many cases, so over-specialized or fractionalized jobs that many individuals cannot identify with a whole job and, therefore, no longer take personal interest and pride in their performance.)

Provide more informal working environments, with a reduced sense of hierarchy. (To the extent possible, work units should be more project-oriented — and structured more to the human scale — so that the individual can retain a voice in priorities and direction.)

In addition, management should think seriously about how leadership can be developed to function effectively in the face of today's pressures and fast-paced change. As Melvin Anshen, professor at Columbia's Graduate School of Business said, tomorrow it may well be "more important to make correct decisions about the direction, training and implementation of change than to maintain a high level of efficiency in administering steady-state operations."

The next decade will also see changes in the management of the major functional areas of business. There already is evidence that the traditional boundaries which were somewhat arbitrarily assigned to various departments are diminishing. The increased use of the systems approach to problem solving, the refinement of operations, research and the growth of the number of systems analysts are all examples of how once nearly sacred departmental boundaries have withered away.

## Redefinition Continues

The future is likely to see the manager of these major functional areas as a person with proven ability to break across artificial barriers among disciplines and professions. His or her ability to manage the intellectual resources of others could well assume overwhelming importance in the years ahead. And, instead of becoming more specialized, higher levels of management must be developed and organized to deal with matters in a broader context. Some businesses already have combined personnel, public relations and environmental affairs groups together because of the close interactions needed to bring about solutions to perplexing problems. Likewise, engineering, marketing and production or operations departments are being consolidated in an effort to achieve coordination and cooperation. I'm sure business organizations will continue this process of continual redefinition of the roles of various departments.

Impersonalization of large institutions, including corporations, is one of the critical problems we face today. We see it dramatized in many forms:

The rise of student radicalism and the alienation of youth;

The demand for equal rights and liberation by women;

The growth of the black nationalism movement with all its "Black Pride" ramifications, and

The continual changing composition of individuals and groups who one day are united on one issue and on the next day are at loggerheads on another.

## New Insights Are Required

It is evident that the employee will seek greater personal identification within the framework of his organization. Self-pride in what he does during his working hours will be more important than the accomplishments of the organization or institution as a whole. Already we see a diminishing of loyalties to the business. Instead — and especially for the highly trained — we can expect individuals to have a greater loyalty to their own discipline, whether it be a trade or a profession, than to the organization. It is through such an association that individuals will acquire the "community of interest" that they seek.

There also are indications that new insights are needed if we as managers are to engage effectively the best energies of young people who seem less concerned with money, status or authority. This also, as I mentioned earlier, would logically call for an increase in participatory management, if we are to tap the better-trained resources that higher education is delivering to the business community. But it does not follow that everyone, therefore, has earned his right to participate in establishing goals and priorities, as well as in determining the means of reaching those

objectives without having first demonstrated his competence.

The question comes to, "Who should participate?" The answer perhaps should be, "Everyone — or every element of society — to the extent of his ability."

## More and Better Planning Needed

There is no question but that business will be held even more accountable for the effects of its actions than it has been in the past. But instead of being held accountable to just one group — stockholders, for example — business will have to demonstrate its accountability to several institutions at once.

It is likely that business will be faced with ambiguities, with conflicting measures of success. What might be a responsible action for one group would be deemed an irresponsible act by others. It's also generally recognized that we don't know enough about the potential impact of our actions, and especially *how* new technology is going to change our life-style.

What is even more perplexing is that we don't know how we would *like* it to alter our lives.

The predicament in which we find ourselves leads us to goals and objectives and the question of how business will accommodate its views and proposals to the societal needs of the seventies and eighties.

In a social sense, the word "planning" has some ugly connotations but it is obvious that, as society grows in complexity, more and better forms of planning will become necessary. And no one institution or organization — whether it be the government, the university or the business community — can establish priorities by itself. In both goal-setting and developing plans for implementation, it will be necessary to obtain the cooperation and coordination of segments of government, education and industry. Problems associated with urbanization, for example, involve a large amount of interaction between public and private organizations. So do problems related to transportation, health and education. Increasingly, such problems will call for business managers who can skillfully bring together experts of government and education into the planning stages. And we may very well see a growth in the number of individuals who — during the course of their careers — hold responsible positions in the various segments of our society.

It is undoubtedly clear that corporations will, to an even greater degree than at present, have to identify their goals with those of the society in which they operate. This will require that business leaders establish such goals mutually with various sectors of that society.

The problems of the magnitude that business and society face will not be solved overnight, and — in all probability — the decisions reached by corporations in approaching them will not come as lightning bolts, but in small increments along the way.

In attacking these problems business should start with the premise that a monolithic business view or approach to the issues is not only undesirable but also unattainable. Such an approach could lead to an "automatic" response on many questions. This would serve neither the business community nor the broad public interest. Corporations will be better served in shaping goals to the public interest by speaking out on sensitive issues, by participating to a greater degree in the political process (in its best sense) and by giving attention to the diversity of views so as to determine the best course for the community or nation.

## Business Must Keep Informed

Another pitfall that must be avoided is the possibility of applying our best knowledge and resources to the attempted resolution of social problems without clearly defined goals to justify — and evaluate — the investment.

We must recognize that business is not necessarily endowed with divine wisdom in matters of national interest, particularly in social areas.

And we must recognize that if business is to be more effective in shaping national goals, it must assume the responsibility to keep itself informed by staying abreast of emerging societal trends.

In the final analysis, the only basis for an organization's authority in terms of national goals and priorities lies in performance . . . not only in economic or technological areas, but in its total conduct as an institution and in its responsiveness to society. The concept of corporate responsibility — and public accountability — has broadened considerably. □


When a male college graduate applies for a job in industry, he's given an aptitude test. When a female with a degree applies, she's given a typing test. A radical feminist declares it's time to call a halt to such inequities and forecasts some major changes ahead in the relationship between women and big business.


by Susan Brownmiller

Some friends of mine and I, encouraged and inspired by the women's liberation movement, have been thinking of late that the way we'd really like to spend the next decade of our lives is in the creation and publication of a slick, mass circulation, feminist women's magazine. Not only is there a need for our product (the philosophy of the existing women's magazines runs counter to feminism) but, to judge from the growing acceptance of feminist ideology, the market is expanding daily. And who is better equipped to fill this new need but ourselves?

Tentatively reaching out into our wide circle of acquaintances for topflight womanpower to fill the key slots in our proposed corporate hierarchy — truly feminist, ours is to be an all-woman venture — we

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made an unhappy yet sadly realistic discovery.

We had no shortage at all on the editorial side. Indeed, our nameless magazine is prematurely wallowing in editors, copy chiefs, art directors, illustrators, journalists, poets and proofreaders. It also boasts a loyal stable of fledgling, though undeniably talented, writers willing to work for practically nothing and who, it appears, have been waiting all their lives for just such an opportunity. But while sheaves of unsolicited poetry — some good, some not so good — find their fragile way into my mailbox with engaging persistence (the supply of poetry, alas, has always exceeded demand), our determined, hard-core nucleus is still minus the critical personnel that can make the magazine *work*.

## Fulfillment found in the arts

Where is the womanpower on the business side of our venture? Where are our eager sales and circulation managers, our advertising reps, our cost accountants, our "money women" — those who have capital to invest or those who know how to raise it? If they exist at all, they have not yet made themselves known to us. Our project may die aborning for want of women who (1) *like*, and (2) *have experience in* the world of business.

Practical business experience and a solid enthusiasm for the same are two things that most women lack. The former has been systematically denied to us by convention; the latter has been sociologically bred out of us by the same convention. Shut out of practically all financially rewarding and meaningful jobs at the managerial and executive level, most of us of the female sex have vested business with both cold mystery and a kind of tawdriness that we consider, in our feminine way, to be rather beneath our dignity.

It is no accident that an ambitious, career-oriented woman (the strictures of our society have allowed but a few of these to flourish) almost without exception looks to the arts for her fulfillment, seldom to the business world. From early childhood a young girl is allowed to develop her verbal skills, but not beyond the point at which she might become "serious" about them, because verbal ability, after all, is considered cultured. But mathematical ability, spatial relations and shrewdness are considered verboten — unfeminine, if you will.

Competition, the backbone of the business world, has long been considered a masculine aptitude. To make a "deal," and to wring from that deal highly satisfactory terms, must, I am certain, be a delightful, gratifying experience. What power one must feel, what unalloyed pleasure! Not for women, however, are such pleasures encouraged.

Although I am enough aware of the way the world turns to recognize that men achieve real pleasure from the actual process of making large sums of money (a revelation that came to me secondhand when, as a working journalist, it fell to me to interview on assignment a couple of captains of industry), I have yet to meet a woman, either on the job or off, who admitted to a similar hankering. (Yes, they do exist. Mary Wells, the very successful advertising executive, comes quickly to mind. I should like to meet her some day, I think she may have a lot to tell me.)

*Making* money must even be a lot more fun than *spending* money, and *making and spending* one's own money must be a truly giddy experience. Even the archetypal female spender of our age, the redoubtable Jacqueline Kennedy Onassis, is missing out on half the fun!

## No inherently masculine jobs

The equation of Money=Power=Masculinity has been a preoccupation of the women's liberation movement. The implications are staggering. We in the movement are pretty much in agreement that masculinity, like femininity, is nothing but a well-nurtured myth, like Santa Claus. Deductive logic has proven to our satisfaction that there is nothing inherently masculine about any job, from jockey at Aqueduct to President of the United States, although there are those who would have us believe so. (As I write this, a judge of the Federal District Court has just

ruled that there is nothing inherently masculine about McSorley's Old Ale House in New York, either, and I suppose it follows for the Harvard and Yale Clubs, too, which have barred my sisters and me from luncheon meetings in their well-appointed rooms.)

## Typewriters dropped in our laps

Jockeys may not have secretaries, but presidents of governments and corporations do, not to mention insurance salesmen and junior executives, and there is nothing inherently feminine about secretarial work, either. In 18th- and 19th-century London all clerks were men (remember Bob Cratchit, Tiny Tim's father?). And when the typewriter was first introduced, men said it was too complex a machine for women to handle. But when they discovered that typing was drudgery and women could be induced to do the work for less money, the men graciously dropped the Smith-Coronas in our laps.

It takes nothing more than a couple of nights of consciousness-raising in a women's liberation group to discover that *it has been in men's interest,* but against the interests of women, to keep us believing that success, ambition, a good job, high pay, etc., were strictly within the masculine province and therefore unfeminine. The fear of losing femininity is the most powerful weapon society uses against its women, and I intend to write a book about that one day soon. I'll let someone else write the companion book about masculinity.

The competitive instinct, that necessary lubricant which keeps the wheels of free enterprise spinning, has been encouraged as a virtue in men in the same degree that it has been discouraged in women. Women are encouraged to compete *for* men, but never *with* them — and woe to the woman who seeks to break that Gentlemen's Agreement. Worse than being called a mutant of her own sex, she is accused of seeking to *unsex* her competitor. How odd it is that a nation that professes to value rugged individualism and holds competition and free enterprise as dear as the flag should seek to deny such opportunity to women. In searching for answers to this situation, we in the women's movement can only conclude that the reasons are twofold — ego and economics.

To start with the obvious, the matter of equal pay for equal work, we have only to cast a jaundiced eye at the statistics reported by the U.S. Department of Commerce. Across the board, in offices and factories, women earn an average of $3,000 a year less than men for performing exactly the same work, *and the gap is widening* according to the yearly surveys. Women clerical workers earn 67 per cent of what men earn; women managers and proprietors earn 54 per cent of what their male counterparts receive for their labors; and saleswomen, the most discriminated-against group of female employees, earn 41 per cent of what their fellow salesmen receive.

## Double standard in paychecks

Twenty-two million women are employed full time in this country. By doing a little simple arithmetic we can show that, since each woman is paid $3,000 less per year than her male equivalent, American industry owes us an aggregate of $66 billion a year. Highly profitable, isn't it, having a cheap labor force at one's disposal? Should we talk about reparations?

It's no good throwing up the argument that men have families to support and women don't, because people are supposedly paid for the value of the labor they perform and not for the number of dependents they claim on their income tax. A significant 2.7 million women in the work force are husbandless heads of families. Not surprisingly, considering how drastically underpaid women are, one-third of the families headed by working women live below the poverty line, which is pegged by the Census Bureau at $3,725 for a four-member family. (The inability of a woman to pull in a decent living wage is a cogent argument for marriage, as it turns out.)

The issues of equal pay for equal work and what constitutes sexual discrimination are matters that the Equal Employment Opportunity Commission has begun to tackle, aided and abetted by alert women who


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are aware of their rights. Thanks to Title VII of the Civil Rights Act, the E.E.O.C. has received a mandate to move on women's rights, but enforcement procedures have not yet been granted. In the past few years, however, several landmark court cases initiated by women have begun to establish badly needed precedents. The National Organization of Women (NOW) forced the august New York Times to integrate its help-wanted columns, a major feat in the composing room and a boon to female job seekers interested in employment more remunerative and rewarding than the catchall "Gal Friday."

Two recent cases won at the Court of Appeals level —a tribute to the observation that discrimination dies hard—have dealt a telling blow to that blatant bit of discrimination cloaked in false chivalry, "protective" legislation. In *Bowe v. Colgate-Palmolive* and in *Weeks v. Southern Bell Telephone and Telegraph*, women sued successfully and won the right to perform jobs which required the occasional lifting of 30-pound weights, a privilege from which they were formerly "protected" by state law. (No state legislature ever passed a law forbidding them to lift and carry a 30-pound child.) And in New York City, a group of female employees at Con Edison won a ruling in a state hearing after the company arbitrarily set its retirement age at 62 for women and 65 for men.

## Mother or worker—not both

A case that many of us are eagerly watching is that of *Mrs. Ida Phillips v. the Martin Marietta Company*, which the Supreme Court has promised to hear in its October session. Mrs. Phillips, a mother of seven, was working as a waitress in Orlando, Fla., when she read an advertisement in the newspapers that the local Martin Marietta plant was ready to hire 100 new assembly trainees. The pay and the hours would be considerably better than at her waitress job. Dashing down to the company's employment office, Mrs. Phillips was told that she would not be considered because she had a child of preschool age. The E.E.O.C. ruled in her favor, but Martin Marietta refused to budge. That was more than six years ago. Mrs. Phillips still works as a waitress. The Government has filed an *amicus curiae* brief in her behalf.

Discrimination against women always employs psychological weaponry. Underlying Martin Marietta's intransigence, you see, is the unspoken belief that Mrs. Phillips *couldn't be a good mother* if she worked at the plant, or that she couldn't be a good assembly trainee if she had a child of preschool age to worry over. (The child, by the way, went to a local day care center.) No one kept *Mr.* Phillips from a job because of *his* preschool-age child.

## Keep them in their place

Psychological weaponry is designed to keep women in their "place," and that means in the home and out of the job market, except when there is a sudden need for workers, as during World War II. (Remember the glamour of Rosie the Riveter?) And millions of women are encouraged to work part time on the theory that part-time work does not interfere with home maintenance and child care. They do not realize that their part-time work is a great boon to corporations, saving them untold millions in fringe benefits they would have to extend to full-time workers. These working women are so bamboozled they think they're *lucky* to get the fringe-benefitless part-time employment.

I think that women, like blacks, have an abiding belief in their own inferiority. They have bought the notion, carefully nurtured by men, that because they are women they are less valuable human beings, somehow less competent. It is a rare woman who manages to develop a healthy ego—a prime requisite for success in business. Ego in women, unless restricted to appearance—and then it is called vanity—is considered unbecoming.

A few years ago, I was employed at Newsweek Magazine as a researcher in the National Affairs Department and entertained fond hopes of one day writing for the magazine. After all, young men less qualified than I were offered tryouts quite regularly.

But I was rudely acquainted with the facts of life by an insensitive shop steward who blithely told me, "Don't you know you girls are hired here to work two years and then go off and get married?" I hadn't known that. It was a shattering revelation.

When my two years were up and I had received neither a writer's tryout nor a proposal of marriage from any quarter, I felt it incumbent upon me not to embarrass the magazine any longer, so I quit.

## 'You're pretty lucky for a woman'

Finding television more hospitable to my knock at the door, two years later, after a period of apprenticeship in Philadelphia, I was back in New York, gainfully employed as a TV newswriter for A.B.C. Achieving status as a real writer, at long last, did wonders for my ego. But hardly a day went by without some fellow newswriter saying to me, "You're pretty lucky for a woman, to be earning $12,000 a year." As men earning a similar $12,000, they did not consider themselves "lucky" at all. Indeed, each considered himself to be grossly underpaid and undervalued by the company, and had his eye on a producer's job at the very least. But I, as a woman, was expected to give daily thanks for such heavenly blessing.

At a spring conference of professional women, held at N.Y.U. Law School's Vanderbilt Hall, woman after woman got up to report on the psychological discrimination she had suffered in her chosen field. A woman architect was asked on a job interview, "Are you really serious about your career?" A woman engineer, married and childless, was asked out of the blue in the course of her interview, "Do you take the pill?" Flustered at the invasion of privacy, she terminated the interview by leaving the office.

It is comments such as these that convince women that, at best, they are barely tolerated in the working world when they seek to approach it on an equal footing with men. Feeling like usurpers, and treated as such, how can they turn in an optimum performance? How can they dare to try for a higher position?

As I write these words I remember—painfully—that each time I walked into a TV newsroom to begin a job, all motion stopped and all heads turned toward me as I rolled the paper into my typewriter. Had these guys never seen a woman at a typewriter before?

## Whites only, men only, women only

And then I remember the occasions when, on assignment for The New York Times Magazine, I had luncheon interviews with men who would suggest that we meet at the Harvard or Yale Club. Arriving early, I would be swept with undue haste to the tiny alcove known as the "woman's waiting room," like a carrier of some communicable disease. It usually took half the interview for me to recover my equilibrium.

I have a friend, a lawyer with a prestigious Wall Street firm, who was the only member of her firm *not invited* to a special business luncheon at one of these collegiate alumni clubs because the dining room did not allow the "contaminating" presence of women. (Actually, she was invited, and then disinvited with a "*You* understand, hah, hah. . . .") Whites only; men only: conventions of exclusion that damage human performance and inspire deep insecurity and alienation.

Most men, I believe, are simply not comfortable in the company of women unless the relationship has the balance of power clearly delineated, as with secretaries and wives. And I would venture the proposition that the secretary-boss relationship in the office is a good deal easier for most businessmen to cope with than the marital relationship at home, because who gives the orders and who does the bidding, and at what salary, is explicitly defined, at work. It goes against the human grain to accept subservience gladly, but that is the lot of the office secretary, who is often as well-educated as her boss, as intelligent and as competent. No matter how hard she works at *her* job, which is most often the highest position open to her in the company, she can never advance beyond her routinized work, except to become secretary to a more successful boss.

When the women's liberation movement reaches into the very fabric of American corporate life, the classic American secretary, loyal, devoted, efficient and glamorous to boot, will be as difficult to come by as the classic American domestic worker, and for the same reasons.

The new feminism will force other changes as well in big business.

One of the most consistent demands of the women's liberation movement is for the establishment of day care centers on the premises of offices and factories for the preschool-age children of company employees. The way the women's movement sees it, the facilities ought to be paid for by management but run cooperatively by the parents concerned. Universal child care centers are the only way that the majority of young mothers may be able to get out of the house, and getting out of the house and into the larger mainstream of life is precisely what young mothers will be demanding.

## Please, no special programs

We will also be seeing a concerted demand by women employees for the inclusion of a host of fringe benefits—*women's* benefits—in company health insurance plans: paid maternity leaves and abortion coverage for both married and single women (why not?). Blue Cross of Greater New York moved swiftly and sensibly in this direction in July when the State's new liberal abortion law went into effect. (Was it only five years ago that I faced employment applications that dared to pry, "Have you ever had an illegal operation, *and if so, when?*"?)

One consideration that the women's movement is not asking, please note, is the establishment of special remedial training programs for the female sex similar to the rash of guilt-inspired programs set up by corporations for minority group members and the hard-core unemployed. Our situation is different from the black experience in this regard. Unlike blacks, white women have not been denied an equal education, except at the vocational trade school level (and we intend to work on that). We have merely been denied the opportunity to put our acquired skills and knowledge to good use.

We ask only that existing training programs, junior executive trainee spots and open-ended jobs be open to all women, black and white, who apply to any company. The old truism, "When a male college graduate applies for a job, he is given an aptitude test; when a female college graduate applies, she is given a typing test," must become an outdated principle.

## Can men stand it?

Will Big Business be able to adjust to the demands of the women's liberation movement? A lot, of course, depends on men. Men are used to being in charge, and history has shown that those in power seldom give up their power without a struggle. It's not that we expect to replace men with our own female supremacist hierarchy, but we do expect that men will have to move over or step aside to give us room.

A mediocre man, and business is full of them on the middle-management level, will suffer the pinch most sharply. No longer will he be assured of a comfortable berth in the corporate structure, with private office, smiling secretary and a tribute of respect from the female filing clerks and typing pool. He stands to be passed over or displaced ("shot down" is the phrase I've heard men use) by topflight women on their way up, and he will be under continual assault from equally mediocre women who are perhaps a shade more aggressive, more sociable or better connected. Mediocre women have a right to equal treatment, too!

The burdens of adjustment will fall on men. We women are ready, willing and able to move forward, and we have been for some time. If we step on your toes, don't expect us to say "pardon." The anger is boiling over in us. We've been watching our step for too long. We're putting our own interests up front at long last. ▢

# Teachers and Technology

## An Impotent but Promising Partnership

Electronic and other technological innovations, long established in industry, are still in the horse-and-buggy days at school. With so much potential to improve education, what's holding things up?

by
**Sterling M. McMurrin**

Technology has been in the classroom for a long time. Picture projectors are nothing new, nor are simple communication and amplification systems. Records and audio tapes are common. But for the most part instruction proceeds with the original tools—books, pencil, paper and chalk.

The new and more sophisticated electronic technology that has come cautiously upon the educational scene over the last two decades could radically transform the character of instruction and revolutionize its effectiveness. It could, that is, if we don't repeat the mistakes of the past, and if education, industry and government can form the partnership necessary to exploit the possibilities. This is a large task and its success depends on some fundamental changes in our habitual ways of treating educational problems.

By the "new" technology, I mean such instruments as television, instructional programs, computers and electronic systems of information storage and retrieval. This technology also includes such telecommunications techniques as the Bell System's holography, which converts computer data into three-dimensional graphs and pictures. When viewed against the possibilities offered by these instruments, it is apparent that technologically today's schools are

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just emerging from the horse-and-buggy age.

The signs, fortunately, indicate that education is beginning to move on the technological front. Over the next two decades, schools may enter the "new era" and begin to reap the benefits already enjoyed by such industries as transportation and communications. Those benefits, we may hope, will include the capacity of the schools to bring all children to at least minimal standards of verbal and mathematical competence. Technology might enable educators to raise the quality of instruction in those cognitive areas pertaining to knowledge and knowing, and also in matters pertaining to the affective life — emotions, passions, moral and aesthetic sensibilities.

But the conditions and responsibilities of education now demand a large investment in innovations that will be adventurous

Education must succeed in its share of the pressing task of bringing the disadvantaged into the mainstream of American life. At the same time the schools must satisfy the demands which we properly make upon them to improve the quality of personal and social life generally. To achieve this dual objective, educators cannot continue to do the same old thing in the same old way.

There is much in the traditional educational practice that must be preserved. An example is the ideal of personal rather than mechanical relationships between teacher and student. But the conditions and responsibilities of education now demand a large investment in innovation that will be adventurous enough to discover and exploit every possible instructional value that is latent in the technical instruments which are now available or will become available in the future. More than anything else, what is needed is a disposition on the part of educators to try the new that is promising as well as preserve the old that is proved.

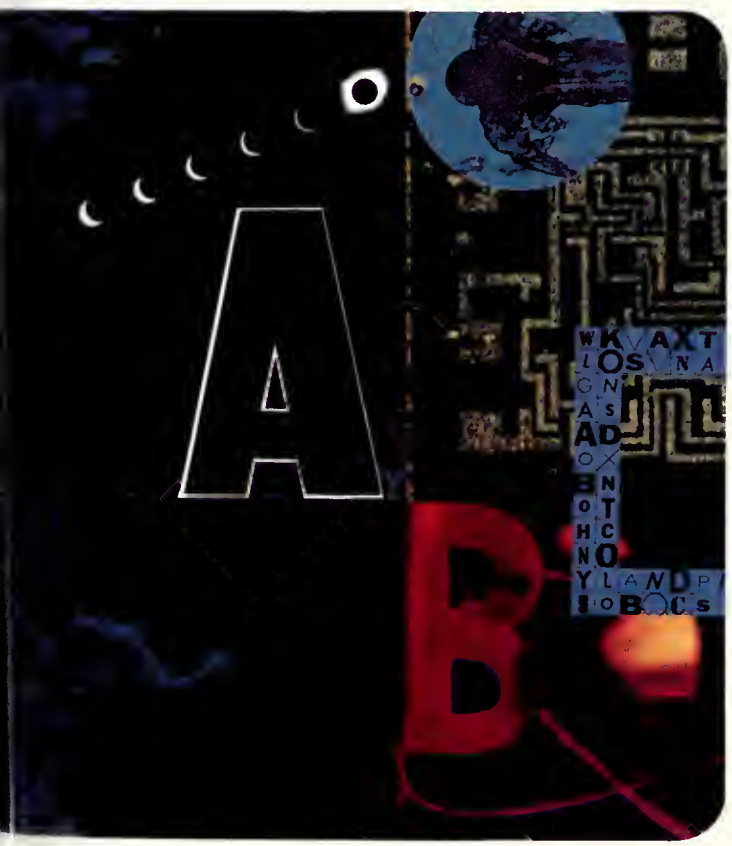
Instructional technology involves more than simply the mechanical and electronic instruments that may be employed as means for the achievement of classroom or laboratory goals. The entire complex of elements which enter into the instructional process is involved; from the teacher, methods and materials employed by him, to the architectural pattern of the school as it affects the character and effectiveness of learning. Much of the failure that attended past uses of conventional audiovisual aids resulted from their employment as gadgets. They were employed to augment the teacher's efforts in his role as a dispenser of information — a kind of frosting added to but not

integrated into the basic instructional effort.

The effective use of both conventional and new technologies depends in large measure on the development of instructional systems that relate all elements of technology in such a way that they become integral to one another, to the subject matter at hand, and to the teacher and his long-range purposes and short-range goals. Unless this is done, and done far more effectively than in the past or at present, the schools will continue to fail to adequately exploit the potential values of technology.

The development of such instructional systems involves updating and, in many instances, radically reforming teacher education to produce a generation of instructors competent to succeed in the new format of instruction. It requires differentiated instructional personnel and functions, including technicians and paraprofessionals as assistants, which in turn require differentiated preparation and pay scales. It calls for instructional resource centers and the technical competence to use them effectively. And it means a closer involvement of schools with homes, including in countless cases the education of parents in order to achieve the kind of home environment and cooperation essential to school success.

The schools should begin now to prepare for the not too distant time when our communications technology will more adequately relate learning in the home to learning in the school. Already it is apparent that audio and video tapes as well as records will shuttle between the school and home as books do now. Telephonic connections between the home, school, library, regional and central knowledge banks and educational program centers may eventually be as common as telephone contacts between teenagers.




## There has not yet appeared an adequate corps of producers

The development of "hardware" has far outdistanced the development of "software" — programs and materials—available for use with the instructional equipment. Indeed, this is one of the causes of recent failures in the field and of the present caution found in many educators. The shortage of program materials is due in large part to the lack of funds available for producing a product for which there is not a guaranteed market. Also, even with limited cooperation between education and industry, there has not yet appeared an adequate corps of competent producers. The software shortage will not be overcome until there is a massive national effort, with adequate financing from commercial and governmental sources, to tap the educational possibilities of both the new and conventional technologies.

The comparative success on the hardware side results from large industrial research and development resources, including an abundance of competent scientists and engineers in the appropriate fields. Another reason is that instruments developed for other purposes are often simply adapted, albeit sometimes unsuccessfully, to instructional uses.

The production of instructional materials for use with, say, television or computers, involves bringing the methods and techniques of learning into effective relations with the curriculum. And the design of the curriculum includes a comprehension of available and relevant knowledge and a grasp of the long-range purposes of education, as well as the immediate goals of instruction. Decisions on course materials cannot be made in indifference to the methods and technical means of learning and teaching, as ends cannot be realistically determined independently of the means

## It would be a grave misfortune if the field of instructional technology were to advance without purposes

of achieving them. Therefore, the job of generating materials must involve an effective working arrangement with media and communications technicians, teaching experts, specialists in the art of learning (especially educational psychologists, anthropologists and sociologists), subject matter experts and educational philosophers.

To say the least, this means large-scale teamwork and a command of experimental and developmental resources as well as access to essential research findings. The funding necessary to such an enterprise is beyond the capability of single school districts, single universities, or even of many individual states. Only a nationwide approach is likely to succeed.

It would be a grave misfortune if the field of instructional technology were to advance without a serious effort to define the large purposes of education and the related proximate goals of instruction. The price of neglect at this point could be, first, the failure to develop techniques capable of yielding the desired results, and second, the failure to define purposes and goals in accordance with genuinely humane

## As presently structured, education is a labor intensive industry, so economies may sometimes occur

ends. This last point is important, for any society which functions with an advanced technology runs the risk of eventual domination by that technology, if the society is careless.

Needed is an investment of talent and energy in the problem of values commensurate with the investment in technological inventiveness and technical development. More attention must be given to educational purposes and the objectives of instruction.

The introduction of technical instruments into the school should not be motivated primarily by an interest in fiscal economies, but rather by the expected increase in educational effectiveness. As presently structured, education is a labor intensive industry, so economies may sometimes occur. At other times, however, the technology may be more expensive. The future in this regard depends upon such matters as the impact on price of mass production, the development of simple and less expensive instruments to do work now done by those adapted from noninstructional fields, and the possibilities of personnel deployment to effect savings. But if genuine advances in education are to be made by way of technology, the approach should be in terms of the quality and effectiveness of instruction first, with this weighed against the actual costs. Most research and experimental programs may be expected to be expensive.

One of the values of technology in the school is

that it frees the teacher's time to enable him to devote more attention to the interests and needs of the individual student. This is usually possible if the teacher has proper technical assistance. At the same time, most of the instructional instruments themselves can be employed by the teacher and student to individualize the student's program. In many ways, through the use of video and audio tapes, computerized programs, and telephonic communications systems, the student's studies can not only be tailored to his personal needs and interests but can also be pursued at his own rate and convenience. The benefits apply equally to students in elementary, high school, college, graduate or professional school. It is in this power of individualizing instruction that technology should pay off most effectively. It is here that technology should play its largest role not only in improving the quality of instruction but in achieving some measure of educational equality.

Numerous other values of technology can be identified. These include moving pictures, television and telephones to bring the great teachers and great thinkers of the world into any classroom; visual techniques to provide close-ups of scientific demonstrations; programmed computers to enable the student to perform at a keyboard and screen the experimental operations belonging to a science laboratory. Specialized equipment now available for the handicapped, in some instances, works wonders in achieving what was impossible by any other means. Noncommercial

## Properly structured, technology should help to humanize classrooms

television is proving to have remarkable capacity to capture the interest of the preschool child in preparing him for more effective schooling.

There are obvious problems to be encountered in instructional technology. No one wants to dehumanize the classroom by preventing or destroying genuine personal relations among students and between teacher and students or by permitting machines to determine the goals to be pursued. Properly structured, where the teacher is the master of the machines, where the machines function as slave devices in the service of both teacher and students, technology should help to humanize classrooms. Today these

## Those business managers who enter the education industry should recognize the large responsibility

classrooms often are not as personal as both educators and public like to believe.

There has been some tendency for school districts to acquire expensive equipment which they are ill prepared to use competently. They are sometimes victims of their own erring judgment, and sometimes victims of irresponsible but highly effective sales rhetoric. There is evidence now, however, that the schools are becoming more sophisticated in their investments, and business more responsible in its marketing approach. Those business managers who enter the education industry should recognize the large burden of public responsibility which rests on them to pursue their profits only by contributing to the genuine improvement of education.

The successful application of technology to the classroom, with the improved teaching and learning resulting from such a union, is clearly needed. Whether education will, in fact, benefit from technological aids as business and government have benefited depends entirely on education, business and government. If they are willing to work together as responsible partners in an essentially civic venture, there are no bounds to the benefits technology can bring to the school. ▢

# Bell Reports

### Ceramics with a "Memory"

Bell Laboratories scientists are investigating the properties of a ferroelectric ceramic "sandwich" through which information can be projected on a screen like a slide, but which has the added capability of being electronically erasable and allowing new information to be added.

Called ferpics (ferroelectric ceramic picture devices), their development was first announced by Sandia Corporation. Ferpics images can be viewed directly by placing light-polarizing sheets over them, or on a screen by employing a standard projection system using polarized light.

Bell Labs is exploring the device in hopes of obtaining low-cost, efficient, solid-state information displays with features not now available in display systems.

### TWX Service Sale Approved

The Federal Communications Commission has cleared the way for the final sale of the Bell System's TWX (teletypewriter exchange) service to Western Union for payment of about $85 million. The transaction had been discussed by the two companies as early as 1943.

Under terms agreed to by the parties, Western Union will acquire some 42,000 teletypewriters and associated central office equipment.

Not included in the sale are about 100,000 teletypewriters used by Bell companies for private line services. AT&T will continue to handle Data-Phone® and various private line services carrying both voice and data communications.

Annual revenue from TWX service —which carries about 50 million messages yearly — amounted to approximately $80 million for AT&T, about one-half of one per cent of total revenue. AT&T will retain 40 per cent of this revenue as it continues to supply facilities to transmit and switch TWX service.

### Telephone Supermarket Opens

In a 12- to 18-month trial, some 2,000 high-rise apartment dwellers in the suburban Florida community of Hallandale will be able to select telephones in a "phone center" in the same way they select food from the local supermarket.

Because the customers in the trial area live in prewired dwellings they can pick a phone of their choice from the phone center, carry it home and plug it into "jack" outlets.

This will permit customer orders to be filled in minutes, at lower cost and only after the customer has seen and tried the telephone he or she desires.

Other "supermarket" trials are scheduled in Milwaukee later this year and in Phoenix in the near future. The Milwaukee trial will involve garden apartments; the Phoenix test will be in a development of one-family houses.

*At Bell Laboratories, Andrew Dienes and Charles V. Shank demonstrate the range of colors—from near ultraviolet to yellow —that can be created from a new dye laser called an exciplex laser. Devised by Dienes, Shank, and Anthony M. Trozzolo, the new laser may become an ideal laboratory tool for investigating the interaction of light with various forms of matter.*

### A Novel Conversion

A New York telephone exchange became famous when it was used as the title of a famous novel by John O'Hara in 1935. Years later, the novel became an equally famous motion picture which earned its female lead her first Academy Award.

Know the exchange? It's Butterfield 8, which has been serving residents of Manhattan's upper East Side since 1926.

On June 27, Butterfield 8 achieved yet another measure of fame when it was converted to electronic switching. The new equipment, which is part of the New York Telephone Company's multi-billion dollar expansion and improvement program, can handle some 20,000 lines with a future capacity to double that.

The Academy Award-winning actress? Elizabeth Taylor, of course.

### W. E. Manufactures Antiques

Western Electric, which makes millions of sophisticated micro-miniaturized solid-state components for the Bell System each year, is also busily engaged in turning out some 175,000 vintage design electron tubes annually.

Not intended for museum collections, these old designs — in 74 varieties — are made to fit equipment dating back as far as World War I. Most of this early-design communications equipment is in operation in

rural parts of the United States and in countries such as India and Australia.

Why should a manufacturing company known for its progress in producing some of the world's most sophisticated electronic components bother with vintage tubes? Because, the company says, it has a reputation for service to live up to and it is not about to abandon purchasers who relied on its early products.

### Aluminum Cable System Ready

AT&T engineers, Bell Labs scientists and Western Electric supply and manufacturing experts have reached the point where they can offer Bell telephone companies a new field-tested aluminum cable system — at a price considerably less than existing copper systems.

The newly developed aluminum cable system involves a specially manufactured wire, a greatly improved sheath, new splicing methods and it employs polyethylene as an insulating material.

During the past decade events have doubled the price of copper. Demand has been continuing to rise, and copper traders anticipate no appreciable price break.

In view of this, the Bell System has had under way for some time a project to develop a viable alternative for some of the 260,000 tons of copper the System uses annually. The new system is the result of that effort.

### From out of the Past

A telephone system first produced 88 years ago is helping struggling Mkar Christian Hospital survive in the grasslands of the Jos Plateau in Nigeria.

The hospital, which is stretched out for a mile along a dirt road, needed a communications system to replace its antiquated messenger system which was wasting staff time when lives were at stake. The problem: no power and no funds.

Bell System engineers at Western Electric's Hawthorne Works in Chicago, members of Hawthorne's Medical Equipment Development Club, an organization that devotes personal time to solving medical engineering problems, heard about the problem and found the answer. They reached back to the first telephone made by Western Electric for the Bell System — the magneto phone.

The phone's crank activates an inner magneto and produces an electrical surge that rings the other phones in the system. Batteries provide the power for voice transmission. The system, ideal for Mkar because of its low power needs and ease of installation and maintenance, has been operating successfully since early this year.

### Employee Overcomes Disability

James Laurence Caldwell is living proof that the human spirit, through all its failings, is indomitable.

In 1962, Caldwell was 25 years old, a big, handsome man looking forward to a career in mechanical engineering. Then one day an outdoor barbecue grill exploded as he was lighting it. While recovering from the accident, other medical complications set in, resulting in his being blind for life and unable to walk again.

Today, Caldwell is a computer programmer at C&P Telephone Company group headquarters in Washington, D.C. He is happily married and has been selected as the National Rehabilitant representing 2.5 million disabled Americans helped by the Rehabilitation Services Administration of the

*Mr. Caldwell*

Department of Health, Education, and Welfare.

The award signifies Caldwell's determination to overcome blindness and paralysis and typifies the courage of handicapped people who fight their way back to a normal life.

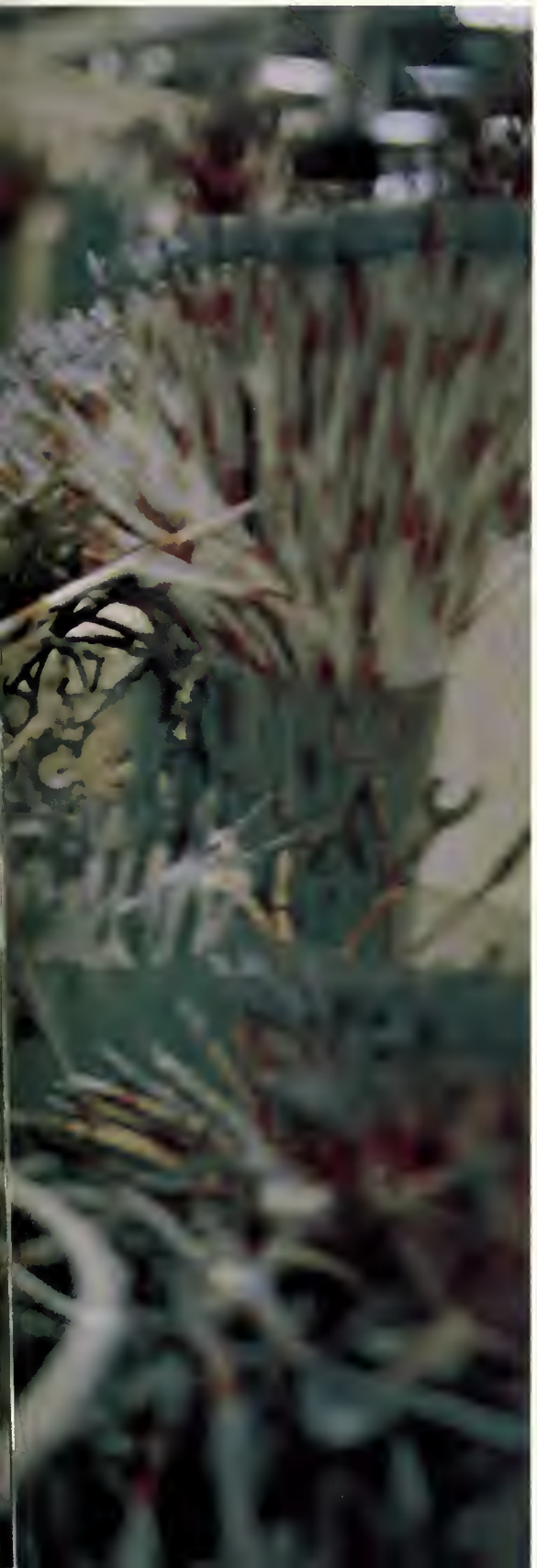
### New Pacemaker Uses Heart Power

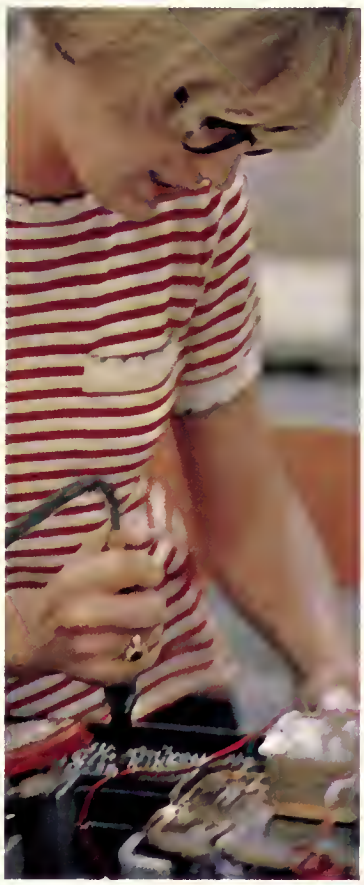
An experimental pacemaker that generates electrical signals from the energy produced by changes in blood pressure is under development at Bell Laboratories.

The new device offers hope that the thousands of people who have pacemakers implanted in their bodies may be able to avoid the need for periodic surgical replacement of the batteries that power conventional types.

The new pacemaker utilizes piezoelectric discs, which produce electricity when subjected to pressure. Although its feasibility has been demonstrated, more work must be done before it can be tested on humans.

# You've Come A Long Way, Baby

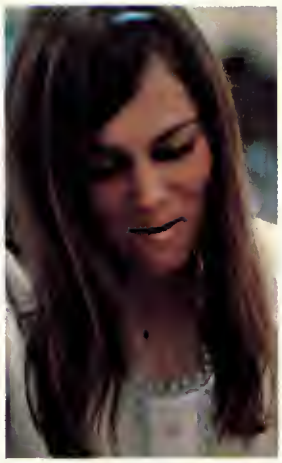


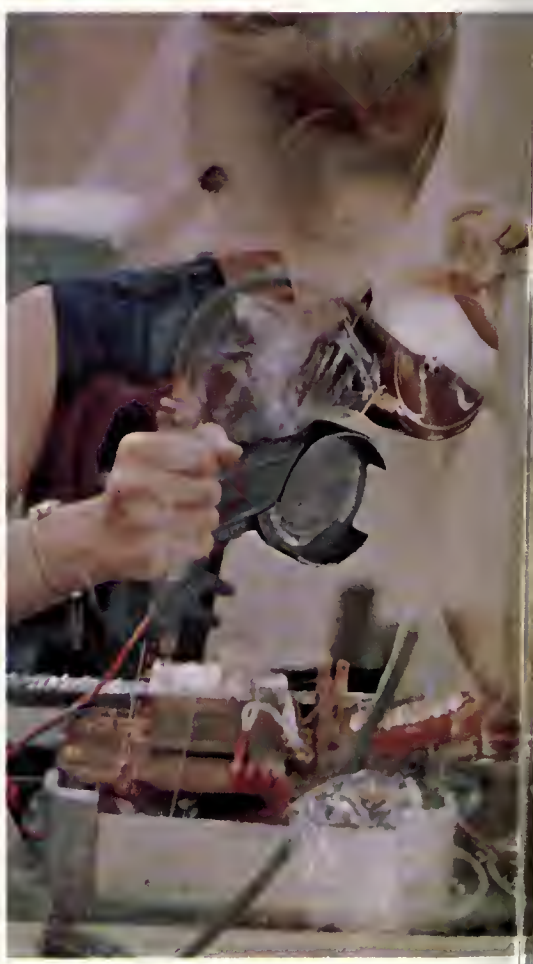


A factory, by definition, is a building or buildings in which things are manufactured. Whether the people in them produced textiles in Providence, automobiles in Detroit or steel beams in Birmingham, the buildings seemed, until fairly recent times, synonymous with sweat, grease, grayness and grime. Similarly, the early environments in which telephones and associated communications equipment were constructed were not the sort of settings to induce handsprings of happiness from today's industrial designer.

But if yesterday's factory milieu was one of drudge and dreariness, today's is a kaleidoscope of cleanliness and color.

The photos on these and the next two pages show Bell System people making telephones at Western Electric's Indianapolis Works. The big plant is no longer among the company's newest. But because of the many, multihued instruments in production there, and the fresh, zesty look of the ladies on the job, the Indianapolis style remains representative of factory life in W. E. — busy, bright, beautiful. ☐





# Business Service and Society

## Excerpts from recent talks by Bell System officers

"Telephone people are different. We are set apart from the generality of people by a calling with an unusual purpose. Our corporate intent is unique. We deal not with a product but with a service. And the service we offer the public is not trivial or just convenient. It is vital. It is no exaggeration to say that communication is one of the highest human values and that the telephone business is its handmaiden.

So it ought to be easy to unite behind the goals and objectives of our business. We're not selling machines or equipment. We're not selling soap flakes or razor blades. We're furnishing communication — intelligent exchange of ideas and ideals between person and person.

A current series of our advertisements has this theme: *Communication is the beginning of understanding.*

Understanding is the power that can control modern technology. It is the power that can give our world back to *people.*

I'm proud—as I'm sure you are—to be part of a business that has a high purpose and a determination to understand and act in the interest of the individual."

*C. L. Brown*
*President—Illinois Bell*

". . . In reaching a million employees, the Bell System has created well over 100,000 new jobs in the past five years compared with 7,000 during the previous five years. Additional hundreds of thousands of persons have been interviewed over this same period in the search for sufficient numbers of qualified people.

About half of all new employees live in big cities, many of them in inner-city areas. And we will continue to reach into the inner city for a good share of our new employees.

During the Seventies, the Bell System will hire many thousands of people. As these new employees join our ranks, the age balance will swing more and more toward youth.

. . . The needs of our fellow citizens—particularly those of the central cities — have never been so urgent. Poverty, ignorance and racial prejudice beget more poverty, ignorance and prejudice. And so the cycle goes. And along the way, other problems foment—such as crime, drug addiction and a wholesale copping out on life.

. . . Today, we hear a lot of talk about the generation gap. But we don't hear very much talk aimed at bridging that gap. We may be side-by-side with young people on the elevator, in the company cafeteria, or on the job. But if we don't learn to talk with young people on a person-to-person basis—rather than as someone in the hierarchy talking to a novice—then we will never bridge that gap.

. . . In this business of ours, in which providing excellent service is not easy under the best conditions, we don't have room for gaps of any description, be they generation gaps, communication gaps, or equipment gaps.

It seems to me that some of the difficulty in communicating with young people stems not so much from the difference in our years as from a fundamental difference in our experiences. Our young people were reared on generous portions of television. And for many of them, their only diet deficiency was in responsibility.

. . . That 'dear Depression' of ours, as our young people call it, was rough. But it strengthened us. And we needed that strength through World War II and for the tremendous Bell System service drive following the war.

We are people who have brought this great industry of ours to its present level of excellence. . . . And we have reason to take pride in that. . . .

. . . But consider the work which is yet to be done.

While we Pioneers have worked hard in the inner cities of some large urban areas, in others we have scarcely soiled our hands—have yet to make a meaningful contribution.

Consider also the growing menace of drug addiction. How many Pioneer programs do you know of which deal effectively with this problem in the areas of preventative education, counseling or rehabilitation?

And what of the menace of pollution—the fouling of our air, our waterways? Can't Pioneers help through clean-up projects and through programs of education?

You may ask—How can we do it all?

Obviously we can't. But we can do very much more than we are now doing—particularly by marshalling the efforts of our younger employees as well as those of all Telephone Pioneers.

. . . Throughout the Fifties and the Sixties, government, business, labor, the church and a long list of community organizations failed to resolve the problems besetting our cities.

These problems have become so serious that we can fail to resolve them no longer. The Seventies must be different. . . ."

*Robert D. Lilley*
*Executive Vice President—AT&T*

"Our immediate task . . . is one of renewal—a renewal not only of our cities and our landscape, but the renewal of that dream we inherit with our citizenship—the dream of a land where a man enjoys his unalienable right to life, liberty and the pursuit of happiness.

Can we do that? Can we, for example, guarantee the right to life in a land that is suffocating under layers of foul, polluted air? Can we guarantee liberty in a land where blacks and Indians and Spanish-speaking people—citizens all—

are still denied full and free access to opportunity? Can we guarantee equal individual freedom to pursue happiness, given the inequities in education, in employment, in housing, in the courts and elsewhere?

This, I think, is what we have to decide. And we can either elect to renew the dream, or forget it. But let us not lie to ourselves anymore. We have had a surfeit of big words. What is needed now are big deeds and, above all, a big dream.

This is what the young are saying to us: 'Give us a vision. Give us a dream.'

And I think we must. For a people without a dream are a people on the high road to dissolution, degeneracy and despair. The greatest nation will always be the one with the greatest dream. And I believe that the American dream is greatest still. But we have drifted from it a long, long way. We must get back to it; we must revive it and make it real. Either that, or we must stop pretending that it is still our dream. . . ."

*Alfred W. Van Sinderen*
*President—Southern New England Telephone*

"Consider that in the year 1969, Pacific Telephone's employee force grew by some 6,000 people. To gain those 6,000 people, we interviewed some 300,000 and, taking turnover into account, actually hired about 30,000.

When you're talking in terms of such numbers, it becomes easier to understand that occasionally there is a slip.

Like the Directory Assistance operator, for example, who was asked for a number for 'Theater Arts.'

There was a pause while she searched the records. Back she came regretfully: 'I am sorry, but I can't find a number for Theodore Arts.'

'No, no, no!' the customer shouted, 'I want Theater Arts. THEATER ARTS!'

'Well,' the employee answered, badly shaken by the irate customer, 'I didn't know you spelled Theodore T-H-E-A-T-E-R.'

And once in a while one of our men can cause a problem.

An angry woman called a manager and complained about the language used by a foreman while he was working in her backyard.

'Why, I never heard such terrible swearing,' she said.

The boss promised to investigate and sent for the profane foreman.

'Well, boss,' he said, 'I was a little upset when that new cable splicer spilled hot lead on me from the overhead line.'

'Oh, I see,' the foreman replied. 'Tell me, what did you say?'

'All I said was: Oh, pshaw! Son, you are spilling that hot lead, and most of it is going down my neck.'

Needless to say, it was good to hear that the foreman had acted with such calmness, courtesy and restraint."

*Jerome W. Hull*
*President—Pacific Telephone*

"If industry has caused some of our environmental problems today — and I think we'd be kidding ourselves to say it didn't—it's a result of our efforts to respond to the demands of the public. Historically, I believe, the public has asked only one thing of business: Create a higher standard of living, with better and cheaper products and with more pay for its employees. None seemed to care much about what happened to the environment.

There's no question that we in the United States have an unparalleled standard of living, and much of the success of our country can be traced to inventive and dedicated businessmen. There's also no question, unfortunately, that this has been achieved to some extent at the expense of our national resources and has deprived us of some of our human needs and rewards.

Now the public is saying they have a second priority. In addition to a good standard of living, they want to preserve and improve the quality of life. And they seem to be willing to give up a little of the first to get more of the second. In effect, that's what will have to happen.

. . . Businessmen working under our system can find the answers to environmental problems when they are asked to. There's no question that we are now being asked to.

The technology to control the effluent that comes from manufacturing the goods and services that people need is being developed quickly. Already new plants are being built which promise to eliminate the pollution traditionally associated with their processes. I think you'll see that very soon, more and more industries will be able to pull themselves into the 'clean' column.

There's a real advantage waiting for the growing area which has someone keeping up to date on the progress of the industries which are learning to bring their pollution under control. These industries will be in demand as 'clean' industries, and they can be a major asset to the areas which are able to get them.

Many cities courted disaster—then found themselves in a shotgun wedding with it—because they had no plan for growth. They sprang up helter-skelter, then woke up to find massive transportation, water, sewage and every other kind of problem imaginable. Woe to the city planners who started 10 years too late to bail the city out. . . ." ☐

*R. K. Timothy*
*President—Mountain Bell*

American Telephone and Telegraph Company
195 Broadway, New York, N.Y. 10007

November/December 1970

# BELL

telephone magazine

Blind Youngsters Run Track,
Thanks to American Voluntarism

# Making The Image Real

An unedited exchange of letters between a customer in Phoenix and an AT&T officer in New York, which says much about the people and the policies of this business

Mr. H. I. Romnes, President
American Telephone & Telegraph Corporation
195 Broadway
New York, N.Y. 10007

August 26, 1970

Dear Mr. Romnes:

As a stockholder and sometime critic of AT&T, I thought you might enjoy an unabashed love letter concerning three of your Phoenix, Arizona, employees: Marketing Staff Supervisor George B. McCarn, Employment Manager M.J. Lathrop and Mrs. Audrey Lane in the Personnel Department.

When my husband and I received our letter telling us that Mr. McCarn would be visiting us as your representative, I must say I felt a little apprehensive for him, for I had been adding to a little list of areas wherein I felt AT&T should do better. High on the list was the hiring of the disadvantaged. But your Mr. McCarn has a talent for disarming critical stockholders, and after his visit we felt AT&T was making progress in all the areas that concerned us.

Of course, it's one thing to project a good image; it's another to make the image real. A few weeks later, Mr. McCarn's goodwill image was tested. Over the years I've been working with a remarkable Negro lady, Mrs. Jessie Jacobs, who, in addition to her own children, has adopted or helped raise about 20 others — all the while working as a domestic. Uneducated herself, she is determined that all these children who have capability will go to college. (One child is mentally retarded, but Mrs. Jacobs has done wonders here, too.) In addition, she has two Brownie groups, heads her church-school primary department and is on the board of several Negro civic groups. But best of all, she believes that bridges can be built between black and white communities if enough people try — a belief that has been rather cruelly challenged of late.

At any rate, when I learned that two of her girls, Ella Listenbee and Amelia Jones, needed jobs to complete their college education, I called Mr. McCarn. The girls were eminently qualified. Amelia had four years of college, lacking only her practice-teaching credits, and Ella, just 17, had finished one college semester and two semesters of the Upward Bound program.

Mr. McCarn did not fail me. Shortly I was talking to Mr. Lathrop, who couldn't have been pleasanter or evidenced greater interest. He told me to have Mrs. Jacobs make appointments for the girls with Mrs. Audrey Lane. Here I have only Mrs. Jacobs' testimony, and I must say that was ecstatic. As far as Mrs. Jacobs is concerned, Mrs. Lane is, without exception, the nicest person she ever met — courteous, thoughtful, altogether charming, Amelia went to work within the next few days, and my reports are that she is doing very well, loves her job and is considering making AT&T, not teaching, her career. Ella will see Mrs. Lane in early September when part-time employees are hired and has great expectation of working while she attends Phoenix College.

But my gratitude is for more than the girls — there I think both they and AT&T stand to gain. What these three — Mr. McCarn, Mr. Lathrop and Mrs. Lane, did to rekindle the faith of one very courageous black woman means everything to me — and, in a small part, I think, to our country. In a world the Ketchams are very glad that Mr. McCarn came to call for AT&T.

Sincerely,

Blanch B. Ketcham

cc: Mr. R. K. Timothy, President
Mountain Bell
931 — 14th Street
Denver, Colorado 80202

rs. Philip W. Ketcham
29 West Wilshire Drive
oenix, Arizona 85007

September 3, 1970

ear Mrs. Ketcham:

Frankly, neither Mr. Romnes, nor
y of us at AT&T, receives a great
any love letters. I do wish to reply to
urs, because I find it gratifying.

We have for years now pursued
olicy of equal employment oppor-
hity throughout the country and have
t it was being successfully imple-
nted. But yet you so frequently read
d hear the comment that high-level
licy may be fine, but it is frequently
t adhered to when you look further
wn in the organization.

That is why it is so gratifying to
ow that in Phoenix, Arizona,
s. Lane, Mr. McCarn and Mr.
hrop really know what "Affirmative
ion" is all about and that they take
it leasantly and expeditiously.

Your comment on the hiring of the
dvantaged prompts me to think
t you would be interested in know-
that as of June 30, 1970, there were
375 Bell System employees
ployed under the National Alliance
usinessmen program for hiring the
dvantaged. This was 136 percent
he commitment the companies had
de to NAB. It is also pleasing to us
: our retention rate is appreciably
ve that experienced in the total
onal program.

When I read about a Mrs. Jacobs
our three Phoenix employees, and
anch Ketcham and her concern, I
feel better about our country.

hank you again for a most
twarming letter. It was gracious
ou also to send a copy to
Timothy.

Sincerely,

ert D. Lilley
utive Vice President
Mr. Timothy


# BELL
telephone magazine

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# Corporate Accountability

## To Whom? For What?

by
Richard Borwick

Recently in our office someone circulated a cartoon from the *New Yorker* magazine. It depicted an annual meeting of obviously happy shareholders.

The management was beaming. With that beautiful profit curve in the background, the company's chief executive was telling stockholders:

*"And though in 1969, as in previous years, your company had to contend with spiraling labor costs, exorbitant interest rates and unconscionable government interference, management was able once more, through a combination of deceptive marketing practices, false advertising and price fixing, to show a profit which, in all modesty, can only be called excessive."*



However outrageous this profile may seem, it appears to be a reasonable likeness of how a growing number of activist groups in our society view the corporate system. Whether their concern is with business practices per se or with broader issues such as poverty or war, these activists are attempting, through force of public opinion and moral suasion, to make American corporations account publicly for more than their profits and losses — *to account in addition for the social consequences of their business.*

In a phrase, we have come to call this the "corporate accountability"

movement. Let's look at its nature, scope and implications for the business community.

The term "corporate accountability" is not an elegant expression. I didn't invent it. Moreover, it probably conveys different nuances of meaning.

To clarify the subject a bit further, I am *not* going to discuss "corporate social responsibility," another phrase much in vogue. To my mind, at least, there is a difference. "Corporate responsibility" raises the question of the ultimate function of a business corporation — particularly, what are its obligations to society as a whole, extending beyond mere economic behavior? Corporate accountability involves the outside pressures upon a firm to justify its social impact and how the company should respond.

## Making General Motors responsible

With this preliminary effort to indicate our course through these metaphysical thickets, let me first introduce the cast in the morality plays we are witnessing.

Holding center stage is a Washington-based organization known as the Project for Corporate Responsibility. It has its ideological roots in Ralph Nader and Saul Alinsky. The project's first, and so far its most spectacular effort, is the Campaign to Make General Motors Responsible.

Armed with 12 shares of GM stock and an initial kitty of $10,000, the young team of Nader followers making up Campaign GM launched a highly publicized nationwide appeal for support of several resolutions—all aimed at actions directly related to the business of General Motors. These resolutions included the following:

- Establish a shareholders' committee — appointed jointly by the GM corporation, Campaign GM and the United Auto Workers — to review the social consequences of GM's activities.
- Add three public representatives to the GM board.
- Amend the corporate charter to forbid GM to engage in any activity that is inconsistent with the public interest.
- Make solid commitments to develop mass transportation; produce a crash-proof, pollution-free car; make good on warranties, and improve health and working conditions of its employees and minority group hiring.

## The campaign won support

The campaigners won the right to place the first two issues before GM shareholders. While the Establishment generally and predictably held firm against this assault, the campaign won support from a number of prominent foundations, church groups and universities. It forced many other trustees to face up to some hard issues.

And at least in the minds of some, the campaign succeeded all too well in profiling GM as authoritarian and hostile to outside influences. Not perhaps because GM is so distinctively wicked, but because to some, this is the nature of large corporations.

## Coast-to-coast inquiries

The Project for Corporate Responsibility is now broadening its target. Some firms — including Western Electric — have just received from this organization a tough, detailed questionnaire on all litigation brought against them by public agencies since 1965. Apparently the inquiry is directed to 100 leading corporations in the United States.

Meanwhile, Mr. Nader and his Center for the Study of Responsive Law, in the manner of Colonel Sanders and his Kentucky Fried Chicken, have set up franchises all over the country. Nader-franchised investigations, now under way, are probing the lending and investment policies of the First National City Bank of New York and its director interlocks with other corporations; the relationship of Du Pont to the State of

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*Richard Borwick is vice president of Newmyer Associates, a Washington, D.C.-based public relations consulting firm whose clients include some of the country's most successful business organizations. He is a former newspaperman.*

Delaware; the impact of Rand Corporation and other think tanks on federal agencies; the paper and pulp industry in Maine; pollution of the Savannah River in Georgia; use and abuse of land in California; pricing, grade labeling and promotional techniques of supermarkets, and so on. Returning to one of his first loves, Mr. Nader also is conducting his own investigation of General Motors.

His investigation of the Federal Trade Commission aroused that agency from years of deep slumber—and as a result, it has been fundamentally reorganized.

## Challenge to the legal profession

His probe of ICC demonstrated the solicitude of this regulatory commission for the railroads. He has initiated a probe of the antitrust division, presumably to determine among other things why the Justice Department has not sought to break up GM. And he will dispatch his forces to reconnoiter the National Institute of Health and also to examine the quality of medical care.

Mr. Nader has picketed an outstanding Washington law office because it is defending a polluter. He has made an incursion into Dean Acheson's law firm to ascertain its influence on government officials. In doing so, he has challenged the legal profession to rise above the narrow confines of the law and to take into account the social implications of legal advice it renders to American business enterprises.

## Another Mother for Peace

Another current venture in the movement to hold corporations accountable for their social impact is the Council on Economic Priorities. The council describes itself as the "socially concerned Dun and Bradstreet." With an office in Washington and field representatives in New York, it has mailed a questionnaire to some 100 companies, asking for detailed information about pollution, hiring practices, foreign investments and defense contracts. This is followed by attempted visits to corporate executive offices. Like Nader's Raiders, the council has a certain arrogance in its manner of talking to its intended corporate victims. The same tendency toward an absolutist concept of ethical and social values is present.

The same assumption of moral superiority exists. The council presumes to pass judgments on individual company performance and renders such judgments in publications and pamphlets mailed to investors, employees and some segments of the general public.

Another well-meaning group seeks to apply economic power to achieve social goals. This is Project Equality, which promotes equal employment practices among suppliers of equipment to churches. The project has Ford Foundation backing and strong interfaith support among Catholic, Protestant and Jewish organizations. Its end product is a list of companies whose employment practices have met the tests set forth by Project Equality, often after inspections and interviews by project personnel. Cooperating churches agree not to purchase from firms that fail to meet the organization's standards.

Less influential, perhaps, are the groups seeking an end of hostilities in Indochina by threat of pressures on major companies. Typical is the Committee for Economic Action to End the War, headquartered at Cornell University. Several months ago, they proposed a boycott of one company's products unless that company publicly condemned the war in Vietnam and Cambodia. An antiwar group in Beverly Hills, Calif., known as Another Mother for Peace and claiming some 150,000 members, lobbies in Washington, conducts letter-writing campaigns, runs ads and distributes peace medallions and bumper stickers. The group sponsors boycotts of goods produced by defense contractors.

## Shareholders should help decide

Even the courts seem to have joined the corporate accountability movement. I refer to a case brought by the Medical Committee for Human Rights, a stock-

holder in the Dow Chemical Company. The U.S. Court of Appeals recently held that the Securities and Exchange Commission and Dow were wrong in preventing Dow stockholders from voting on whether that company should get out of the napalm business. The court's opinion contained a statement that is of particular interest to management people. The court said in essence that Dow pursued a line of business that produced little profit and risked impairment of public relations and employee recruiting. The court noted that management considered this course to be morally and politically desirable — but emphasized that management is no better qualified than the shareholders to make this kind of judgment. The court deplored "management's patently illegitimate claim of power to treat modern corporations with their vast resources as personal satrapies implementing personal, political or moral predilections." In effect, this means that when a corporation's business is motivated more by social considerations than expectation of profit, shareholders have a right to participate in that decision.

## A strong kinship among activists

Here is what other major corporations were up against on the annual meeting circuit last spring:

Gulf Oil encountered three protest groups in Pittsburgh — the Quakers American Friends Service Committee, the Gulf Action Project and a citizens-church organization.

IBM and the Chase Manhattan Bank encountered the Business Executives Movement Against the War, a national organization.

United Aircraft faced the Anti-Aircraft Conspiracy in Hartford.

This is only a partial review of the myriad citizen movements challenging corporations to account for the social consequences of their actions. Let me turn to some interpretation of the deeper roots and long-range significance of these efforts.

No task holds more pitfalls than that of sorting out the reciprocal and complex relationship of events, trends and ideas underlying these movements. I make no pretense of being able to do this. But I suggest we begin with recognition of a strong kinship among most activist movements that agitate our society. We are witnessing a many-sided revolt of individuals against the impersonal forces and institutions that dominate their lives.

## The revolt is not new

Young people, blacks, the poor, intellectuals, blue-collar workers and others are venting their frustrations over circumstances and events they do not like, but over which they feel they have been unable to exercise any decisive influence. In this atmosphere, the individual, instead of finding freedom, feels crushed by external forces.

He feels at the mercy of vast institutions — the government, the corporation, the university. A few would include capitalism, itself. All seem to impinge upon freedom of personal expression and the quality of life. Psychologist Kenneth Keniston blames the alienation of many of today's brightest youth on their inability to meet the demands of the ego in contemporary society.

The very structure of society is regarded as a threat to their individuality. It is cold, impersonal, technological, dehumanizing. This sense of a lack of appreciation of human values may be one thread that underlies protest movements against war; pollution; mistreatment of consumers; lack of democracy in our political processes, educational institutions and corporations. Whatever merit such criticism may have is confounded by the fact that youthful apostles of change are not clear in their own minds as to which factors are being condemned for which social and cultural consequences. Our critics are loathe to sort out causes and effects with precision, to qualify their judgments or to express them in empirically measurable terms. Nor are they clear on how to prevent the abuses they deplore.

This revolt may have flowered overnight, but at least on the intellectual plane it is a familiar article. John Stuart Mill over a century ago said: "I confess I am not charmed with the ideal of life held out by those who think that the normal state of human beings is that of struggling to get on; that the trampling, crushing, elbowing and treading on each other's heels are the most desirable lot of humankind."

## Americans are unhappy

Eric Hoffer, the longshoreman-philosopher, has written that "where people toil from sunrise to sunset for a bare living, they nurse no grievances and dream no dreams." In past eras, man was fundamentally oriented to economic scarcity and thus to insecurity, fear and self-centeredness. Accordingly, there was then no general support for reforms dealing with the consequences of abundance, with questions of quality versus quantity or with the moral and ethical content of economic decision making.

Thus the new reform movement results partly from the discovery that general affluence is no cure-all. Indeed, it frustrates many to observe we have ample total resources to do what needs to be done, but we seem to know not how to do it. Americans in the decade of the 1970's are remarkably unhappy people when measured against people of other cultures or Americans of other generations.

There has been a tendency in some circles to shrug off these movements as ideological fads; I think that is an error. Consumerism and environmentalism have struck a powerfully responsive chord, as seen by the sudden, remarkable grip these issues have among politicians around the country.

## More loyalty than the flag

Consumerism has usurped the sanctity attributed to Motherhood, which is no longer in such good repute. Environmentalism commands more loyalty than the flag. And the assault on the Defense Establishment is led by some of the most respected leaders in the Senate of the United States.

Yet it was not so long ago that the consumer movement was rather like the Salvation Army — a retreat for a handful of the unworldly. Environmentalism was considered scarcely relevant unless one had a personal stake in the Hell's Canyon Dam or some other direct intrusion on nature. A vote against ABM would have been considered unpatriotic.

Yet these are all mass movements, rooted firmly in the attitudes and concerns of millions of Americans. Thus, even after the emotion of the environmental teach-ins has dissipated, antipollution action has great appeal in both Congress and the White House.

Not so the corporate accountability drive. At this stage at least, it is essentially an elite movement directed by serious and well-disciplined young men and women of keen intelligence, largely the children of rich and influential parents. Significantly, most of its leaders determine to work within the system. They are neither Maoists nor Marxists. They seek not to abolish our economic and political organizations, but to make them more responsive. Yet, the corporate accountability movement has a limited constituency.

## National corporate commission

Lacking mass appeal, corporate accountability has not yet shown signs it will develop into such a compelling political force as Consumerism and Environmentalism have proven to be.

Senators Muskie and Eagleton have proposed a bill that would prevent corporate managements from excluding in their proxy statements stockholder proposals dealing with "economic, political, racial, religious or similar issues" unless the matter is wholly beyond corporate control.

So far, it seems this bill has attracted more attention from corporate executive suites than from key congressmen and their committee staffs. I see no serious consideration of this bill in Congress this year.

Senator Magnuson, chairman of the commerce

committee, is reported to be weighing sponsorship of a bill creating a national commission on corporate responsibility. The commission would examine corporate impingement on society and issue a code of corporate social responsibility. So far this proposal also has been received with apathy. Such indifference reflects the fact that, in the past decade, we have witnessed not a breakdown but an increase in the ability of the political system to give meaningful direction to our complex society.

## Two views of the movement

I suspect some energy harnessed by the corporate accountability movement comes from passions loosed in our country as result of the war in Vietnam. Thus some may anticipate that the agitation for corporate accountability will decline when the war ends. They feel all backers of Campaign GM and all who subscribe to the "socially concerned Dun & Bradstreet" are not necessarily signed on for the long haul. In my view, there is an equal prospect that, after the war, basic discontents will be directed in some other form toward corporations.

In any event, my hunch is that corporate accountability is not likely to attract broad political support or to generate significant legislative prescriptions.

This does not indicate we should dismiss the matter lightly. While the issue may not confront corporations so acutely in the legislative arena, corporations may well face an increasing array of difficult challenges at annual meetings, in proxy statements and in questionnaires and investigations from private rather than governmental sources. It will be more a public relations problem than a political problem.

From this perspective there are two views of the corporate accountability movement: a threat and a wake-up signal.

No doubt many businessmen regard the idea as Marxism in Love Beads, the leading edge of an assault on the American Way of Life. What is surprising is the number of businessmen willing to listen and talk to individuals and groups who raise disturbing questions.

I don't know of a single major corporation that has yet responded to a demand for information — no matter how self-righteously phrased — with the response that I would have expected to hear, namely: "It's none of your damn business, sonnyboy."

Is it because our corporate executives are so responsive these days to public relations? Is it because they recognize instinctively that corporate defiance is not likely to be popular? Or is it because they harbor reservations about what business is doing in the social arena of America?

The answer, I suspect, is YES to all three. Many businessmen have responded to the corporate accountability movement as a wake-up signal, and this certainly is encouraging.

## What constitutes good care?

In bygone days, businessmen were comforted by Adam Smith's theory that in pursuing maximum profit they were led, as if by "an invisible hand," to serve society's interests. Today, many businessmen are not sure the answer is that simple. The old beatitudes of private enterprise and the assumed benefits of profits no longer appear to be persuasive dogma.

I don't know of anyone who has yet enunciated a coherent philosophy of corporate social responsibility. Somehow the rationale sounds like either a contemporary *noblesse oblige* or a slightly swinging version of the Charlie Wilson doctrine — if we take good care of society in the short run, society will take good care of us in the long run. But in these days, what constitutes "good care"?

The real challenge, I suggest, is that the corporate accountability movement compels us to strive for modern and persuasive formulations of the essence of what a business corporation is and how it can best serve the society that creates and sustains it. Both the standards and the idiom of corporate life are always changing. We need to say and do things so as to get inside the vibrations of our times. ▢

# Voluntarism IS AN American Habit

BY DAVID R. MAXEY

"Never volunteer for anything," is a typical bit of American advice that Americans choose to ignore. And that's good for the nation. There are in the United States 69 million individuals who may have in their willing hands the answers to some of our most pressing national problems.

It is a small sickness to feel anonymous. Too many of us do. There have been bales of writings over the last 25 years teaching us that the uniqueness of an individual man is being buried by bigness—big government, big labor, big business.

Our political debate often takes the form of a discussion about whether government should tackle some social problem, or whether the solution would be better left to private enterprise. While that argument goes on, so do our national troubles.

We can sit in our living rooms and hear much more than we want to know about racial tension, crumbling cities, poverty, pollution and all the other spectres that haunt us. No wonder, then, that the evening newspaper occasionally gets slammed down on the living room floor with this cry: "But what can *I* do?"

We might seek the answer by referring to a report on America by a Frenchman. Writing about us in the 1830's, Alexis de Tocqueville, one of the keenest observers of Americana who ever lived, delivered "Democracy in America." Here's a sliver from it: "Americans of all ages . . . constantly form associations . . . of a thousand kinds . . . to give entertainments, to found seminaries, to build inns, to construct churches, to diffuse books, to send missionaries to the antipodes . . . to found hospitals, prisons and schools."

After noting that phenomenon, Tocqueville declared his esteem: "I have often admired the extreme skill with which the inhabitants of the United States succeed in proposing a common object for the exertions of a great many men and inducing them voluntarily to pursue it."

Tocqueville was talking about more than a neigh-

*Mr. Maxey is a native of Boise, Idaho, now residing in New York. He is a graduate of the University of Idaho and the Harvard Business School. He has held various posts with Look magazine and is now Co-Managing Editor of Look.*

borhood barnraising. He was talking about a principle of our way of life. Voluntarism is an American habit. The Red Cross alone marshals 2.3 million volunteers. Last year, Dr. George Gallup announced that 69 million adults had said they were willing to donate themselves to solve problems in their own communities. And although most economists treat volunteer work as if it weren't worth money, one Department of Labor study estimates that by 1980, Americans will be contributing as much as $30 billion in hours of free work in their communities.

Seeing the size of the voluntary work force, Richard Cornuelle, in his 1965 book, "Reclaiming the American Dream," broke loose from the popular notion that society is divided into only two segments, government and private enterprise. He took inventory of the organizations that would not fit neatly into those categories and worked up this partial list: 6,000 private foundations; 18,000 business associations; 131 labor unions; 320,000 churches, and 100,000 private welfare groups. Mr. Cornuelle labeled his list the "Independent Sector." He saw it as larger and potentially more effective than the government bureaucracy his fellow conservatives were fond of cursing.

Mr. Cornuelle's unearthing of the Independent Sector means we may be on the verge of getting over the standard liberal-conservative shouting match about whether government or private enterprise is the font of our national well-being. The Independent Sector appears to be ground on which both groups can walk comfortably.

## It beats welfare checks

Take, for example, Zita Potts of Crothersville, Ind. She is a 64-year-old widow who gets by on $2,000 a year, so she has more than a nodding acquaintance with poverty. Working with VISTA volunteers (from the government), and with the staff of the Community Action Program in Columbus, Ind. (government, foundations *and* private enterprise), Mrs. Potts helped low-income women form a sewing cooperative. Working when they can, the women run up ties, uniforms, tote bags, dolls and other items to sell. If their products catch on with consumers, the members of the Stitch & Quilt Association will come to own their own business. That's private enterprise, and it beats welfare checks for these proud women. Zita Potts, herself, working for satisfaction, is a one-woman addition to Cornuelle's Independent Sector.

Examples of Independent Sector action surface behind just about every headline that gives us bad news. Citizens in Fresno, Calif., did more than moan about drug abuse. They have the FACTS Foundation Youth Service Center going for them. Volunteers, many of them college students or former drug users, counsel youngsters that drug abuse is a bad trip.

## Meals-On-Wheels

Amicus, Inc., is a Minneapolis, Minn., project that matches a volunteer with a prison inmate. They correspond and visit, and when the inmate leaves prison, his volunteer friend helps with jobs and housing. The purpose: to cut recidivism.

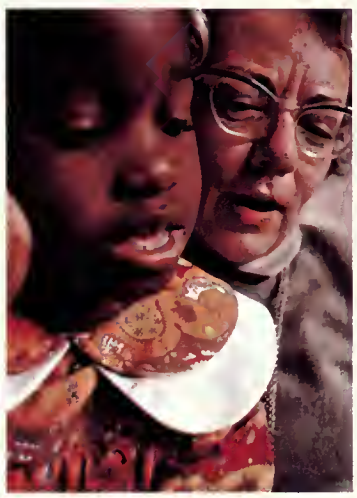
It is still true in America that some people don't get enough of the right kind of food. Meals-On-Wheels of Leon, Iowa, fights that problem with church volunteers who deliver one hot meal a day to shut-ins and low-income old people, at low cost.

It is almost an axiom that "the poor pay more." Without sufficient money for handling day-to-day expenses in an orderly manner, low-income families often plunge into expensive debt that propels them further downhill. In Phoenix, Ariz., Family Debt Counselors is trying to break that spiral by scheduling evening meetings with trained volunteers for families who need money-management advice.

Richard Nixon, then candidate Nixon, began to talk about voluntarism in an October, 1968, radio speech. He described the malaise that the feeling of insignificance causes: "As government has strained to do more, our people have felt constrained to do less. The more the federal government has tried to solve *all*

*Indiana Bell Telephone people devised a way for blind boys at Indiana State School for the Deaf to run races. Contestants grasp a wooden spool running on a cable strung between poles—and away they go.*

*Above: Telephone Pioneers in Portland, Me., run Olympic games for retarded children. Below, left: Young volunteers help entertain Vietnam veterans hospitalized in San Francisco. Right: Pioneer tutors a child in one of San Francisco's inner city schools.*



## The "Spirit of Service" Works After Work

The "Spirit of Service" is an integral part
Bell System tradition. It is so strong tha
Bell System people choose not to turn
when they go home at the end of the w
day. These highly motivated people c
their energies into volunteer action of
kinds, producing a dividend in dollars and
benefiting the entire nation.

Thousands of telephone people ever
make a valuable contribution to their com
ties by giving their time and cash to the
raising efforts of United Fund, United A
Community Chest and Red Cross cam
Thousands of others serve as volunteers i
munity-service projects sponsored by th
vice organizations to which they belong

Some telephone people serve as volu
in Scouting; as advisers to Junior Achiev
projects; as youth leaders in community c
churches and synagogues; as hospital aid
as voluntary firemen and auxiliary police.
collect clothing or eyeglasses for the dis
taged, or toys that they'll recondition f
tribution to needy children. Operators ar
phone people often pitch in to man th
phones for fund-raising telethons.

Some Bell System employees have
leaves of absence to devote their full

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our problems, the more it has seemed to fail. Public programs are attacked by the very people for whom they were created. And our young people, our most precious resource, are disillusioned as well as disaffected by results."

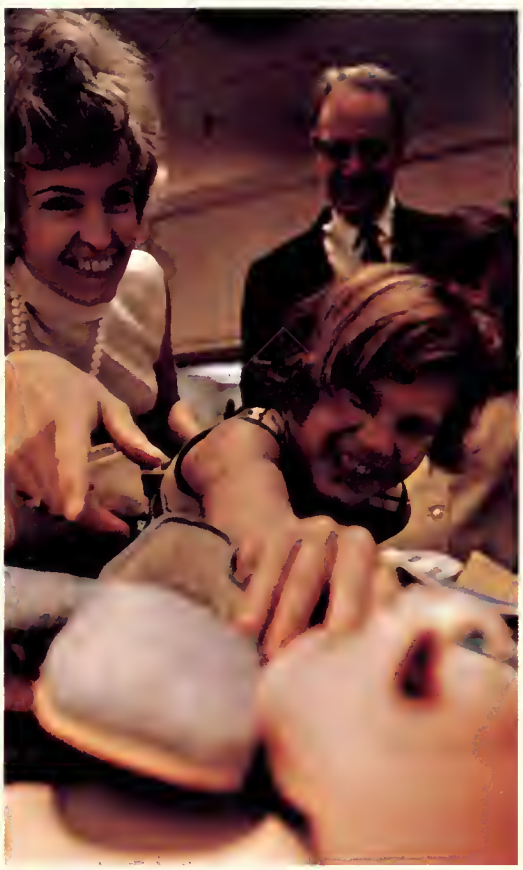
In his own drive toward the Democratic nomination, Robert Kennedy struck similar themes. Secretary of Housing and Urban Development George Romney, a Republican, has pointed out the similarities between the Nixon and Kennedy themes, to show how little the voluntary idea has to do with politics.

### No need to rob gas stations

Mr. Romney has a full charter to talk about voluntarism. He was putting volunteers to work in Michigan even before he became governor. He pushed citizens into a searching examination of Detroit schools. They

teer action in VISTA or the Peace Corps.
er number devote part of their after-work
to direct attacks on local community
ems. In one community, Bell System peo-
ork as volunteer aides in a Head Start pro-
helping prepare disadvantaged children
ndergarten. In an Eastern central city area,
one people promoted, equipped and as-
the operation of a day care center for the
en of welfare mothers who work or attend
l. In many communities, Bell System vol-
rs serve as tutors for underprivileged chil-

System people volunteer for all manner
jects: they engineer "ditty bag" drives for
oops in Vietnam; they teach courses in
, electricity and other vocational skills for
ducationally and economically deprived;
ey are active members of organizations
g with drug addiction, race relations, em-
ent, housing and other urban problems.
ong the most active volunteers in the Bell
are the Telephone Pioneers of America,
anization of more than 339,000 active and
l telephone people with more than 21
f service.
-five thousand of these community-
d people now engage in Pioneer-spon-



*Left, above: Volunteers help with the Talking Book program in Oklahoma City. Left, below: Life Member Telephone Pioneers test children for Lazy Eye affliction for Head Start program in Socorro, N.M. Right: Pioneers, serving as substitute parents at an Oklahoma City inner city school PTA, fit indigent children with new shoes.*

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came up with 182 new ideas and helped sell the people of Detroit on a bond issue and tax increase to implement them.

Mr. Romney has other stories to make his point for voluntary action. At the White House in 1969, he told about a sociology professor at Michigan State University who had been watching a low-income school district in Pontiac, Mich. Many of the students, the professor observed, were headed for delinquency. He asked for volunteers at Michigan State, and 350 college students showed up for the first meeting. They plunged into a program for tutoring the young in reading and arithmetic. Implicit in their work: The child who learns more and stays in school won't need to find self-esteem in robbing gas stations.

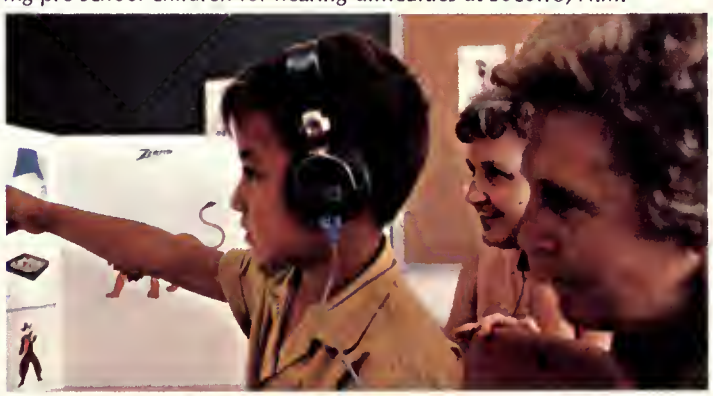
Catching up with the professor's volunteer tutoring program after it had been under way for a year, Mr. Romney helped spread the idea across Michigan.

sored community-service activities, and 16,000 nonmember telephone employees and family members join with them. In one year's time this group contributed 963,890 hours of volunteer effort in thousands of communities in the United States and Canada.

Telephone Pioneers participate in more than 700 kinds of volunteer projects. They are a familiar sight in children's hospital wards, at community blood bank donation centers and anywhere else a community agency may be at work.

Telephone Pioneers work with the sick, the disadvantaged, the lonely, the retarded, the handicapped and almost anyone who needs help. They are involved in raising funds for many organizations and agencies, in a continuing "talking book" project for the sightless, and in projects to collect, recondition and distribute toys for disadvantaged children.

The Bell System now has more than a million employees. Many of them have the volunteer habit, although it is impossible to know exactly how many. They work for a variety of causes. Their viewpoints differ. But they all have a common goal: to serve — to make life bigger, better and more meaningful for somebody else.



*Above: Pioneers help care for children at an inner city Day Care Center in Newark, N.J. Below: Pioneers lend their telephone expertise to screening pre-school children for hearing difficulties at Socorro, N.M.*

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Eventually, 13,000 college students were working with 35,000 elementary school children.

Michigan is not unique. One-to-one tutoring is nationally becoming one of the most popular ways to volunteer. College students, with their urge for immediate involvement and results, get both when they sit down with a younger child. Once regular teachers get over the idea that nonprofessionals might bungle the job, they savor the relaxation of demands on their own crowded schedules. Some educators believe college students break through faster with their young students, just because they don't appear to them like "adults."

During his successful campaign for election, President Nixon often raised the voluntary idea. So did Mr. Romney in his campaign speeches for Mr. Nixon. With the election won, the new administration began to hunt an approach to encouraging voluntarism throughout the nation.

There were hurdles. Labor leaders worried that too

much emphasis on voluntarism would hold down the supply of union jobs. There were comments that the administration might seize on voluntarism as an excuse for the government to back out on its own social obligations and programs. Voluntarism wasn't precisely a new idea, so leaders of the voluntary organizations that already existed expressed worry that the government was about to become involved in what had always been a private activity.

For more than a year, Mr. Romney and Mr. Cornuelle worked with Max Fisher, Detroit philanthropist and the President's Special Consultant on Voluntary Action, toward an administration approach to voluntarism. Mr. Romney and Mr. Fisher sat through long sessions with representatives of more than 250 organizations, listening to their ideas and their worries.

Out of those sessions, plus talk within the administration, grew the President's Program for Voluntary Action. It has two branches. Mr. Romney heads the Cabinet Committee on Voluntary Action and the Office of Voluntary Action (O.V.A.) within his own department. O.V.A. surveyed federal programs to find out how volunteers were being used, if at all, and how they might be used better.

## Ideas from data bank

Outside the Government, Charles (Bud) Wilkinson, known best for his football coaching, heads the National Center for Voluntary Action. The N.C.V.A. has a blue-ribbon board of directors, numbering more than 100, headed by Henry Ford II. Financing for the center is accepted only in $100,000 lots, a concession to other voluntary organizations, whose leaders feared that their own donations, mostly small, would stop coming with the establishment of N.C.V.A.

The National Center's first action was to prepare a data bank. Throwing out questionnaires to citizens in local communities, the N.C.V.A. chronicled the methodology of successful voluntary programs.

Interested citizens can write for guidance on their own programs and get ideas back from the data bank.

N.C.V.A. also is exploring the statutory and regulatory barriers to the use of volunteers by the federal government. With a few exceptions, like the Office of Economic Opportunity and the Veterans Administration, most government agencies are not able to use volunteers legally. But an effort will be made to untangle such legal questions as this one: If the government loans a car to an unpaid volunteer to get to his place of voluntary work, whose liability insurance applies — the government's or the driver's?

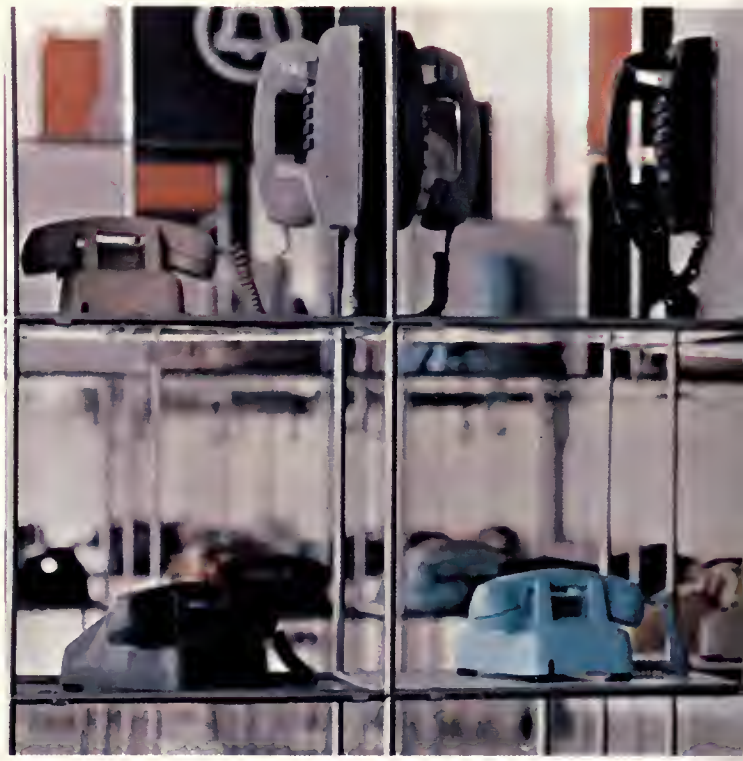
## We are not just being nice

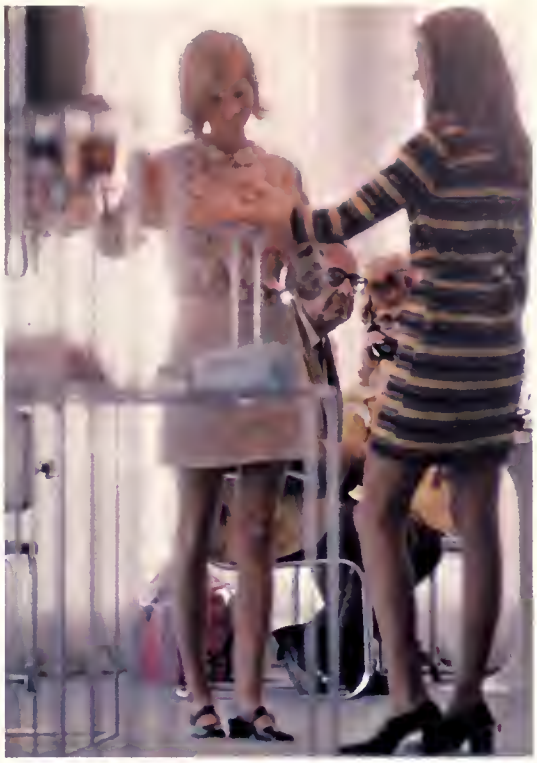
The Nixon Administration — and indeed all of us — must learn much more about voluntarism. Tocqueville told us correctly enough that we are great joiners, and that we do volunteer in great numbers. But why?

One study points out that most of us say we volunteer for *humanitarian* reasons. But the study suggests we are not just being nice. We volunteer also because we have more leisure, our boss told us to get involved in community activities, we are lonely and want to meet new people or we may have a chance to learn new skills useful in our regular job. Social status is also a great motivator in many towns, with status varying according to the cause or campaign.

The President has acknowledged something important in talking about recognizing, "the small, splendid efforts that never make the pages of the national journal." He has acknowledged the danger in large voluntary organizations' becoming institutions, as much concerned with continuing to exist as with the problems they were organized to solve. "Small, splendid efforts" are more likely to go out of business happily because the job is finished.

The President and his advisers have been properly cautious about claiming that voluntarism will solve every American problem. But if involvement in trying to solve problems means that a volunteer gets a better vision of himself, then voluntarism may pay a double dividend. We may solve some problems, and may wind up with fewer angry, alienated citizens. ☐





# A Telephone Boutique

The scenes on these and the next two pages were photographed in a unique new boutique a few miles north of Miami, Florida. Called the PhoneCenter, it represents a totally new approach to providing service for residence customers — in this case, those living in a cluster of sunny new high-rise apartment buildings in Hollywood-Hallandale area.

The PhoneCenter, run by Southern Bell, features attractive displays of telephones in many colors and models — all "portable." Customers browse among the phones, make their selections, have their orders filled on the spot, then take the instruments home and plug them in for instant service. The PhoneCenter customer also gets a substantial reduction in the

one-time charges for establishing service.

Opened in July, the PhoneCenter is scheduled for a run of a year to 18 months to test this new AT&T marketing concept. The Center is on the street floor of a new apartment complex, next to a pharmacy and in among other shops and offices. The handsome showroom is staffed by Commercial and Plant Department people who work together to serve customers in the trial area.

Said one pretty service representative about her present job, "It's just great here. We hope we stay open forever." If customer response is any gauge, the citizens of Hallandale-Hollywood agree. Declared one brightly-clad matron as she picked a pair of matching Trimlines, "You know, this place is fantastic!" ▢

# TO MANAGE TOMORROW

When we say that "Management is an art," what does this banal statement imply? A contrast to science first comes to mind. The physical or social scientist concerns himself with *analysis* of things or events, while the artist is primarily involved with *synthesis* of materials, human efforts and ideas.

Modern managers are far closer in temperament to men like Michelangelo, Da Vinci and Rubens than to the giants in the history of science. They observe the world, conceive visions of how it can be changed, gather people and resources, develop deployment strategies and inspire their followers to turn their visions into reality.

All these factors emphasize the future. However, the past of any significant organization has its claims, and the manager's task is to take that past success and its traditions into the future, sometimes keeping to the old course, but more often readjusting or altering the navigational instructions he gives his crew. He cannot be satisfied with precise records of the past as purported by accounting statements. Regardless of their status as ends in themselves to the accountant, to the manager they are only checkpoints on a voyage into the future. At every point he has options and decisions to make that will determine what future reports will tell. To this extent he is akin to an artist at work on a gigantic fresco, which he will not complete in his lifetime, but on which each day's activity will influence the final product.

Planning is thinking ahead with a view to action, beginning from the base of where you are — which is often difficult to determine — and laying out alternative tracks that can be traversed to get where you want, which is extremely difficult to determine. Some assume that planning consists solely of setting the goals, aims or objectives and turning these over to lesser men to achieve, often accompanied by Nelsonian postures like "The company expects every man to do his duty."

This kind of "planning" leads to fantasy, ridicule and failure. Serious plans live on a hard line that separates dreamy aspiration from the harsh world of reality. They try to resolve thorny questions or dilemmas that arise when hope for the future exerts a drag on the present. They do so by decision, communication of that decision to all hands, and adjustment of The Plan as unforeseen events occur. The Plan is not a blueprint for building construction, but more a design for attack. Two statements by Field Marshal von Moltke illustrate the wisdom corporate planners must acquire: "No plan can survive contact with the battle," and "Whatever can be misunderstood, will be misunderstood." Such insights describe a process, not a project, something flexible rather than rigid, demanding involvement to a greater or lesser extent of every person in the organization.

The process begins by acquiring in some way what we can call "aims." Aims can spring from inheritance, rational calculation, divine revelation, irritation, shrewd discernment of opportunity, fear, love, dissatisfaction or any other shock to the mind. They are essentially visions, in the non-pathological sense, of desired future states. They are also the *sine qua non* of the planning process.

Resistance from managers to the idea of planning, when traced to its source, often comes from an emotional reluctance to re-examine the premises of their business and to make their purposes explicit. This is understandable since it is a painful process and creates as much trouble as Socrates caused in Athens by his infernal questions. Those who engage in planning take similar chances, for they must make nuisances of themselves if they are good at their jobs. A "popular planner" is a contradiction in terms.

Assume that by some process an aim is embraced. Until the next step occurs, the aim remains merely sterile aspiration. When the aim is shared by men of action, implementation (that barbarous word) begins. Here is where resources of personnel, money, plants, equipment, advertising and all the other weapons in the management

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*Mr. Boettinger, head of AT&T's Management Science Division, has written widely on techniques of corporate planning. This article is drawn from a series of lectures given recently by Mr. Boettinger at the invitation of the British Institute of Management in London and Manchester.*

arsenal are wheeled into action. Their disposition, timing and amounts should be related to the overall aim of the organization if the management process is to be characterized as rational. Implementation, however, requires that men must make assumptions about the infinitude of variables at work in order to make the decisions required. In most businesses these assumptions are seldom appreciated and less often articulated. When this is the case, nasty surprises occur. However, in error lies the core linkage of day-to-day supervision and management planning. Error, in this sense, means a discrepancy between what one wanted to happen and what actually happened because what had been assumed to be constant is actually variable.

Error, once detected by some measurement system, leads directly to an operation called "correction," and here we return to the implementers. The presence of a discrepancy between what they intended and what they got sounds the bugle for action. Sometimes, when the error is negative, *i.e.*, things turn out better than expected, they should rush forward to exploit the unexpected opening. When the error is positive (things turn out worse) they may have to fall back and regroup for counterattack. But the correction mode almost always poses a dilemma that can cause a man of affairs to freeze with indecision. Hamlet knew well the mood: "And thus the native hue of resolution is sicklied o'er with the pale cast of thought."

The dilemma arises because implementation and/or the aims are candidates for correction. Some managers show symptoms close to neurosis when placed in this spot, unable to decide, perhaps making half-hearted attempts to correct everything simultaneously, or refusing to believe the error message. Others always assume that an aim received from on high can never be wrong, that the fault must lie in themselves and the people in their charge. They resolve the dilemma by throwing everything in sight into renewed operational assaults. Historians are often kind to such people, and the annals of most nations are littered with their heroic exploits. They represent a romantic approach to management. Its danger lies in its aura of manly appeal and a distorted view that it takes of blind faith, obedience and loyalty.

Other men assume their personal execution can never be wrong, and the roots of failure must always be found in faulty selection of aims. They usually can be identified by their insistence that they have absolutely no responsibility for the selection of aims. "Tell me what you want, and I will do my best, but I can't promise anything," is the motto on their banners.

Some hierarchical structures make questioning of an impossible aim quite dangerous and introduce so much reluctance to do so that top management, deafened by silence, may not suspect that they have sent people on fools' errands until the roof falls in. In the past, such silence merely produced inconvenience, embarrassment and losses. Today it can be suicidal.

We see many failures today in all areas of life by good, experienced and intelligent men who, in another age, would have been brilliant successes. They are victims of the quickened pace of change, which outstripped their ability to cope. They must pay the price of dragging carcasses of dead policies into their future. Thorstein Veblen, a maverick American economist, observed that "Immutable conduct and progressively changing conditions result in a logical muddle." It is difficult to quarrel with this if you assume things were in step at the start.

Corporate planning's reason for

"No plan can survive contact with the battle" —which is why any serious enterprise must plan flexibly for an uncertain future

Resistance from managers to the idea of planning, when traced to its source, often comes from an emotional reluctance to re-examine the premises of their business and to make their purposes explicit

Corporate planning, rightly understood, is the prime test of top management

Good organizations keep their planning taut and smart by scanning widely for new possibilities. Others act as though they inherited guns rusted solidly in place

Business enterprise is the one institution of society dedicated to the idea of change

existence begins with Veblen's statement: It tries to assess changing conditions and prescribe alternative courses of conduct matched to them.

This is difficult enough to do for an individual, but when attempted for all individuals who compose an organization, it is a task worthy of the best of men. Corporate planning, rightly understood, is the prime test of top management. It is also its prime tool of leadership. Real planning can only be a serious activity if the top men in command want it, support it, demand it and form their judgment by its processes and imperatives.

Planning is the one task for which they cannot delegate their responsibility. Those who try the easy road of delegation do their planning staff men a disservice. These experts have been condemned to produce sterile documents whose value is solely decorative. They are removed from shelves only to answer questionnaires from outsiders. Subordinate managers soon realize that top management's lip service to planning implies neither penalties nor rewards for participation in the planning experts' games. In this case, those willing to talk with the alleged planner are those least able to help his work survive. There is no way to use planning attitudes, techniques and methods if top leadership does not want them, because all the support structure of information, communication and decision rules will be either missing or easily sabotaged by anyone who dislikes a planning staff recommendation.

Placing such aberrations aside, let's examine how a top management that is serious about planning can proceed and what burdens it must assume. As with field guns, corporate aiming consists of two movements, one sweeping the horizontal plane (azimuth), the other moving up and down (setting the range). The horizontal movement consists of examining the spectrum of possible markets for the organization and selecting a sector for serious *probable* effort. The range movement consists of how far one intends to penetrate that sector. It usually is measured by "share of the market" criteria for businesses and churches, by scales of eminence for colleges and by relative size for defense establishments.

Good organizations keep their planning taut and smart by scanning widely for new possibilities. Others act as though they inherited guns rusted solidly in place, trained forever on a target selected long ago. All their management energy goes into mere drill, or traditional operations, and none into target selection. When the targets constantly jiggle and disappear, or new ones spring up nearby, the gunners experience frustration. When some new targets are lively enough to begin firing on the old guns, panic ensues after initial rage at their impoliteness.

Yet business enterprise is the one institution of society dedicated to the idea of change. It institutionalizes change, a paradox. This is why planning is so important in modern business. If one does not expect to have to change in the face of an uncertain future, no planning at all is needed. It is no accident that other institutions have embraced the techniques — but not necessarily the processes — of business management planning. The reason is that they are experiencing unprecedented change and are eager to look to the one institution where change has been both its nature and its driving force.

The principle used in horizontal scanning for opportunities is extremely important for a planning-oriented leader. In selecting the scanning principle, severe constraints demand the most clearheaded appraisal of an organization's abilities. This appraisal

must be purged of all modesty and wishfulness. Lower level people in an organization usually are prone to *underestimate* its overall strengths, but top-level people are highly biased toward *overestimation* of strengths. They also tend to minimize weaknesses and assume that "a little tightening up" or a "return to fundamentals" will put everything right. This attitude seldom does much harm in day-to-day administration, but it can be fatal for strategic decisions.

Here I should explain my view of the difference between *strategic* and *tactical* plans, since these terms will reappear. *Strategic* decisions and plans have longer effects; are difficult to reverse; affect more functions; are broad in scope; set goals and broad selection of means, and use the *longest* period worth considering. *Tactical* decisions are narrow in scope; find the best specific means to achieve specific goals, and use the *shortest* period worth considering.

These are all relative terms and vary in business and industry. In dress manufacturing, strategic plans reach out six months and in timber operations, a hundred years. Even so, the classifications are not meaningless in a specific organizational context. Decisions made by a top management that delegates operational administrative authority are almost always strategic, even though such decisions may be made quickly. Strategic decisions turn the whole ship, and while every man on it may still go about his assigned duties, sooner or later they are all affected if they remain on board.

A cynical observation sometimes heard by military staffs states: "Lieutenant colonels work on strategy because field marshals love tactics." This canard was undoubtedly coined by a lieutenant colonel, but it does contain a core of truth for those unfortunate organizations where operational myopia is habitually an endemic disease.

Thus, selection of aims is a strategic decision. After vigorous appraisal of the organization's abilities, the search for possible coupling of those abilities to markets for them can be narrowed by the scanning principle allowed by those abilities. When an opportunity is discerned, the objectives for concentrated effort can be stated. This involves a painful process known to experienced strategists as "adjusting ends to your means." Objectives are more specific than aims, but less specific than goals. The setting of goals leads to the implementation stage of the planning process.

With specific goals in hand, the strategic assumptions known, the skills of operations managers and specialists are now required. Their task is to suggest several practical, alternative methods for reaching the goals and the resources required for each alternative. Organizational structures, personnel, finance, technology, equipment, marketing effort, legal issues, measurement systems and time frames should be made explicit for final judgment of the best approach. All must understand what this effort is: a systematic assembly of a mass of interrelated decisions that will be set in train in the future. They must take the process seriously and not as so much waste of time.

The best way for top management to show its seriousness is to allow key sponsors of various alternatives to present their ideas in person. Few men of action can convey their passion and thought in the stifling straitjacket of a formal report. If they are forced to, many brilliant ideas will never be heard by top management. Here is where a competent staff of planning experts can fill the gap, if they are good at organizing the ideas of their insightful but inarticulate colleagues. Also, the planning staff saves

In dress manufacturing, strategic plans reach out six months and in timber operations, a hundred years

Strategic decisions turn the whole ship, and while every man on it may still go about his assigned duties, sooner or later they are all going to be affected if they remain on board

One of the best services of a planning group is to have available some solutions lying in wait for the right problem. More than one planner's reputation is due to a good memory for ideas others forgot

Organizational measurements are dynamic forces; they inject power into the administrative process

all the rejected alternatives, and as they go on the shelves, a repository of good but untimely ideas grows.

One of the best services of a planning group is to have available some solutions lying in wait for the right problem. Conditions can change quickly, and if the assumptions made at the time of decision are not realized, retrieval of some ideas from rejected approaches that were not right for the time often can save the day. More than one planner's reputation is due to a good memory for ideas others forgot. As George Bernard Shaw said: "When you use an idea from one man, we call that plagiarism; when you use ideas from a dozen, that is known as research." Planners, like good intelligence men, are usually good researchers.

Implementation should not be allowed to begin without specification of the information system that will measure and report what is actually happening. As the strategic decision and its implementation cut their way through the world of men and events, methods for detecting and communicating the inevitable discrepancy between intention and realization must be planned in advance and well known to all involved.

I believe that neglect of this crucial area in the control process accounts for more failure than is necessary. When it is not paid any attention at all, the entire planning process is meaningless, since the system goes completely out of control and is finally pulled up only by exhaustion of resources available. Those organizations we call "well managed" or "rapidly responsive" have one thing in common: a measurement system closely tailored to their objectives.

Organizational measurements are completely different from measurements in the physical sciences. In science, one tries to minimize the effect of the measuring devices on the system or factor being measured. The goal is to keep the measurement completely neutral. Organizational measurements can never do this, and good ones don't even try. Such measurements are dynamic forces. They inject power into the administrative process, because they shape the behavior of those who will incur censure or receive accolades based on the meter readings observed by their masters. Nothing in management practice could possibly be less neutral.

A management aphorism says, "You get what you measure." This is a homely expression of great common sense and implies a compliment to higher management: "They are smart people up there. They must know what they want. They tell me what they want and what they are interested in by asking me to report certain information up the line. They also send down questions about some of the report items. I assume that other information I have, which they don't ask for, makes no difference to their judgment of me and my people. I am no fool, therefore I spend my time on what they pay attention to."

The attitude underlying such an expression gives the planning leader his best chance to couple his plan to the daily life of his organization's people. They may not understand all the nuances of the grand strategy, but they understand the recording angel who has been given her instructions for weighing their individual worth. Sometimes conflicting measurements are placed on a system with no advice for their resolution and balance by subordinate managers. There is no better way to demoralize a work force or to sabotage a plan. Tacking an extraneous, conflicting measurement onto an information system is a favorite stratagem of anti-planners. Good planners should be as alert for them as

sappers should be for enemy mines.

Consider the "correction" phase of planning. Also assume that a good measure of performance, related to goals, is operating. Here the planner faces his most demanding work. If he has not anticipated the possible conditions he is setting up for his subordinate managers, they will be transformed into moody Danes when the measurements flow. The planner must have produced some decision rules to help the manager judge whether to intervene directly in the implementation stages or to report that the aims, objectives or goals are unrealistic. Since these are expressions of top management's will, only top management can approve the decision rules that can cause them to be questioned, relaxed or modified.

Repetitive decision rules are called procedures, and it is a rare organization that is aware of all the old and irrelevant decisions fossilized in those venerable binders found on every desk. Keeping procedures up-to-date is a labor even Sisyphus would shirk, but adherence to obsolete decision rules produces material for tragic and comic plays. A planner usually needs to create new procedures if the plan is to be more than an updated reprise of an old plan. A plan changes things, puts people in novel situations and raises anxieties everywhere. The price paid for a chance to wreak this constructive havoc consists of procedures matched to the changed environment top management is trying to create. If they think the price unfair, they do not know their business. Lack of a good procedure to deal with contingencies is an embarrassment to the planning staff. To the people trying to cope with the consequences of their loftiness, it is a disaster.

There is a tacit assumption to the planning process: superb, two-way communication among the various groups. Organizational charts display the anatomy of a business, operations transform resources and constitute its physiology. The inertial forces of human nature furnish the endocrine system, which resists change. The communications links are the nervous system. The planning process demands a finely adjusted nervous system, which both couples it to its outer environment and keeps its internal organs functioning in harmony. It is interesting that the first faults to surface, when an organization decides to embrace the planning process seriously, are communications problems. More writing, investigation, studies and theories have been produced in criticizing and analyzing this area of management than in any other.

Yet, dissatisfaction with results remains at a high level. I believe one of the reasons to be a lack of attention to the imperatives of the planning process, which causes communications problems. The will to plan assumes the will to communicate. I believe it far more likely that those symptoms of organizational malaise called "communications problems" will disappear when the disease causing them is treated. We use pejorative terms for those who treat symptoms, though they may indeed have large followings of desperate patients.

The basic disease to treat is similar to what physicians call a *deficiency disease*. In the practice of management the deficiency is that of the planning process. Planning is not an easy medicine to take. But the harsh training to which it disciplines the minds of managers toughens an organization for successful engagements in an uncertain future.

"What is the value of planning?" the practical man may ask. My answer can be only another question: "What is the value of health?" □

A plan changes things, puts people in novel situations and raises anxieties everywhere

The planning process demands a finely adjusted nervous system

The first faults to surface, when an organization embraces the planning process seriously, are communications problems

# The Bell System's Role In Data Communications

by
**William M. Ellinghaus**

The Bell System has been involved with computers for a long, long time. The very first electrically operated digital computers were built at Bell Laboratories some 30 years ago, and all modern computers are based on the solid-state technology developed at Bell Telephone Laboratories.

We're also large computer users, with more than a thousand general-purpose computers in operation. As such, we have learned something about their potential and the importance of communication in realizing that potential.

It seems to me, though, that there are a number of links between the information processing and communications industries beyond the obvious need for one computer to communicate with another.

We share, for example, some of the same technology, and that technology is changing rapidly.

Both industries operate in markets in which customer requirements also are changing rapidly.

And both industries have a far-reaching impact upon most aspects of human activity.

And so we are locked together. While there may be occasional uncertainties, as there are in all successful marriages, I assure you that the marriage of computers and communications is one that is going to last.

The seventies will be a period when Americans will increasingly rely on communications to help manage their businesses, their institutions and their homes, and a period, I might add, during which the same can be said for computers. There is a "revolu-

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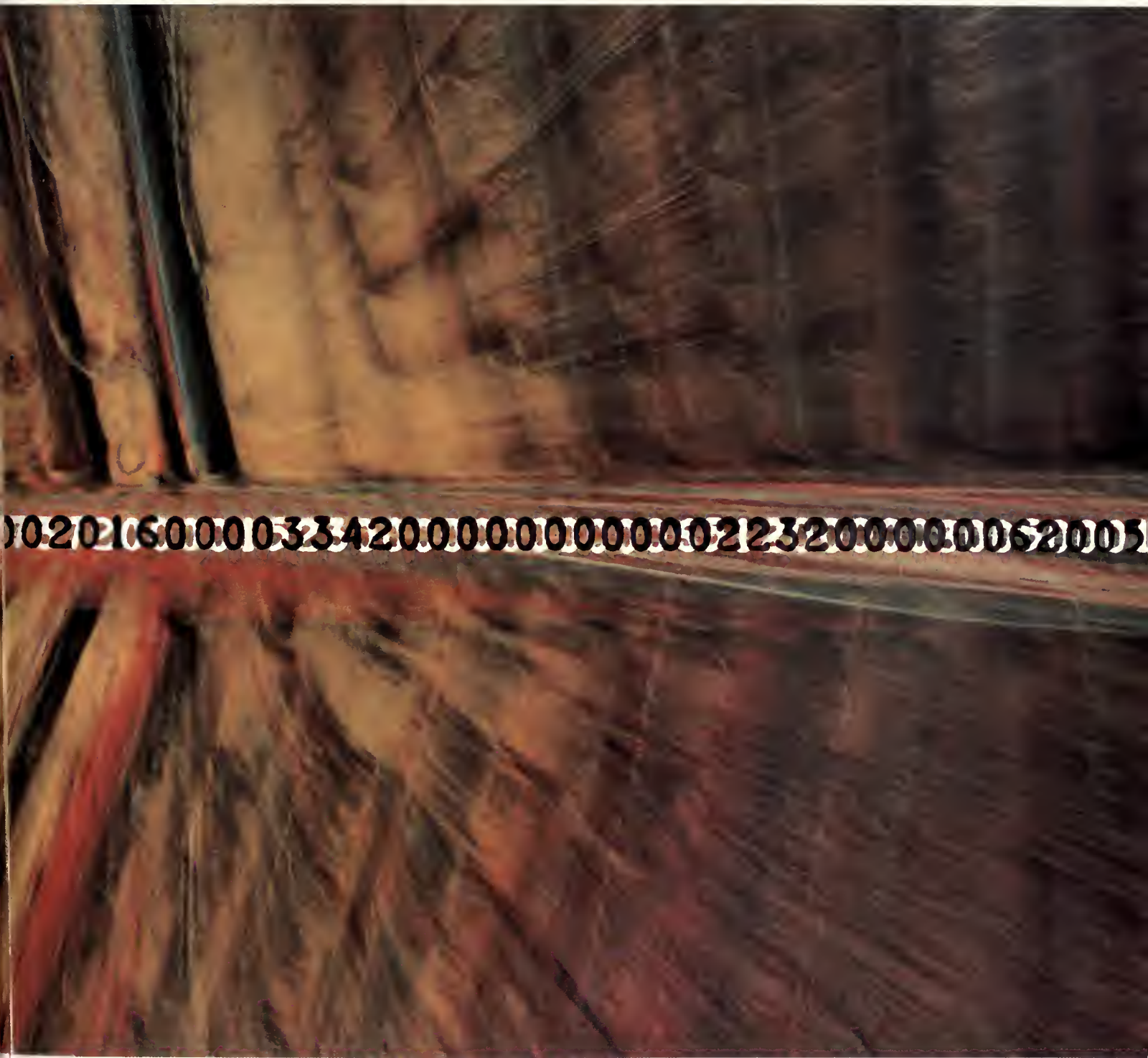
*Mr. Ellinghaus became president of the New York Telephone Company on September 1, 1970. Previously he was executive vice president of AT&T, in charge of rate planning and government relations. A native of Baltimore, he is a director of the Ball Corporation, the Indiana Bell Telephone Company and the J. C. Penney Company. This article is taken from a speech Mr. Ellinghaus delivered in September to the Association for Computing Machinery.*



tion" in communications taking place today. Changing technology and changing customer requirements have helped bring about that revolution, of course. But more important has been the impact both have had on the structure of the communications industry. It is the interaction of these elements that not only sets the pace of change in the communications industry but brings about as well some of the uncertainties that — to some observers — seem to cloud my industry's future.

It is to some of these uncertainties that I would like to address myself today, because the role of the communications common carriers — and the Bell System in particular — in serving data communications users is one of these uncertainties. My purpose here today is to leave no question about our desire and determination to serve data users just as well as we know how — and that we do in fact know how.

Let's talk first about the capacity of the Bell System's switched network now and in the years ahead.

## A fourfold increase

In the past 10 years, the circuit miles in the nationwide switched network have tripled. Today that network includes some 650 million miles of telephone circuits. In the next 10 years, we foresee a fourfold increase. This expansion will not consist of more and more of the same, but will incorporate facilities that are in the laboratory today, and promise vastly increased capacity — at lower and lower costs as the decade unfolds. Domestic communications satellites linked with our terrestrial network figure prominently in our plans for the future, as do millimeter waveguide systems and even lasers.

Bell Laboratories has announced a breakthrough in laser technology that may bring the day of laser communications ever closer.

Existing transmission technology is also undergoing dramatic change. For example, we have recently doubled the circuit capacity of our major microwave systems from 6,000 circuits to approximately 12,000 voice circuits per route. This is four times the capacity of most microwave systems that were in service at the beginning of the sixties.

We also have been able to use high-capacity coaxial cable systems for more of our long distance routes. Multi-coaxial cables in use since 1967 provide 32,400 two-way telephone circuits in a single cable. Today's technology, however, will permit the Bell System to increase the capacity of these existing systems to 81,000 circuits and at the same time put into service new coaxial systems with a capacity of 90,000 circuits.

## Digital transmission

Later in the decade, we will begin installing new underground waveguide systems, which will provide approximately 250,000 two-way voice circuits within a single two-inch diameter pipe.

Expanding the capacity of the network is essential if we are to meet the growth in communications that we forecast for the seventies. But we are also well into introduction of new transmission techniques, the most important being digital transmission.

A major portion of our short-haul carrier facilities today employ a digital system. Our long-haul systems can be either digital or analog, and we will be converting more and more of these systems to digital. As for some of our future facilities — the waveguide system, for example — they will be entirely digital.

Digital transmission is important among other things because of its application in data communications — currently the fastest growing aspect of our business. But digital transmission also can be used for voice and video messages as well as data, and we plan to use it for various kinds of services just as we do our analog facilities. This is as it should be. As long as we are providing the kind of service customers need at the lowest possible cost, it should not make any difference as to what kind of facilities are being employed.

We are, therefore, planning increasing use of digital facilities within our telecommunications network wherever they are appropriate.

## 60-city network

We will have, by the middle of this decade, a digital network in operation serving approximately 60 major cities. Like our other networks, this new network will be functionally discrete but physically integrated into the existing nationwide network. It will use long-haul digital carrier systems operating over both microwave channels and coaxial cable and will provide a variety of data speeds, including something in every speed range that equipment manufacturers say they will want or need over the next decade. Call completion times — and that includes dialing, switching and ringing — will be only a few seconds. Ultimately we expect to have these setup times under one second. For a typical call, error performance on this network should be in the range of no more than one error in 10 million bits. We plan to have this data network in operation on a private line basis by early 1974.

## Network is here now

We have yet another digital network under way that also should help meet existing and future data needs. The expansion of PICTUREPHONE® service will involve a high-speed digital transmission system that can carry data as well as face-to-face communications. We'll have such facilities working next year with an eight-city network in operation by 1973, providing data speeds at the rate of 1.3 megabits per second. But data users don't have to wait until 1975 or 1980 to put the world's largest information network to work. That network is here now, ready to be used for transmitting any form of information anywhere and anytime. Furthermore, it is a network that is constantly being modified and expanded as needs change and demand grows.

But can the Bell System meet that demand? I raise this question in full awareness that you know as well as I that there have been instances where we have not. I do not need to remind you, for example, that New York is one place where demand soared beyond anyone's expectations. Our estimates predicted strong growth, but we simply did not anticipate the increase in demand that actually materialized.

I personally feel New York Telephone has done a tremendous job in its efforts to make matters right. A truly massive construction program — more than $1.7 billion in 1969 and 1970 — is under way to provide new facilities. Thousands of new people have been hired to help handle the continuing heavy demand for service.

## Data: a $2 billion market

I hope, in my new capacity, to help build on the solid groundwork already provided until we are out of the woods in every exchange.

I do not want to minimize the problems some of our customers have encountered in New York and elsewhere, but it is nevertheless a fact that for most of the country and for the vast majority of Bell System customers, service has been good.

In the data field — and I single it out because it is an area where we have not been immune from criticism — we have also been able to meet the demand in most instances. Where we have fallen down from a service standpoint, it is not — as some people have intimated — because of a lack of interest in the data market. Currently, data communications account for about $450 million of our revenues. By 1980, it is estimated it will account for roughly $2 billion of our revenues. It is, as you can see, an extremely important portion of our business and one that we are determined to serve well.

For example, we have made available about 75 different types of data sets with some 20 speeds of operation ranging from 150 to one-half million bits

per second. Late last month we introduced yet another data set, a low-speed model that carries a monthly charge that is less than half the rate of earlier low-speed sets.

For customers who wish to provide their own modems, we have provided a variety of data access arrangements that permit customer-owned equipment to be interconnected with our switched network.

We also have steadily increased data speeds feasible on our network. Before the end of the year, our direct dialed network will be able to handle 4,800 bits per second, while private line voice channels will accommodate 10,800 bits per second. For ultrahigh speed data needs, we have trial service between four major cities, which provides a switched 50-kilobit-per-second transmission rate.

## Tenfold improvement

We are doing other things in the data field, which mean better service for our data customers. We have, for example, in the last decade made a tenfold improvement in the quality of our transmission paths to minimize noise that can affect the error rate of data systems. Better performance also is being obtained through use of automatic data test centers, dedicated maintenance and installation forces, and generally improved methods and procedures for servicing our many data customers.

We think we have a pretty good idea of what the needs of the data market are — but we're not going to rely exclusively on our own evaluations. We have nearing completion the most extensive, most detailed study of the data market ever made. It is a massive effort to discern what the market will require in the next decade and what we have to do to meet the needs of that market.

In addition, we have under way a field survey of how we can further improve service to data users. This survey, along with the market study, will be invaluable in planning future directions of our data communications offerings. In summary on this point, let me say we recognize that we haven't always been on top of the job in serving our data customers. We've missed some dates, and there are cases of trouble we haven't cleared fast enough. *We're* not satisfied with our performance — but we are bound and determined *they* will be.

## Data user must cooperate

Serving the data market, however, is not a one-way street. It requires the close cooperation of the data user and the telephone company. Since we may not always have central office facilities available to handle a last minute request for data service, we have been urging our customers to give us enough time so we can plan to meet their data needs. We are also working closely with other companies — designers and planners of data systems.

Since we are in the data communications business and not the data systems or data processing business, we look upon the suppliers of processing equipment as partners in supplying service to the customer. We are trying to make our communications as flexible and responsive as possible to the needs of the users, but it is important that the planners of data systems make communications an integral part of their systems planning from the start.

While demand has followed technology, both have contributed to another aspect of the communications revolution. Since the mid-sixties, there has been increasing discussion of the role of competition in providing communications services. A number of regulatory decisions have been addressed to this point, including the Carterfone decision.

That case led to a liberalization of our tariffs that permits more interconnection of customer-provided communications devices and sharing of our facilities among customers. We think these changes are good because they will stimulate use of the nationwide telecommunications network while at the same time

providing more options to our customers and more business for the manufacturers of communications terminal equipment.

It should be recognized, however, that these tariff modifications came about after careful examination and consideration of the merits of the changes by all interested parties. A similar process is, in our opinion, called for with regard to other proposals now before the FCC. I am referring, of course, to the proliferation of proposals for the establishment of transmission systems — in some cases in competition with each other — that would parallel routes already served by existing common carrier systems.

## Not everybody wins

With communications technology so widely available and the market for communications services so extensive, it is not surprising that the communications field should become increasingly competitive. There are, however, some important questions about the role of competition in communications, which must be answered if we are to fulfill the promise and potential of this vital resource.

Among other things, it should be recognized that competition means that *not everybody wins*. It would be unfortunate, it seems to me, were the door to be opened to competition in the absence of an understanding that the same ground rules apply to all players, including the existing common carriers.

As far as the Bell System is concerned, we are not seeking "protection" from competition. The Bell System is a highly competitive outfit, and I don't think anybody need worry about our ability to take care of ourselves in fast company.

More fundamentally, we sincerely believe, along with most other Americans, that where competition will serve the public better, as in most instances it does, it ought to be encouraged. At the same time, we believe quite strongly that the questions of *whether* and *where* and *how* competition in communications will be permitted ought to be resolved — not with a view to preserving the status quo on the one hand or on the other creating competition for competition's sake — but in the light of the consequences to the users of communications services.

## Bell can play either way

Let no one pretend that the answers to these questions are easy. What, for example, will be the impact of competition in intercity transmission on the common carriers' system of nationwide average pricing? And what will be the consequences if the common carriers were to charge different rates for calls of the same distance, as surely they must be permitted to do if competition is to be real competition?

The Bell System can play it either way. (If we aren't allowed to, then it's not competition — it's market splitting.) But we think that before we abandon the system of average pricing that has worked so well over the years, all parties must consider the impact on the using public. Would competition serve the broad public interest or would it, for example, work to the disadvantage of smaller towns and less heavily populated states? Would we in the long run be denying the public at large the economies of scale that are derived from shared use of common facilities?

These are the kind of questions that we think must be asked and objectively answered. For our part, we are willing to stand by decisions that reflect the public's best interests.

To conclude, I hope my remarks have demonstrated to you both our understanding of — and commitment to — the links that bind together computers and communications. And I hope, too, they have demonstrated that the Bell System is very much in earnest in its determination to meet the needs of data communications users, competitively or otherwise. In our network and our technology, we have, we think, the resources it will take to do a good job. And in our people we have the skills — and the will. □

# Bell Reports

### AT&T Proposes System Of Domestic Satellites

Two 10,800-circuit satellites in geostationary orbit and five earth-stations would be added to the Bell System's nationwide communications network under a plan proposed by AT&T. The domestic satellite system would carry long distance and Picturephone® calls, data services and TV programming.

AT&T estimates its total investment for the system at $64.9 million and its annual operating costs at $46.6 million.

The Communications Satellite Corporation (Comsat) has agreed to furnish and operate the two satellites for AT&T's use. The second satellite would be a backup facility for the primary satellite, although it could be used for occasional and peak-load service when needed.

The proposed system would supplement existing microwave radio and coaxial cable systems and would add an extra dimension of diversity to the communications network to ensure continuity of service. It would be capable of serving Alaska as well as the continental United States.

AT&T estimates the system could be operational 30 months after authorization by the Federal Communications Commission.

### Sixth Transatlantic Cable Proposed

AT&T has filed with the Federal Communications Commission an application to construct a sixth transatlantic cable, citing a 43 per cent increase in calling between the United States and Europe over a period of only 12 months.

The proposed cable would have a capacity of 825 voice circuits and would extend from Green Hill, R.I., to Penmarch, France. It would be connected by land facilities to Germany.

The proposed new cable would provide needed circuits to Europe, the Middle East and parts of Africa. In addition, it could serve the Indian Ocean area by extension through European earth stations to the Indian Ocean satellite. In its filing AT&T stressed need for proper balance between cable and satellite facilities to assure the public of reliable and economical service.

The new cable would be constructed, owned and maintained by AT&T, the French Ministry of Posts and Telecommunications and the Deutsche Bundepost in Germany.

### Bell Laboratory Scientists Devise Tiny Laser

A new laser, smaller than a grain of sand and capable of operating on ordinary flashlight batteries, has been developed by Bell Laboratories scientists. Such lasers may some day speed the transmission of voice, data and other information signals in high-capacity communications systems.

*Brent Sheets, a 6-year-old from Crawfordsville, Ind., demonstrates the child-size artificial larynx developed for him by Bell System engineers. An adult-size artificial larynx was made lighter by putting the batteries in a separate pack and smaller so it would fit under his chin and into his tiny hand. The device enabled the youngster to talk while recovering from injured vocal cords.*

The new semiconductor device operates continuously at room temperature, something that earlier semiconductor lasers could do for only fractions of a second at a time, limiting their message-carrying potential.

With additional development, the new device may eventually be able to produce a single high-frequency light beam capable of transmitting hundreds of thousands of telephone calls, TV signals or data messages.

When remaining technical problems are eliminated, the new type of laser should be no larger than a pen light or cigarette lighter, cost a few dollars at most and be capable of providing a lifetime of service.

### Laser Beam Carries Billion Bits a Second

Recent advances in new types of high-speed electronic circuits by Bell Telephone Laboratories scientists have made it possible to transmit one billion bits of information (a gigabit) per second over a laser beam. This is four to five times the capability of previous methods and equivalent to transmitting 200 books per second, or a library of 50,000 volumes in about eight minutes.

Devised by Gerard White for use in optical communication systems, the new circuits are a significant step toward utilizing the large message-carrying capacity of lasers.

A communication system using laser light offers the prospect of carrying telephone calls, data messages, television and Picturephone® signals simultaneously in bundles perhaps 10,000 times larger than now possible with microwaves. □

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BELL

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# BELL

telephone magazine

# "They Really Want to Do a Good Job if We'll Let 'em...."

The Age of the Industrial Revolution, with its assembly lines and fragmented tasks, built the greatest corporations and nations the world has ever known. What is left of that age today is a flux of tried and proven traditions and anachronisms that are struggling for survival against a new age that nobody knows quite how to label. The Computer Age. The Space Age. The Age of Aquarius. The Age of Youth Rebellion. The Age of the Greening of America. Regardless of how one attempts to name this period of runaway technology and worldwide iconoclasm, one idea rises above everything else and shouts to the observer: "This is what it's all about!"

What it's all about is the worth and dignity of the individual.

"Directory Assistance."

"I want the number of Acme Hardware."

"If you care to make a note of the number, sir, it's listed in your directory as 553-1212."

Click!

"Directory Assistance."

"Yeah, I want the number of Harold K. Smith."

"If you care to make a note of the number, sir, it's listed in your directory as 555-1217."

Click!

"Directory Assistance . . . ."

And so it goes, day in, day out, week in, week out. The operator in New York, the auto worker in Detroit, the telephone repairman in New Orleans, the aircraft worker in Los Angeles are long tired of performing the same monotonous tasks. Many younger ones — and some older ones — are thinking alike: "This is for losers. I'm going to get a job someplace else." Force loss figures in the Bell System alone — in Plant, Traffic, Commercial and Marketing — show they're doing just that. They're leaving. But they're leaving what used to be known as one of the world's best employers. The paradox is that the Bell System still is one of the world's best.

To re-emphasize that fact, this business is leading the way in development of a concept designed to enrich jobs at all levels in all departments. The concept is known as Work Itself. There is nothing new about Work Itself. As its practitioners will tell you: "It's nothing more than good management — running the job the way it should have been run all along."

Alfred W. Van Sinderen, president of Southern New England Telephone Company and a proponent of Work Itself, defines the concept:

"It's a planned, continued effort, managed from the top, on a company-wide basis, to provide satisfying jobs for employes and to increase the company's effectiveness and health."

Van Sinderen has appointed an *ad hoc* committee of cabinet members and lower level managers to analyze Work Itself and recommend where and how it is to be expanded in SNET operations. Like others involved with the concept, the committee emphasizes Work Itself is designed primarily for job enrichment. If any other primary goal is sought, Work Itself will fail.

"The purpose of Work Itself is not to increase productivity," says Van Sinderen. "The purpose is to give a man or woman more responsibility according to individual ability and willingness to take on greater responsibility. If Work Itself is properly applied, the result will be decreased turnover because of greater job satisfaction. A by-product can be increased productivity."

SNET Business Office Manager Gertrude Edwards of New Haven typifies the subtle yet revolutionary restructuring that Work Itself can engender: "I had to change completely, and that wasn't easy. I was a boss type. At first I had the feeling I was losing control of my people and the job. But gradually there came this realization that we were attacking problems better than before. Slowdown in turnover seemed to be a direct result. Morale went up noticeably. The reps were thinking the job through better, and their growth potential became more apparent. My first line supervisors did less checking and had more time to supervise and take personal interest in the reps. We're really customer-oriented now. And our results didn't slide, because the reps are more concerned for the customer than we ever thought they were. If we went back to the old way of managing, I'd probably have to ask for a transfer. I couldn't take that turmoil and the force losses, which I know would return . . . ."

How does Work Itself work? What does it cost? What are the problems and obstacles? What will it not do? A visit to four locations — Indianapolis, Dallas, New Orleans and New Haven — answered these questions and some others with a few shocks along the way. Each location has been involved with Work Itself for a little over a year.

*New Orleans installer Emmett Bealer and his foreman, L. J. Holmes, check signals as a new day gets under way.*

**by Marco Gilliam**

INDIANAPOLIS: Paul Weakley, general personnel supervisor at Indiana Bell, says:

"There are three myths in our business. One says there's no room for failure or error. Another says you can't try anything new. And the third says you must know all that's going on in your shop." Weakley is known as a "key man" in implementation of Work Itself. He was trained by the personnel group at AT&T headed by Dr. Robert N. Ford, father of the Work Itself concept in the Bell System.

As Weakley explains operation of the concept, you first take a look at the work, itself. In Directory Compilation, Indiana Bell had 16 girls performing 21 tasks in producing a directory. "So we set out to see how we could improve the job. We had 'greenlight' sessions, where everyone involved with the job was encouraged to air their criticisms and their ideas. And we listened to them. We ended up with a different work module. Instead of 16 girls doing one book, we had one girl doing one book with nobody checking her work," said Weakley.

Bill Evans, district marketing supervisor, explained how once the new work module was formed, the biggest problem involved training the girls selected to do the work. "We finally decided to turn them loose on their own for three weeks and let them train themselves by observing and talking with the other girls on the job. Once they demonstrated they were ready, we stayed out of their way but within calling distance if they needed help."

The directories the Indiana Bell clerks compiled were small city books, but the girls were responsible for both white and yellow pages, including National Yellow Pages Service and billing. With nobody checking their work, here were the results: two perfect books, one without billing errors. The other books had lower error rates than previous books. Today eight girls in the Indianapolis office are compiling four books each every year. Force losses in the office are down.

"This thing is based on trust," says Evans. "We trust them to do the job, and they trust us not to nail them if they take a risk or make a mistake. Once that two-way trust is developed, you're on your way. Without it, you can't even get started."

When asked what she doesn't like about the Work Itself concept, one of the utility clerks replied after some thought: "I go home from work absolutely exhausted. But I'll have to say my husband and I both were pretty proud when I brought my finished book home with a note of commendation from my boss." Would she return to the fragmented work concept of directory compilation? "No," was her immediate reply.

DALLAS: The problems of growth challenge Southwestern Bell to perpetuate the kind of telephone service Dallasites are used to — the best.

General Traffic Manager Bill Hoffmann sees Work Itself as a useful tool in doing the job. He illustrates his belief in the concept by recalling a recent visit to an old friend who is chief

*Floyd Bernard, South Central Bell state plant personnel supervisor, left, makes a point in Work Itself workshop. Center: Bernard, "key man" for Work Itself in New Orleans, draws out ideas in "greenlight" session. Assignment foreman Charles Kenney, below, discusses his work and its problems with J. D. Howard, Jr., general operations manager, New Orleans. Bottom: Repair foreman Gerald Wade discusses success of Work Itself motivational techniques.*


operator in a small town near Dallas:

"We were standing there in the unit, chatting about the old days, and I was looking at the board, which had maybe 15 or 20 positions. And I said, 'What does an operator here do when she wants a drink of water?' My friend gave me a quizzical glance. So I asked her to take me, step by step, through the process.

"'Well,' she said, 'the operator signals the service assistant and asks permission to get a drink. The S.A. gives her permission, the operator unplugs her headset, takes it off, goes to the water fountain, gets her drink of water and returns at once to the board.'

"'Now, Mary,' I said, 'you have two grandchildren, about 6 and 7, don't you?'

"'That's right,' she said.

"'What do they do at home when they want a drink of water?'

"'They go get it,' she said.

"'You mean they don't ask their mother or daddy or you if they can?'

"'Why, no. Now wait a minute here! There's a difference. We're running a business. We can't just let people get up when they feel like it and go to the water fountain.'

"About that time the service assistant said: 'You know, whenever they ask me for permission, I always give it. They don't ask unless they know they can be spared.'"

Hoffmann continued. "I asked them about emergency relief and the procedure followed to get an aspirin, and the more we talked, the more the chief and her associates began to see potential in a more liberal procedure. So they relaxed some rules, and trips to the water fountain and the rest room and the medicine cabinet declined."

All of which calls to mind Bob Ford's so-called "Fourth Law," which says: "People need certain kinds of relief

less when they're allowed to have it."

Bill Hoffmann explained one of the first hurdles faced in starting Work Itself in Dallas. As in the case of SNET's Gertrude Edwards, "We had to change me," he admitted. "I was too set in my ways. I had to become more attuned to new values. People express themselves differently on the job today. The paycheck isn't as important to them. What is most important is that they want to do a *good job.*

"We have found in our exit interviews that operators are quitting because, as they put it, 'Good operators quickly become nobodies! That is, they're taken for granted, nobody notices them, they don't get enough attention or recognition. This is a terrible indictment of our department."

Hoffmann insists unless the right climate is created for Work Itself, it won't work. Trust is needed, up and down the lines of organization. Work Itself cannot be forced on anybody, management or nonmanagement. It has to take hold gradually, naturally, with quiet, persistent encouragement. "Your people have to know you mean it when you say to them, 'I want you to take hold of your job and run it, manage it, take some risks, try something new, listen to your own subordinates,'" he says.

Work Itself in some ways seems to ease the job of the supervisor while simultaneously toughening the task. "Take gum chewing, for example," says Hoffmann. "It's easy to set a blanket rule that forbids gum chewing among operators. But it's another story to say this operator can chew gum on the job, and that one can't. The new rule allows an operator to chew gum as long as it doesn't interfere with service. Many can do it, but others can't, and the supervisor must decide on each individual. Just don't believe it if somebody says Work Itself is loose, permissive management. It isn't."

Bill Hoffmann believes there are basically two types of people who will have a hard time adapting to Work Itself — the person who cannot delegate and trust his subordinates to run the job, and the person who won't accept more responsibility. There are, of course, plenty of such people around. How did these types evolve? "Partly because of conventional management," thinks Hoffmann. "Every practice and procedure has been spelled out for them, and they have been encouraged to check with their supervisor before making any decisions or new moves."

Weldon Meers, division traffic superintendent, Dallas South, says: "One of the greatest things about this concept is that it completely destroys level consciousness. A stranger could walk into a Work Itself greenlight session and he couldn't tell the general traffic manager from a first line supervisor. The district people run these sessions. Once we let them know we mean business with Work Itself, they become its most enthusiastic supporters. They're the ones who make it work. And they're running the job."

Meers and Ben Miller, key man for the Dallas Work Itself, led a tour of two operator units testing the concept.

Initial shock: The scene was one of operators seated in a variety of postures, many in slacks, some chewing gum, talking with each other, visiting the water fountain. An occasional sound of quiet laughter accentuated a pervasive air of pleasantness.

Subsequent shock: The results of Work Itself in Dallas Traffic. To quote Budd Reinhold, vice president — personnel for Southwestern Bell: "The service indices in the four *achieving* (Work Itself) offices for April-November, 1969, were compared to the same period in 1968 (before Work Itself). Each office raised its index one point during the period. There was no service slippage in those offices as a result of the trial. The operators' productivity in the toll achieving offices increased 9 per cent in the eight-month period over the same period in 1968. During this same period, the toll control offices (those without Work Itself) improved 6 per cent. The directory assistance office having Work Itself improved its productivity 9 per cent during this period, while the directory assistance office that did not have Work Itself dropped 1 per cent.

"Putting this improvement in the Work Itself offices on an annual basis, a $56,000 savings would have resulted in the control offices alone, had they obtained the same rate of improvement" said Reinhold. "If all offices in the Dallas Area had been able to use Work Itself to improve operator productivity at the rate these four offices were able to do, an annual savings of $370,000 would have occurred," he said. Reinhold pointed out another impressive statistic:

The achieving offices lost 46 fewer operators in the eight-month trial period than the control group. That's 69 people on an annual basis, for an annual savings, according to Reinhold, of $69,000. If the trend in the loss rate in all offices in the Dallas Area had been the same as in the four achieving offices, a savings of $460,000 would have been accomplished.

Reinhold pointed out the increased productivity, as indicated in calls per hour handled by each operator, was probably related to improvement in force losses, therefore the two savings figures should not be combined. He noted an increase in the number of written commendations received in the achieving offices.

Another shock was generated in conversation with a pert group chief operator in a Work Itself unit. She explained how each operator is approached individually "to see how her

own particular job can be enriched." Said the group chief: "Sometimes they come to us and say, 'You know, my girlfriend is keeping her own attendance report. I'd like to try it.' Well, we say, 'Let's not talk about your girlfriend. Let's talk about you. Do you think you can do it without interfering with the service you give the customer? Can you do it accurately?' If she says she can, and she has demonstrated good ability and attitude on the board, we let her try it. We've found when an operator keeps her own attendance report, she usually apologizes for an absence or tardiness and promises to improve. And she usually does. Some of them even keep their own records on numbers of calls handled, or board loads. And they start competing with themselves — each girl with herself — to improve. We even have our own index score sheets where an operator can rate herself daily and weekly on productivity, attendance, manner — the whole job — and come up with an overall performance score."

"Do you check on their figures, such as attendance?"

"Not always, no."

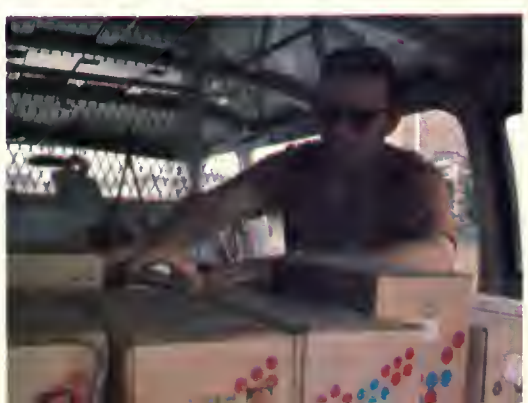
"Aren't you afraid some might tend to fib a little?"

"Certainly not! Why *should* they?"

NEW ORLEANS: South Central Bell in New Orleans has taken the Work Itself bull by the horns, while many watch from a respectable distance. They've installed the concept in the Plant Department. And it's working. This is the department with the most people, the most indices and measurements, the most controls. And this is where Work Itself may well be needed most.

J. D. Howard, Jr., general operations manager in New Orleans, lays it on the line with Southern charm and succinctness: "With Work Itself, we run the system — it doesn't run us." The

*Above, Installation foreman L. J. Holmes gives stack of service orders to Installer Emmett Bealer, who will then be on his own for the rest of the day. Below, top: Bealer needles boss for "sending me out on a rainy day again." Below, bottom: Final checkout of truck supplies. Right: Day's first installation job.*



key man to Work Itself in New Orleans is Floyd Bernard, state plant personnel supervisor. Like key men in other companies, he ran the greenlight sessions for first level plant supervisors. Unlike other departments, plant did not attempt to apply Work Itself to craft people until first level supervisors and above had it in operation. Although Bernard is an ombudsman-coordinator of sorts, he takes an active part mainly when called upon for objective advice or for interviewing participants.

"One of the things we've done," he says, "is extend the greenlight sessions from two to three days. We need the extra time in order to greenlight the foreman's job as we do the craft job. We initially held two separate greenlight sessions, and each group came up with a list of job problems and possible solutions.

"There was 75 per cent agreement between the two lists. One list was composed by foremen and the other, by their supervisors. That really made some people sit up and take notice, because for the first time the people who know the job best had been motivated to discuss their work and suggest improvements. The agreement between the two groups substantiated their suggestions. It's amazing what happens when you get people to stop thinking out of bell-shaped heads."

Repair Foreman Gerald Wade is an old hand at both craft and first line management in New Orleans: "My people tend to thank me for this improved work situation. They don't know anything about *Work Itself* as a formal effort, because we haven't talked to them about what it is. But what they don't realize — and I've got to make them realize — is that it's this company, not me, that's made this possible.

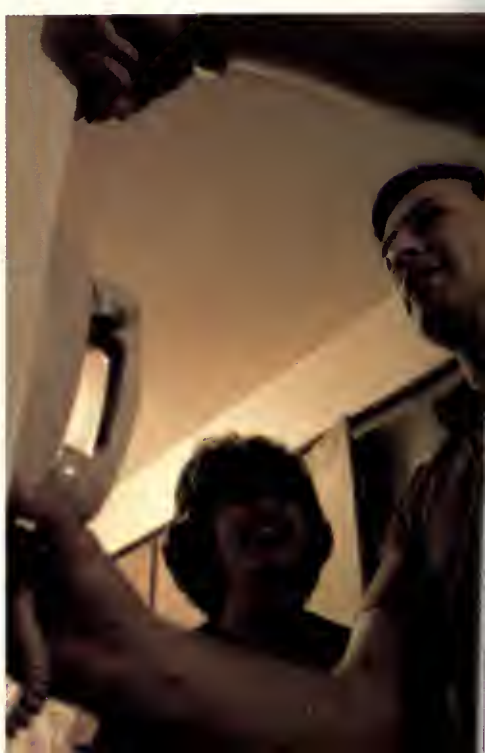
"For example, we have a repairman on our force who'd come in, and we'd give him a couple of repair orders, and he'd go out and work them and then work three or four more a day. He did the usual amount of complaining over the years, and so when we got Work Itself going, I asked him how he thought he could make his job better. Now we give him a stack of orders in the morning and a Bellboy® in case we have to call him for some emergency — and we turn him loose. He works between 20 and 25 orders a day now, and he doesn't have to go back and rework hardly any. He maps his own route and calls ahead to make sure the customer is going to be on the premises. And now he's asking for more work. He told me the other day this is the first time in his life that he's been treated like an individual."

Assignment Foreman Charley Kenney was asked what his reaction would be if Work Itself were stopped. "Well, they could stop support of the concept, but nobody could ever stop me from running my job the way I've learned to run it and to take care of my people the way I've learned to. I know my people better, and they know me better. We work things out together and do the job better. Why should anybody want to stop something like Work Itself?"

The Plant people in New Orleans feel the first payoff from Work Itself comes in decreased force losses. Morale improvement is discernible. Improved productivity is more slowly realized, although in some work groups results are exciting. For example, in 1969 in the New Orleans West Bank Installation Group, there were four resignations. Operating according to Work Itself, there had been one resignation in the group as of November 1, 1970. Sales results in the group for July, 1970, were 370 per cent above January's results — a division record.

About 70 craftsmen are included in the group, and of those only a few have had Work Itself items introduced

*"Sometimes I get more orders worked in rainy — I move faster between the truck and the work . . . I just don't like wet clothes . . . I like the job mean, they let me work the orders in the way I t give the best service . . . A wall phone would lo here, and it'd save you running to the bedroom. Y you never heard of an extension phone? . . . I us ahead to let the customer know I'm coming ar sure the customer is going to be there. 'Course, hard time doing that when the customer is wa new service . . . Don't get me wrong. I don't alw my lunch this way. Sometimes, though, if a job longer or I can see a way to work an extra order I'll grab a takeout sandwich and stick with the*



to their jobs. "But," says Plant personnel man Floyd Bernard, "all craft employes were indirectly affected because of their foremen's greenlight involvement in the program and subsequently improved management. You have to consider this is a long-range program. We'll have more greenlight and follow-up sessions that will result in other ways of enriching the job for both craft and management."

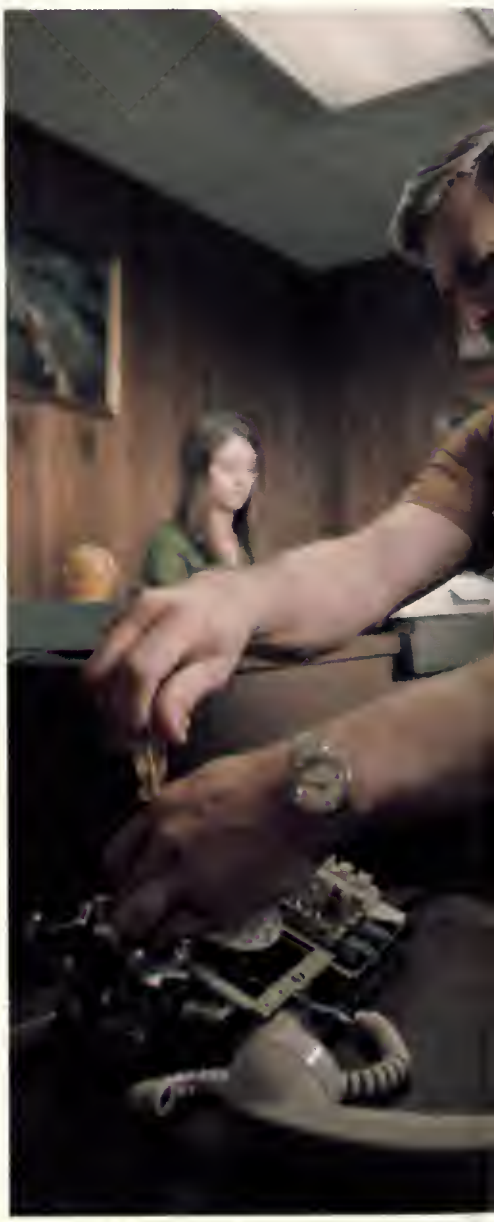
Greenlighted items, if agreed to by those to whom they're offered, are tried out gradually, on an individual-by-individual basis with regular feedback through immediate supervisors and Work Itself key men to see how they're working out. Here is where the key man is invaluable, because of his objectivity and alien identity, which elicit information of greater depth and candor than a supervisor could ever hope of gleaning.

In New Orleans, they hold special hope for Work Itself as an incentive to the young. One Plant supervisor expressed this view:

"Back when I came with the company, when a fellow was given a task to do, he did it and didn't ask why. I knew I'd better do my job, or I'd get rapped. I did my job and got paid for it and promoted. But with these young people today, you don't just tell them, 'Do this here job, son, or you'll get rapped,' cause they'll tell you right off, 'Go on and rap me. I'll go to work for somebody else.' And they will. Even with jobs as tight as they are, some of these youngsters had just as soon take a walk as look at you. They'll pump gas and live in a tent in the park just to prove they're free and independent. But the hell of it is, *they really want to do a good job if we'll let 'em. . . .*"

NEW HAVEN: If Work Itself were early Christianity, Fran Jessey, Southern New England Telephone's coordinator for the concept, would be John the Bap-

*"With a secretary like that, Mr. Tate, I'd say this office needs a Trimline phone. 'Course, I'll put the plain ole black one in, if you really want it . . . Well, they bought the Trimline. The least I can do is fix the Call Director while I'm here . . . The best part of the day. No more orders. See you in the morning."*



tist: "The problem is, people lose individuality in the Bell System. We get brainwashed, locked into tradition. Work Itself helps break traditions that no longer serve us. Now what we need to assure success of this concept is team building. There is no lasting feature of Work Itself if key supporters leave. So we need to build teams throughout the company, have private — very private — leveling sessions with plenty of candid talk between one another aimed at getting at problems caused by inhibitors.

"But right now I'd say our trust level is low. We're afraid to talk candidly with one another, and this is unfortunate, because the key word in this concept is *trust*. So we have to build trust as we build teams."

Southern New England Telephone introduced Work Itself through a strategy different from that of other companies. Instead of injecting the concept vertically and working toward a lateral contagion, SNET did the reverse. For example, Southwestern Bell sought out an area where the concept was welcome — or could be made welcome — from department head level through first line management. The company is now introducing the demonstrated concept in other departments and areas. SNET people introduced Work Itself to various departments throughout the company where they found acceptance at a particular level or series of levels. Further lateral expansion is under way, but the SNET people are betting their main effort on the concept's growth up and down the lines of organization.

"We're convinced that for our own company, this is the best way to do it," says Jim Rourke, SNET education supervisor. "Admittedly, this makes it more of a challenge to the manager who has to take risks and let his people take risks, perhaps without full support from above. But it's working out, because how can you argue with results? The district-sized group is a natural for Work Itself to get a foothold, and in my opinion the people in a district that has the concept in operation derive more management development from it than they do from our conventional classroom training."

SNET people involved with Work Itself agree the time is ripe for a change in basic management style. Today's employe population attitudes and the need for increased productiveness demand it. President Van Sinderen wants at least one Work Itself activity "in every division man's backyard by next year. We need it, because we need more long-range planning, and we need to translate objectives into short-range goals. Work Itself is a tool to be used in this translation," he says. "We need to revise and revitalize our objective-setting process. And we must manage our business with people goals. If we don't improve people, we won't produce any results. Maybe a better name for this concept would be *People Themselves*."

While Work Itself has been concentrated on line management positions and craft, some staff people around the Bell System have been introduced to the concept. As an example, Wisconsin Bell Public Relations has greenlighted a number of its jobs, including preparation of employe information material and writing of external news releases. Staff experiments also are under way at AT&T Headquarters.

At Indianapolis, Dallas, New Orleans and New Haven the cost of implementing Work Itself was the same: much time, virtually no money. The toughest part of getting started was breaking away from the day-to-day job, which meant turning the business over to sub-district or acting first line supervisors for a day or two. But with development of the concept in each work group, more time for greenlight sessions became available, and first line supervisors and craft people demonstrated ever more effectively that they could, indeed, tend the store while the boss was out. As recognition for job excellence, nonmanagement employes have been honored as business office supervisor or group chief operator for a day.

Some developed an interest in management, while others, though they enjoyed acting as supervisors for a few hours, found they preferred their regular jobs. Almost all demonstrated they could handle the challenge, at least for awhile. This method of recognition for a job well done proved helpful in enabling supervisors to attend greenlight sessions to discuss further work improvements. Experience shows that the payoff from Work Itself can have a snowballing effect.

Work Itself experts emphasize the concept cannot be put into operation on an impulsive or informal basis. It requires weeks of planning, selling and development of a favorable atmosphere. Above all it requires the presence of a trained key man to run the workshops and help with followup items such as feedback from employes, exit interviews and subsequent greenlight sessions. Improper implementation of the concept, or even proper implementation with the wrong goals, all but guarantees failure.

"The supervisor who really cares about his people," says one division head, "is going to have relatively easy sledding with Work Itself. You have to ask yourself, do you care about your people or only your own career? The simple truth is, if you take proper care of your people, they'll take care of you. Look at the Bell System. What is it? Just a network? No. It's people. They are the whole ball game." ☐

# Finding the Good in the Gaps

**by Robert D. Lilley**

Even among the more sober-minded observers of modern youth, there is considerable disagreement as to just what has produced the *differentness* that adults perceive in their offspring today. Interpretations range all the way from complex psychological theories through "fear of the bomb" to simply the "bad influence of TV."

For example, the Cox Commission Report on the student movement at Columbia University concluded that: "The present generation of young people in our universities is the best informed, the most intelligent and the most idealistic this country has ever known."

But William V. Shannon, a member of the editorial board of the *New York Times*, feels that today's college youth are "ignorant of university ideals," "emotionally disturbed and prone to violence," or they are "political totalitarians."

On the other hand, Robert Kennedy felt: "Not since the founding of the Republic . . . has there been a young generation of Americans brighter, better educated or more highly motivated than the present one."

And yet the mass media — the television networks and the weekly news

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magazines in particular — have frequently pictured the modern young person as violent, irrational and anti-democratic.

We are bombarded, then, with a multitude of conflicting views and opinions. But for all the controversy, we can at least begin to dimly discern what has wrought the change in American youth, what has caused so many of them to reject the values and life-styles of their elders, and, most important, what needs to be done to restore understanding.

That opinion is based in part on a number of studies conducted by the Bell System over the past two to three years, but even more so on the fact that those who are best trained in the psychology of modern youth are tending more to concur in their views as to the root causes of the Generation Gap. The work of men like Yale University psychiatrist Kenneth Keniston, Dr. Bruno Bettelheim of the University of Chicago and Anthony G. Athos of the Harvard Business School — to name only three — has shed considerable light on the problem, not only as it confronts parents and teachers, but also as to the ways in which it will increasingly affect the conduct of business. It is helpful to summarize some of their key findings and concepts.

First, the matter of upbringing.

These experts — Dr. Keniston, in particular — point out that grandparents of today's 20-to 30-year-olds generally were born around the turn of the century. "They were," Keniston writes, "the heirs of a Victorian tradition as yet unaffected by the value revolutions of the 20th century, and they reared their own children in families that emphasized respect, control of impulse, obedience to authority, and traditional values of hard work, deferred gratification and self-restraint."

But their children, the parents of today's youth, were influenced outside their families by a variety of progressive, liberal and even psychoanalytic ideas that contrasted sharply with the values of the Victorian Age. Moreover, during the 1930's, they were exposed to or involved with ideas of the New Deal, and sometimes to more radical interpretations of man, society and history.

### Revert to childhood

Major changes in values, when they occur in a single generation, are likely to be far from complete. To have grown up in a family where unquestioning obedience to parents was expected, but to rear one's own children in an atmosphere of "democratic permissiveness," requires a change of values more total and comprehensive than most adults can achieve. There is a constant tendency to revert to practices of one's childhood. The generation who fathered today's youth are products of the Great Depression, products of an experience that tended to reinforce the Victorian necessities for hard work, deferred gratification and self-restraint; the importance above all else of getting and holding a steady job, of achieving security, of acquiring material possessions.

Thus, this generation's children are likely to sense a discrepancy between their parents' avowed values and parental basic instincts. A special credibility gap has opened between the generations. "Our parents," so many of today's young people are saying, "are hypocrites. They don't practice what they preach."

Keniston points out, for example, that perceptions of parental hypocrisy occur today with regard to racial, religious and political matters. How many of us, he asks, support racial and religious equality in principle, but become violently upset when our children associate intimately with someone from another race or religion? How many of us support in principle the cause of political freedom, but oppose our children's involvement in controversial issues lest they "jeopardize their records" or "ruin their later careers"? Today's youth seem to be saying, in effect: "I will not think as my parents thought but as they told me to think. I will not live as they lived but as they told me to live."

What the older generation has done, the psychologists feel, is to create its own critics on a mass basis—that is, to create an ever-larger group of young people who take the highest values of society as their own, who internalize these values and identify them with their own best selves — and who are willing to struggle to implement them.

The problem, then, stems not so much from the difference in our years as from a fundamental difference in our times. Our life experiences, as the parental generation, have been so radically different from those of our children that it should not really surprise anyone that our viewpoints and personal philosophies are also different. But there is an additional factor that helps account for the *differentness* of today's young people. I refer, of course, to the headlong pace of the ubiquitous social and technological change of the past three decades.

### Inherit a new world

The world has changed more in the lifetimes of our children than in many previous centuries. They have witnessed, among many changes, a great upsurge in striving of minority groups

for social and economic equality; an epidemic of international conflicts; the steadily increasing role of government in all our lives. They have been privy also to the first glimpses of man's ultimate control over his environment; unleashing of thermonuclear forces; extension of the electron to virtually every human activity; probings into the secrets of life; a reaching out to the moon and the planets.

Our young people are inheriting, then, an unbelievably exciting, but also a new kind of world — a world that is wholly different from that which an older generation has known. Is it any wonder that communication between us is difficult? The wonder is that we communicate as well as we do.

*Yet I think there are ways to bring us closer together.* Whatever the distance between us, there is a bridge that can bring meaning and purpose to our dialogue if we both will try for it, if we both will understand that forces beyond our control have altered the traditional relationship between us. I suspect, moreover, that we of the older generation will have to take the initiative in constructing that bridge. To explain why, let us refer once again to the research findings of people like Keniston, Bettelheim and Athos, especially as they apply to the needs of business and industry. Here, in summary, is what the findings seem to indicate.

### Drop out or hang in

Although neither hippies nor militant radicals are "representative" of the midstream 80 to 90 per cent of young people from whom business and industry must draw their future leaders, it is these fringe groups that are helping to give the younger generation its distinctive mood and shaping its thinking. We should recognize that hippies and radicals — or "revolutionaries," as they now like to call themselves — are in some ways similar and in some ways vastly different. They are similar in that both are in strong reaction to the so-called establishment, and in that both seek alternatives to the institutions of middle-class life. They are different in that hippies have dropped out of society, while the radicals have not. Far from dropping out, the radicals are determined to change and redeem society.

### The flexible generation

But for all the differences, the two groups share a number of attitudes, attributes and opinions that they have managed to impress upon their more conventionally-minded contemporaries. There are six in particular.

First, today's youth display a special personal and psychological "openness." That is, they are far more flexible than previous generations, far more willing to experiment with new life-styles, and far less committed to traditional ways of doing things. As just one consequence of this openness, we are finding that their concepts of their personal future and their lifework are ever more hazily defined. Hence, they are more inclined than were their elders to shop around, to move from job to job and from firm to firm before settling down to a permanent career. As a corollary, they are less interested in security and making money than in having an opportunity to do challenging work, to serve mankind and to be creative.

Second, young people view themselves primarily as members of a generation rather than of a cross-generational society. They identify with their contemporaries as a group and look upon their elders almost as a different specie. There is a feeling of psychological disconnection from previous generations, their life situations and ideologies. The older ideologies are thought of as exhausted or irrelevant.

### The quality of I-thou

Third, today's youth care most deeply about the creation of loving, intimate, open and trusting relationships between small groups of people. The ultimate measure of a person's life is felt to be the quality of his personal relationships. The greatest sin is to be unable or unwilling to relate to others in a face-to-face, I-thou situation.

Fourth, modern young people have a strong capacity for involvement and identification with those who are superficially alien: the peasant in Vietnam, the poor in America, the nonwhite, the deprived and deformed. Racial barriers are minimized or nonexistent, and the ultimate expression of unity between races — courtship and marriage — is considered basically natural and normal by a larger proportion of the young.

Fifth, the depersonalization of life as expressed in commercialism, careerism, bureaucratization and the complex organization of modern institutions — business, in particular — seems intolerable to today's young people, who seek to create new forms of association and action to oppose the *technologism* of our day. However, it is not the material but the spiritual consequences of technology that youth opposes. They adamantly reject contamination of life by what they consider the spurious values of technological organization and production.

Last, young people today are committed to a search for forms of organization and action where decision making is collective, where arguments are resolved by "talking them out," where self-examination, interpersonal criticism and group decision making are fused. The objective is to create new styles of life and new types of organization that humanize rather than dehumanize, that activate and strengthen the participants rather than undermine or weaken them.

### The impact of the future

These attitudes and attributes are not all bad, by any means. Indeed, many, if not most, are admirable. But there can be no question that they will, in time, have an unsettling effect on those institutions of modern life that are unable or unwilling to accept the consequence of change.

The impact of changing youth attitudes already is being felt in the business world. But, for all the problems we are experiencing today, there is every reason to believe that they will be vastly multiplied in the years ahead. For example, what will be the effect upon business of employing larger numbers of young managers who identify strongly with their contemporaries as a group and consider their elders to be hypocrites? Who tend to demand face-to-face relationships and even confrontation with the leaders of the business establishment? Who consider commercialism, careerism, bureaucratization and the complex organization of business intolerable? Who oppose the bigness, stratification and hierarchical structure of business and industry? And who feel that the best way of securing change is by demonstrating one's personal convictions in the strongest way possible?

There are those who feel that most young people will modify their views once they get out into the "real world" and face the realities of making a living and raising families. Perhaps they will. But there were those, also, who felt that the young labor activists of the 1920's and 1930's eventually would modify *their* views — or, alternatively, that they could be beaten into submission. But, of course, it didn't turn out that way. It would seem only prudent, therefore, to assume that the changing attitudes of young people will indeed have a profound influence on the future of American business and to take steps now to see to it that the influence is for the better rather than for the worse. The natural question is, "But what steps?"

### The new human relations

I think the best way to attempt an answer is to describe briefly some of the steps the Bell System is taking.

An initial step was creation of the job I now hold. Its significance lies in the fact that, for the first time, we have combined under a single executive vice president, who is also a member of the AT&T board, all those functional organizations that are concerned directly with human relations. They include, among others, the Personnel, Information and Environmental Affairs departments, the latter being a relatively new organization.

AT&T took this step for a number of reasons. But none carried greater weight than the growing recognition that the changing attitudes of younger employees, including especially young management people, call for priority attention at the highest levels of the business. It is the intention to scrutinize every aspect of Bell System operations, and indeed every job assignment, in an effort to assure that they are attractive to young people entering the business world, that they provide the broadest possible scope for individual initiative and creativity, and that they provide effective outlets for expression of diverse views and opinions with respect to the conduct of our day-to-day operations.

### Listen to the young

AT&T's managers are asking themselves some hard questions. How meaningful are the early task assignments and work experiences that the business provides? What are the rewards for exceptional performance? What challenges are presented? How well do the company's underlying values correspond with those that today's young people consider important? What opportunities are offered for service to the community at large? To what extent is individual achievement retarded by outmoded practices and tradition? How can we provide lower levels of management with a larger role in decision making?

We are, in short, carefully reexamining our job assignments, our management practices, and indeed our entire operating philosophy, in the specific light of what young people are telling us about their perceptions of business and its role in society.

It is too early to say what will come of all this effort. The important fact is that the Bell System, the country's largest employer outside of government, considers the changing attitudes of young people to be a matter of utmost importance. Finding ways to adjust to those attitudes is, for us, a top priority undertaking. □

Flexibility of Bell System organization and directed research help move an innovation from idea in the laboratory to reality in the telephone network

# From Concept Into Service

Innovation, in the context of the industrial community, is not just the discovery of new phenomena, nor the development of new products or manufacturing techniques, nor the creation of new markets, but is, rather, all of these things acting together toward a common goal. Jack A. Morton, vice president in charge of electronics technology at Bell Telephone Laboratories, describes it as "a people process with a purpose."

Twelve years ago, the editors of *Fortune* magazine commented: "The preeminent discovery of the 20th century is the power of organized scientific research. In the Western world this discovery was made not by the universities, nor by governments, but by private industry . . . The industrial enterprise that has carried out this mobilization most brilliantly in the U.S. — and indeed in the world — is Bell Telephone Laboratories, Inc."

By 1958, when this *Fortune* article appeared, technological and scientific achievements — born in the basic research of Bell Laboratories and carried forward to production by the Western Electric Company — had earned the Bell System a unique reputation for innovative accomplishment.

The achievements of its scientists and engineers were known throughout the world. They had twice won the Nobel Prize: for demonstrating the wave nature of matter (1937) and for the discovery of the transistor effect (1956). They had conceived information theory; developed the basic structure of network broadcasting; pioneered sound motion pictures; created the new science of radio astronomy; developed and built the first electrical, digital computer; fathered the first public demonstration of television; given the world hi-fi sound reproduction; introduced microwave radio and coaxial cable systems; and developed principles that would open the way to worldwide communication by satellite.

### Problems without counterpart

The concept of system engineering had been largely generated in Bell Laboratories and Western Electric to help assure the rapid and efficient introduction of new technology into the nationwide communications network. That concept was later applied to many of the nation's military programs, including its first operational guided missile system, Nike Ajax, for which Western Electric was prime contractor. And, the Bell System has provided the United States with what is still the world's best communications service, at less than half the cost of that in most other nations.

To its unabashed accolade for Bell Laboratories, *Fortune* added: "The job of creating the modern telephone system has required the solution of problems of such deep complexity that they have had no counterpart in any other industry. . . ." The problems, however, were solved with astonishing rapidity. Less than four decades, for example, separated the invention of the telephone from the inauguration of coast-to-coast telephone service in 1915. Only two decades separated this primitive system, which could carry but a single conversation on a pair of open wires, from the development of coaxial systems able to provide 480 two-way telephone circuits over a pair of tubes. A few years later, microwave systems, which had been under development since as early as 1940, were transmitting over 600 separate conversations on a radio beam. And by the mid-1950's, the voice-carrying capacity of existing systems had been multiplied into the thousands.

Between 1915 and 1958, AT&T and Western Electric spent more than $1.5 billion on research and development. This works out to about seven per cent of the total plant investment of the entire Bell System at the end of this period. And yet, in spite of the huge costs involved, telephone service was becoming, in real terms, less and less costly for the American consumer. In 1940, the average telephone user worked six hours to pay for one month of local residence service. By 1958, despite the spiraling inflation that had characterized the intervening years, he worked only half as long to pay for service that had become far more reliable, efficient and versatile.

### Innovative leadership

In the years since, in the explosive "post-Sputnik" era, which has witnessed so vast a proliferation of scientific and engineering endeavor both here and abroad, the Bell System has

continued in its innovative leadership. Efforts to produce the transistor reliably and economically led to the science of microelectronics, which, in the 1960's, resulted in the development of integrated circuitry. Western Electric's invention of continuous processes for the manufacture of so-called "thin films" was an essential step toward broad scale application of this new microelectronics technology.

Bell scientists also shared in the invention of the laser, which they expect to find wide application in communications, scientific research, medicine, the shaping of metals, and the expansion of computer memories. A single laser beam may one day carry telephone calls, data messages and television signals in bundles 10,000 times larger than are now possible with microwave systems. The first industrial application of the laser was achieved by Western Electric, which in 1966 began to use its beam to pierce diamond dies used for wire-drawing.

### The key: organizational flexibility

Over the past dozen years, Bell scientists and engineers have developed a broad variety of new products and services. Among them are over-the-horizon radio relay systems, permitting telephone transmission over water, or over inaccessible terrain, to points beyond the curvature of the earth; the electronic Artificial Larynx; Centrex service, bringing new dimensions of speed, convenience and versatility to business customers; the world's first international communications satellite, TELSTAR; Touch-Tone® calling, introducing pushbutton "dialing" through electronic tones, and opening the way to a variety of wholly new services, including access to computers and private data transmission; Picturephone® service, enabling the user to "see while he talks"; the first commercial electronic switching system for home and business customers; transistorized undersea cables, providing over 800 voice circuits, five times the capacity of the most efficient previous design; the first commercial digital transmission system employing pulse code modulation techniques; increasingly efficient microwave radio systems and a coaxial cable system which can carry 32,400 simultaneous conversations; direct dialing of overseas phone calls; and various data devices to transmit information from computers and other business machines, including a data set which enables widely separated hospitals, doctors and medical research centers to transmit electrocardiograms over regular telephone lines.

These are but a few of the hundreds of recent Bell System innovations that have contributed greatly to the advancement of communications and to the scientific and technical capabilities of other industries as well.

Perhaps the most important factor contributing to this kind of accomplishment has been an organizational flexibility that permits free and constant interaction between the various units of the Bell System and between groups of specialists within these units. Any part of the System, any unit or organization, can be the originator of an idea to be passed along and developed by any of the others — or by several working together.

### Response to the public's needs

The basic structure of the System, integrating research, manufacture and operations, is designed to be responsive to the enterprise's fundamental objective: ever-improving, low-cost service. It makes possible the quality and compatibility needed to operate a nationwide network, and helps assure a coordinated response to the public's needs, along with a common sense of responsibility for service improvement.

Often the inspiration for an improvement comes from AT&T or the operating companies which are constantly assessing the present and future needs of telephone customers. New ideas can — and often do — spring from Western Electric's search for improved techniques of manufacture and supply. And, of course, the Bell System's creative core is Bell Telephone Laboratories.

A functional dissection of the Laboratories yields three major categories of endeavor: research, development and systems engineering. While these approximately coincide with the formal organizational structure, there is elasticity and functional overlap for ideas to flow freely across the boundaries. This interaction is basic to an effective, integrated innovative effort. It is carefully nurtured through geographic deployment, permitting close association between personnel of the Labs and Western Electric, through enlightened and aggressive recruiting policies, and interchange of personnel between the various divisions.

### Good science is relevant

In relation to the Laboratories' total technical effort on behalf of the Bell System, research constitutes about 16 per cent. Over half of the professional scientists and engineers here are assigned to reconnoiter the frontiers of the physical sciences, seeking new knowledge and new understanding; the remainder work in such fields as mathematics, statistics, economics, learning theory, acoustics, vision, switching and transmission.

The fundamental purpose of such research is to extend and broaden the science of communications. This includes discovery, invention, and the building of experimental devices and systems. It frequently means delving into areas which, on the surface, may seem far removed from the essentials

of any communications technology. According to Labs President James B. Fisk, "Our fundamental belief is that there is no difference between good science and good science *relevant to our business*. Among a thousand scientific problems, a hundred or so will be interesting, but only one or two will be truly rewarding — both to the world of science and to us. What we try to provide is an atmosphere that makes selecting the one or two in a thousand a matter of individual responsibility. . . ."

It is largely as a consequence of this approach — this cultivation of an atmosphere of freedom and individual responsibility — that Bell researchers have been able to make so many first-rank contributions, not only to the field of communications, but to science and technology as a whole.

The largest of the Laboratories' three functional divisions is that devoted to the actual design and development of new components, products and systems. This accounts for over 74 per cent of the Labs' total effort; for herein lies the core of the organization's reason for being: the exploitation of new technological resources in operating systems.

### Economy through ingenuity

From the reservoir of basic and applied research, development engineers select the technology to best yield designs that are reliable, economical, useful, and can be manufactured efficiently. While cost criteria are among the more compelling of these considerations, economy of design must be achieved through ingenuity rather than by taking short-cuts — for the design must also be aimed at long, trouble-free service. Thus great effort goes into developing components with extremely low failure rates, and assembling them into systems in which single failures will not interrupt service. In all this, the ability to transfer ideas easily across organizational and corporate boundaries is a vital asset.

Over 2300 of the Laboratories' engineers and technicians are located in branch labs in or near Western Electric's manufacturing centers. Organizationally, these people belong to Bell Laboratories; but spatially — and, to a degree, functionally — they are strongly linked to their associates in Western Electric. Because of this, design for best performance and reliability can be balanced on a day-to-day basis against design for minimum cost of manufacture.

This close interaction and coupling of specialties has become increasingly important with the swift advance of communications technology. Permitting a rapid interchange of ideas and information, it assures optimum results in terms of the quality, economy and compatibility of finished products; and, because it allows production planning and the final stages of design work to take place concurrently, it greatly accelerates the total process. For example, before the establishment of the branch labs in the mid-1950's, the time between the final design and actual production of a standard telephone was about 27 months. Today, far more complex instruments — such as the new Trimline® telephone—move from design to production in less than a third of that time.

### To anticipate tomorrow

Sharing mutual respect, common vocabularies and interests, and a desire to resolve mutual problems efficiently, the WE-Bell Labs teams at the manufacturing centers contribute immeasurably to the effectiveness of the System's innovative efforts.

The systems engineering concept provides for testing each proposed innovation against a number of standard criteria. The new product, system or service must have a useful purpose and meet a real need of the business and its customers. That is, it must provide capacity for an entirely new service or at least enhance the function of existing equipment. It should also be flexible enough in design for efficient response to needs and new technologies of the future. For example, the "stored program" concept in electronic switching and the "pulse code modulation" techniques embodied in today's digital transmission systems promise flexibility to meet foreseeable increases in communications traffic as well as growing customer demand for new varieties of service, particularly data transmission and Picturephone.

In short, the innovation should be geared to meet the needs of tomorrow, so far as they can be anticipated, as well as the needs of today.

### The risk in commitment

The proposed innovation must of course be practical from a financial standpoint. And unless a compelling need dictates otherwise, it should not result in increased costs. Preferably, it should provide for an immediate or long-term *reduction* in costs to the business and its customers.

Cost considerations are especially important in this era of accelerating technology and customer demands. Effective use of the innovation entails quick and decisive commitments of money, as well as scarce and valuable manpower. This in turn implies a high degree of risk; for commitments often must be made in situations where there is little or no reliable experience or empirical data. Obviously, these risks cannot be undertaken unless the potential benefits — to both the business and its customers — are sufficient to justify them.

The new technology must provide service at least as good as that already existing and preferably, some distinct

performance *improvement*.

Because of the great complexity of the communications network, performance and reliability requirements are stringent. The network is composed of more than 110 million telephones, along with television and data facilities, which all connect flexibly through the thousands of switching offices that blanket the nation. Superimposed on and connecting to these are long distance transmission and switching facilities making the whole an integrated entity.

### No downtime allowed

Made up of over a trillion components, the network is, in effect, a great computer-like machine that depends on the quality and reliability of its individual parts. Since the network cannot anticipate just who is going to call whom and when, it must stand ready to provide any combination of some five million-billion possible interconnections when a call is made. An ordinary call within a city involves the operation of about 1200 relays alone. If just one should fail, the call would not get through.

Telephone switching equipment provides a good illustration of the order of quality and reliability required. It must operate around-the-clock, day in and day out, for year after year — and with no "downtime" for repairs. While computer people speak of failure or downtime in terms of hours or even days, telephone people speak of momentary failure of switching equipment in terms of a decade or a lifetime. The new electronic switching systems may use as many as a million components, each designed and produced for reliability against failure that is hundreds to thousands of times greater than that expected of similar electronic components used in most consumer products.

Again, because of the nature and complexity of the network, all of the pieces, parts and components added to the system must be mutually compatible, capable of working harmoniously together. A relay in California must respond unerringly to pulses from Virginia which may have gone through thousands of electron tubes, transistors, or other devices on their journey — and which have been kept free of the cumulative distortions of cables, wires, or microwave channels. Every new and improved item of equipment, every new service, must operate effectively with what already exists; and what exists today must be fully compatible with what will come tomorrow if millions of dollars' worth of equipment is not to become obsolete too soon. The present rapid introduction of Touch-Tone calling and electronic switching — to cite but two examples — would not otherwise be possible.

Techniques and facilities for producing enough of the new equipment at reasonable cost must either exist already or lie within the practical development limits of manufacturing technology. Meeting this criterion is by no means a simple matter today. The sophisticated new products and systems emerging from communications science require the development of equally sophisticated production processes — a task that is often as complex and as technically demanding as the product innovation itself.

### New methods for new products

For example, products such as integrated circuits and undersea amplifiers have required the development of dozens of new materials, a vast array of new manufacturing techniques, and production facilities that are radically different from those of the past. Increasingly, Western Electric facilities look more like laboratories — or even surgical rooms — than anything one usually associates with the word *factory*. At the company's Indianapolis Works, integrated circuits are assembled under microscopes in manufacturing space kept ultra-clean to avoid contamination of the circuits by particles of dust. The area is, in fact, 90,000 times as free of dust as the outside atmosphere. A dust content of thousands or even millions of particles per cubic foot is not unusual in a well-kept household, but only 100 particles per cubic foot are permissible where these very tiny and delicate components are made.

In this and many other instances, Western Electric engineers have had to create fundamental changes in the manufacturing environment, to develop radical new approaches to the art of production. There seems little question that the pace of communications progress would be retarded if they could not find imaginative and ingenious solutions to the problems posed by today's advancing technology.

### Planning: a shared responsibility

Products embodying new technology must be easy to operate and maintain by the telephone companies. This requirement is especially important and challenging in large systems such as the No. 1 Electronic Switching System. Here much of the development work was devoted to making it easily serviceable. As it finally emerged, the system is able to diagnose its own troubles and advise maintenance men, via teletypewriter, of its difficulty.

Clearly, detailed planning is an essential part of the innovative process. And planning is a shared responsibility, calling on the talents and resources of every Bell organization. A major part of this responsibility, however, falls upon the Engineering Department of AT&T and Bell Laboratories' System Engineering division.

It is the systems engineer, more than

anyone else, who looks at the *total process* of innovation, who matches problems with potential solutions, translates these into specific proposals, and catalyzes the work of the Bell System's research, development and manufacturing specialists. For this reason the systems engineer tends most often to be a former specialist, with experience in several areas of science and technology, who has broadened his knowledge to include one or more other disciplines such as economics, marketing, sociology or psychology. With the important task of building information bridges connecting social and economic needs to scientific possibilities, he is essential in the Bell System effort to give its customers new and better products and services.

### Hold down the cost

The critical nature of the role played by Western Electric in the innovative process cannot be overemphasized. It is, in fact, among the more important criteria by which Western Electric's Bell System partners measure the company's performance. Certainly many of the Bell System's scientific and technological breakthroughs would have remained laboratory curiosities had it not been for Western Electric's ability to translate them into working hardware at reasonable costs.

To augment that ability, Western Electric established, in 1958, a unique Engineering Research Center near Princeton, New Jersey. Broadly, the Center looks for new ways of making things, while Bell Laboratories looks for new things to make. In its brief history, ERC has made an impressive number of outstanding contributions to the art (increasingly, the "science") of manufacture.

Equally important is the fact that Western Electric has been able to hold down the cost of its products and services, while at the same time advancing their quality and reliability. At the end of 1969 its price level for products of its own manufacture was 2 per cent lower than it was at the beginning of 1950, despite a 63 per cent increase in material costs and a 138 per cent increase in wages and salaries.

Many factors influence the pace of Bell System innovation. First, there is the need to maintain the confidence of telephone users and the Federal, state and local regulatory bodies that represent them. There are pressures of competition and of rising customer expectations. And there is the ever-present need to maintain earnings in the face of rising costs.

It is, of course, the Bell System's operating units — the telephone companies and the Long Lines department of AT&T, which provides interstate and international services — who feel these pressures most directly. It is they who are closest to the American consumer; it is they who must answer to him for the quality, economy and versatility of service; and it is consequently they who provide much of the stimulus for service improvement.

### The ideal new product

The pressure for innovation from the operating units is evident in its influence on Western Electric's operations. From any manufacturer's point of view, the ideal new product is one that grows in production volume at a gradual pace — allowing time for training and re-training personnel and for maintaining a reasonable schedule of capital expenditures. Eventually, the volume should reach a level warranting extensive mechanization of production and, having done so, continue indefinitely with only minor fluctuations. There should be few if any changes in the design of products after they have gone into manufacture, and design tolerances should permit the most economical production.

In the Bell System, however, the manufacturer's needs are subordinate to those of the telephone companies and their customers. New products, designs and systems are introduced whenever they promise service or economic advantages to the user, and with little regard for the problems, financial or otherwise, imposed on Western Electric.

### The customer comes first

For example, for several years, much long distance transmission was provided by microwave systems with a capacity of about 600 voice channels. When a higher capacity was needed, Bell Laboratories developed an improved system and Western Electric set up extensive — and expensive — facilities to manufacture it. Then, unexpectedly, engineers discovered means for doubling the capacity of the older system in a way that would save money for the telephone companies and ultimately, for their customers. It was decided, therefore, that manufacture of the new system should be held back, even though this would create a sudden excess of production facilities at Western Electric and impose an unforeseen financial burden on it. The needs of the customer came first.

Such disruptions of Western Electric operations are by no means infrequent or unusual. It very often happens that the company has scarcely solved the problems of manufacturing a product or system, when something better comes along to replace it, cutting into existing or forecasted production schedules and commitments.

Thus, while the operating units of the Bell System are innovative in themselves, their dedication to the task of providing top-quality, ever-improving service also has considerable impact on the Bell System's total process of innovation and on the long-range planning of the enterprise. □

Technology is concerned primarily with physical processes,
but it also will affect the way organizations
are managed in the future

# Technology Tomorrow: Impact and Implications

**by Henry M. Boettinger**

To discuss "the" future of technology may not be the most arrogant act imaginable, but it comes high on the list. Perhaps only a combination of fool, visionary and fanatic would presume to predict "the" actual configuration of technology that we and our descendants will be using — or enduring — to carry on the world's work. Future historians will find steady employment in tracing the pattern of our responses, both errors and triumphs, to the explosive forces set off by that marriage of knowledge to practical work we call technology.

Peter Drucker suggests to those of a deterministic cast of mind that they look at the headlines of a newspaper and try to identitfy those events that could have been predicted 10 years before. I have done this with issues of *The New York Times,* and confess I could not identify one that looked certain a decade ago.

First, even though individual technological *events* are unpredictable, one can discern forces shaping probable future developments that will affect the affairs of organizations and persons. Even if they deplore such developments, reasonable men should select strategies that, at least, prevent severe harm to their enterprises, or, more hopefully, let them harness these forces to positive causes and purposes.

Second, unless one is content to let his people career from crisis to crisis, a leader must make judgments, based on cool appraisal of the possibilities awaiting them, considerably ahead of the actual impact of events. Such judgments will suffer error in detail, but most organizational arrangements geared to the general forces at work will adapt better than those that insist no bridge be acknowledged to exist until the leader puts his own feet upon it. Of course, one cannot cross a bridge until he comes to it, but sensible men do look at maps, or send out scouts, before they deploy large numbers of their followers into unknown territory.

This article is essentially a personal "intelligence estimate" produced for consideration by those charged with leading people into that unknown territory we call the future. My sources include scholars, engineers, managers, scientists, politicians, sociologists, historians, psychologists and "lesser breeds without the law." I am sure that half of them are

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*As director of Management Sciences at AT&T, Mr. Boettinger works daily with problems inherent in managing a business heavily dependent on technological innovation. This article is drawn from the last of a series of four lectures delivered recently by Mr. Boettinger in London and Manchester. It follows his study of tomorrow's managers featured in the previous issue of* Bell Telephone Magazine.

wrong, but I do not know *which* half. Only events themselves can sort them out.

Statisticians distinguish two types of error, which they call, with singular lack of imagination, "errors of the first class" and "errors of the second class." Stripped of pedantry, these are:

First Class: assuming true something that is false.

Second Class: assuming false something that is true.

All of us are trained from childhood to avoid errors of the first class: "Do not accept a statement as true unless there is overwhelming evidence for it." Practical men often use this expression to describe themselves: "I'm from Missouri," which means, "You have to show me." Leaders seldom make errors of the first class. However, the greater their skill in avoiding decisions without sufficient evidence, the more prone they are to make errors of the second class. They will treat as false something that may be true, but for which there is not yet sufficient proof to remove all doubt. When dealing with the future, the leader must be especially on guard against this kind of error. His experience and habits of a lifetime will furnish more protection than he needs from errors of the first class.

Most persons have a tendency to think of technology as a collection of inventions spun off from science. Some technology — the glamorous part — does come this way, but technology is far more than this. The definitive history of technology, published in five volumes by Oxford, produced in Britain, and edited by Charles Singer, chronicles what technologies really are: bodies of skills, knowledge and procedures for making, using and doing useful things.

## Practical application of knowledge

Technology concerns itself primarily with techniques applicable to physical and biological processes, in contrast to social and psychological processes. Some current anxieties may cause technology to take greater account of its social and psychological effects, but technologists see themselves as men expert in accomplishing recognized purposes. How these purposes are arrived at and agreed on come from outside their frame of reference. They also distinguish their activity from science, which strives for acquisition of knowledge, while they strive for practical application of knowledge to meaningful tasks.

I have used two words, "useful" and "meaningful," admittedly in a vague way. Let me give them more precision, since different societies decide whether something is "useful" or "meaningful" by different tests. In societies like those of England and America, a useful task is one that people are willing to pay for, either as individuals (in purchases) or collectively (in government expenditures). In other societies, the term *useful* describes what some official needs to achieve his purposes. This point often is overlooked by Westerners of provincial outlook, who assume other people are irrational if they do not immediately embrace a new discovery or technique. What technological changes occur, how they are used and the reverberations they cause are influenced by all major features of a society. Thus, if one sets out to forecast probable technological development *in a specific society,* he should look at the demands for goods and services deemed useful by that society, and should consider its overall goals.

## Societies welcome three things

There are some features of most advanced societies that will result in certain categories of demand. These are: 1) food, shelter, clothing; 2) energy, transportation, education; 3) communication, medicine, defense; 4) art, entertainment, charity. In *The Age of Discontinuity,* Mr. Drucker states that all societies, no matter what their stage of economic development, welcome three things: better education for their children; increased mobility, and better health services. These basic needs will remain stable, but the specific goods, products and services required to satisfy them will constantly change and will require changing technologies.

Since total resources are limited, the matching of

potential demand to possible costs forges the link between marketing and technology, which characterizes modern business. When that link is not strong, both areas suffer, either by getting in each other's way, or by blaming one another for failure to deliver expected volumes or low costs. Organizations that insist on widely separating marketing and technology jurisdictions leave a gap through which wiser competitors will penetrate with everything they have.

Regardless of how clean an organization chart may look, with its neatly bounded boxes, no enterprise serious about its prosperity can afford to respect those boundaries. Why not? Because we are entering, or are now in, an age when three characteristics will increasingly predominate. Sociologist Alvin Toffler calls these novelty, diversity and transience. Notice how these collide with ideas of old industrialism that strove for standardization and long product life.

## Turned Marx upside down

Our predecessors were intelligent men, and their success with mass production of universal products and services built the base from which we can take off anew. The economics of the technology available to them and the markets hungry for the flood of standard amenities called for maximum exploitation of economies of scale. They inverted Marx, trying for higher profits by lowering costs, expanding volume with lower prices and so on to the limits set by the sensitivities of costs to volume, and volume to price.

Henry Ford epitomized his idea of marketing's influence on management in his statement, "You can have a car in any color you want so long as it's black." He was not about to disrupt his humming assembly lines by catering to the foolish whims and fancies of people who did not know what was good for them.

The transition stage from that day to the present saw the emergence of market research along demographic lines. The population was sorted into various pigeonholes, in which the people assigned were assumed to be homogeneous in their habits, life styles and needs. A typical research statement for a product design might have been: "Primary market: mother of 2.7 children, college graduate, age 27-35, middle income, suburban." This approach, still valid and flourishing in many areas of business, tries to keep the attractive features of the old industrialism (large, standard volumes) and yet adapt to changes in the social structure (pinpointed design features).

## New management emphasis

This period witnessed the technological explosions of the past two decades, and created new management emphasis on interlocking relationships among appropriate technology, product design variations, distribution channels, service facilities and advertising. A worldwide increase in population gave the process additional impetus. Demands for government services (primarily defense) funneled enormous resources to exotic technological fields. The infrastructure of roads, housing, schools and municipal services kept demand strong for the older lines of business.

Inside the perimeter of technology, which supported this demand, great shifts and substitutions occurred. Solid-state physics applications, beginning with the transistor, metamorphosed the electronics industry and let the computer make its all-pervasive incursions into almost every area of human activity.

Air travel; oxygen processes in steelmaking; transfer machines and numerical control in manufacturing; containerization; higher temperatures; pressures and voltages in electric power; plastics; electronic switching, satellite, cable and microwave systems; printing; nuclear energy; petrochemicals; synthetic fibers; foods; television; pipelines; pharmaceuticals; fertilizers, and a new understanding of the nature and properties of all materials have transformed the way we see, do and use things, and conduct our lives.

Some organizations have foundered, but others have ridden the crests of the waves caused by the successive shocks of these innovations. There have been few areas of slack water anywhere, much less

safe harbors, for any organization of significance.

Concurrent with these technologies, rooted in the physical sciences, have come technologies developed from study of the organization of people and their work. New arrangements designed to enhance the psychological and social environment created by the organization are being experimented with, embraced, rejected and modified every day. The current emphasis seems focused on viewing the work force as persons, not so many hands. The entire field is in ferment, and we will need several years to separate froth from wine.

In short, no one engaged in satisfying the basic needs listed earlier has been insulated from the impact of both these aspects of technology. But some of the post-dated bills for this technological thrust are now coming due. The early murmurs of ecologists have reached the crescendo stage, and future innovations will have to meet more rigorous tests of their potential benefits *versus* potential injury.

There is some evidence that life cycles of specific products and services are shortening. A "generation" in electric power plants was 40 years; a computer generation now is six years. This accounts for part of the characteristic Mr. Toffler calls "transience." The remainder is accounted for by a weakening of our individual roots in time and place, where more people move about, making and breaking social and community relationships in ways unknown to our parents.

## The quest for sense of self

Novelty in everything is prized, perhaps too much, as an end in itself. This may reflect simply restlessness and dissatisfaction, but I believe it actually reflects the quest for individuality and "sense of self" so dominant today as a reaction to our industrialized society. Yet it is a powerful force, and marketing men who ignore it will mislead their technological brethren into building plant and equipment so inflexible as to become white elephants — which are always expensive and hard to get rid of.

Diversity seems to be the direct antithesis of standardization, but is more subtle. If you look at spectators of a parade, you almost never will find two dressed exactly alike. Yet, most wear clothes produced by assembly-line methods. Here we have a clue as to how the economies of mass production can satisfy a personal yearning for being different. Each module can be mass-produced, but assembly of the final product can be directed by the customer himself. Byzantine mosaics are each a distinct work of art, but the little squares and triangles of colored glass and stone are nearly identical.

## "Build yourself a Mustang"

One of the most successful advertising campaigns in this country exploited — or demanded — a flexible technological arrangement for making cars: "Build yourself a Mustang." Each prospective purchaser was seen as an individual person, not as a group of people, and the cars were sold as are custom-made suits by bespoke tailors. Marketing and technology both will have to live with the new emphasis on the "custom" aspects of customers. This will cause severe mental wrenching for many technical people, and the required adaptation will greatly influence the technology they can use.

In the past such discontinuities in performance criteria have brought forward new technology, often in industries different from those experiencing the old demand. New industries, using new technologies, have habitually made their main entrances by offering lower priced or better quality substitutes for a venerable product or service: aircraft for ships and railways; plastics for metal and wood; paper for glass; aluminum for steel; nylon for silk, etc. I believe that the emerging preference for transience, novelty and diversity will cause continuation and intensification of that experience. New technology is the cutting edge of the knife that slices the "cake of custom," if we use Bagehot's metaphor for tradition. How well that knife cuts, and how deep, depends on the mar-

keting intelligence that guides the blade.

We can also expect new technology to cope with the deleterious effects of old technologies. Pollution control and environmental rehabilitation demands will call into being, or make feasible, a whole new set of entrepreneurial and technical opportunities. In the fifties and sixties, any corporate name ending in "--onics" became the darling of our stock markets. Future sweethearts probably will have "environment" for their middle name.

## Technology heading for inventory

I have heard it wryly observed that, "We have more technology than we know how to use properly." That may be so, but I do not see the pace of development slackening while we work off the inventory. If anything, it will be the other way — more and more technology that we don't know how to use properly heading for inventory. Yet, some of that inventory of knowledge sits waiting, patient but alert, for an idea whose time has not yet come. One example of this was a radio receiver technique, invented at Bell Telephone Laboratories in 1936, which had to wait for the communications satellite before it became the indispensable link for Telstar feasibility in 1962.

Another feature of technology will predominate: emphasis on performance of a system of components, rather than on the components themselves, considered and developed as isolated artifacts. Component emphasis has brought us to a marvelous plateau, whether applied to the human cell, microcircuits, vacuum tubes, metal crystals, magnetic cores or whatever. But great possibilities now lurk in imaginative assembly and arrangement for interaction of this highly developed componentry. Our parallel with the mosaicist will hold even more strongly in the future. The technological designer will experience an expansion of his freedom known heretofore only by individual artists. The possibilities are truly incalculable, especially when one sees them as designs to match the diverse demands of what William O. Baker, vice president of Bell Telephone Laboratories, calls "human-oriented, market-oriented technologies."

What effects can such things have on the individual manager? Before attempting to answer that, consider how managers now relate their activities in two major domains, the human and the technological.

Assume that we can agree on some measure of effectiveness for a working group. For our purposes any measure will do. Individuals in the group experience something we all feel, but find difficult to define. Call this *tension*. Language takes note of this with phrases like "a slack operation" or "a taut ship" to describe the overall organizational condition. What is the relationship between effectiveness and tension?

## Effectiveness requires tension

Maximum effectiveness requires people in an organization to feel some positive, complex sense of pressure, obligation, responsibility, accountability, pride, etc. — all of the ingredients that produce tension. But if tension is increased beyond the optimum, by using all methods known to leaders of men since the pharaohs, effectiveness will decline. Similarly, if organizational tension is reduced from the optimum, effectiveness also will decline. A discernible slackness will begin to pervade the organization. Those whom we call great leaders or managers instinctively strive for the optimum, sometimes relaxing, sometimes goading their people, making small changes as external forces beyond their control add or subtract from the total tension their people experience.

Consider now the relationship between effectiveness and technological capability available to an organization. The same sort of relationship seems to prevail there between techniques (or tools) and overall performance. We can find extremes where the tools are too deficient for optimum performance, or they are too powerful (and thus wasteful) for the job in hand. At a midpoint we have the right tool for the job. Digging the Panama Canal with spades and wheelbarrows epitomizes the first extreme, while

gardening with a bulldozer illustrates the second.

Middle managers can often make do with the tools they are given, but their leaders ought not be misled by such heroic underlings. Such leaders have condemned their organizations to suboptimal performance — which usually means "at higher costs than need be." Competitors who *do* optimize the relationship between effectiveness and technological capability can set a blistering pace for their less enlightened rivals.

In the real world situation, a manager must balance effectiveness, human tension and technological capability. All these relationships must be tended by supervision if overall optimal effectiveness is desired. If a brilliant technologist makes optimal provision of tools to an inept manager, he has wasted his time. If an ideal manager has been furnished the wrong processes or equipment, his people cannot catch rivals who have skilled technologists looking after their interests. One can compensate for bad technology, to some extent, with great leadership, and for poor leadership with superb technology. But peak performance seldom can be achieved without peaks in both domains — human and technical.

## Constant reorganization

Managers unwilling to face the implications of this harsh analysis may seek to counter the shocks from a changing environment in other ways. One of the most attractive, but dangerous, is constant structural reorganization. This is not a new response. Consider this excerpt, written in 66 A.D., by Petronius Arbiter:

"We trained hard — but it seemed that every time we were beginning to form up into teams, we would be reorganized. I was to learn that later in life we tend to meet any new situation by reorganizing, and a wonderful method it can be for creating the illusion of progress while producing confusion, inefficiency and demoralization."

Organization design is too important to be given a counterpunching assignment. It should be guided by marketing intelligence, technological understanding and sociological awareness. To design the organization well is probably the most demanding task top management can attempt.

When it is done poorly, or left to evolve in random ways, adaptation to future events will have an unreal quality, like driving a car by looking only in the rear-view mirror, or steering a ship by correcting its wake.

## A flood of sensory data

In the relevant future, organizations and individuals will experience a flood of sensory data and information. Their ability to think through — and about — this information in order to discern patterns of opportunity and potential harm will be taxed to its limits. Decisions and choices will be required in greater numbers, and will be more varied and far-reaching in a world demanding novelty, transience and diversity for its desired qualities of life and the products needed to support myriad life styles.

These stimuli may overload an individual, an organization or nation, pushing tensions to intolerable levels. If that happens, the symptoms observed will be similar in all three entities. They probably will follow a pattern seen in nervous breakdowns, the stages of which in sequence are: confusion, anxiety, irritability, apathy and emotional withdrawal. The future holds such dangers, but it also offers challenges which, if met well, may let this next period be one of the golden ages of man. The outcome is uncertain, but that only adds to its zest for those who would carry us forward.

As one of our Broadway denizens, Damon Runyon, once advised, "The race may not be always to the swift, nor the battle to the strong, *but that's the horse to bet on.*"

Future management of human-oriented, market-oriented technologies will be a rigorous contest. Yet, I believe it is one that can bring out the best in each of us. If so, that kind of contest, unlike wars, could be one in which everybody wins. □

# The Need for New Rates

On November 20, 1970, AT&T asked the Federal Communications Commission for the first general increase in interstate long distance rates since 1953. AT&T Vice Chairman John D. deButts said at that time: "The increases in rates—designed to boost interstate revenue by 6 per cent — are essential. They will help sustain the Bell System's extensive service improvement programs and meet new dimensions of growth and demand for communications in the '70s."

In its filing, the company asked that the new rates — expected to produce about $386 million in additional revenue — become effective in January, 1971.

Eighteen years have passed since the last general increase in interstate message telephone rates. In fact, interstate rates have been repeatedly reduced in this period. While the Consumer Price Index has risen about 47 per cent since 1953, interstate message rates have had a net decrease of between $450 million and $500 million. Jurisdictional sharing changes, which shifted revenue requirements from intrastate to interstate operations, totaled between $300 million and $400 million. These adjustments, and one of January 1, 1971, represent an annual savings to communications users of about $1.4 billion.

This 18-year history of declining interstate rates was accomplished primarily by Bell innovations in technology and management which enabled the System to cope with surging demand for service while, at the same time, cutting back the cost of providing it. For example, mechanization programs first converted all manual service to dial, then were extended to introduce Direct Distance Dialing almost everywhere; Network Management Centers were developed to make more efficient use of equipment in relation to traffic patterns, peak calling loads and other variables; and higher-capacity cable, together with microwave and carrier installations, multiplied the number of messages able to travel simultaneously along the same communications channels, reducing operating and construction costs.

Such improvements helped to offset rising costs such as the higher wages that must be paid today to attract and hold competent people, the higher interest rates on large amounts of debt capital, and the generally higher prices from which the Bell System is no more immune than any other business. The System's ability to keep ahead of rising costs continued through the pre-1965 period, when inflation was 2 to 3 per cent per year. Since then, however, the rate of inflation has risen sharply, averaging almost 6 per cent for the years 1969 and 1970.

On January 1 of last year, interstate rates were cut by $150 million, in accordance with a decision reached with the FCC in the interstate earnings review in the fall of 1969. At that time, the view of most economists was that business activity in 1970 would

remain at a high level, while the rate of inflation would decrease and interest rates ease somewhat.

But things didn't turn out that way. General business growth slackened and inflation continued at a rate of almost 6 per cent. The growth rate of interstate messages went down from 13.2 per cent in 1969 to about 10 per cent for the first 11 months of 1970—this despite the fact that rate reductions such as that of January, 1970, tend normally to stimulate growth. Total interstate revenue growth was only about 6 per cent for the first 11 months of 1970, whereas the annual increase in the previous four years ranged from 9.8 to 16.1 per cent.

As a consequence of all this — and of other factors, too — earnings on interstate service did not rise to an expected 8.5 per cent range. Instead they *declined* from 8.14 in 1969 to around 7.4 per cent.

## Building and the impact of inflation

While growth rates of interstate messages and revenues are down, the Bell System's expenses and costs are up sharply. The business has mounted the largest program of service improvement in history, a program requiring huge amounts of capital in an inflationary period that has seen interest rates climb to record highs — as high as 9.43 per cent for Bell Company debentures.

Operating expenses reflect the impact of both expanded service effort and inflation on materials, supplies and wages — including those of added employes. At the same time, construction expenditures to meet current and future service needs were a record $7 billion in 1970 for the Bell System as a whole — more than $1 billion over 1969. More startling, roughly $1.3 billion of that 1970 construction investment can be attributed to the impact of inflation since 1965. Also, the average cost of new debt capital has risen to nearly 9 per cent — almost double what it was in 1965.

In short, 1970 expenses for interstate service grew faster than revenues. This has led to inadequate earnings, even taking into account such factors as the

*below: New York Telephone building engineer studies truction job in Manhattan, part of a massive Bell System ding program. Below, top: Western Electric process tester ks production of new wire at Baltimore Works, which lies telephone companies with materials to provide new ce. Bottom: Cable splicer's helper at Indianapolis hole site represents part of Indiana Bell's continuing ram to expand and improve service.*

surtax reduction, the intensive expense control efforts of the Bell System, and the continued availability from Western Electric of equipment prices well below that of other manufacturers.

## Billions for construction

To meet service demands during the 1970s, the Bell System must continue to mount large construction programs with capital requirements that will total in the tens of billions over the next decade. About half of this capital currently comes from such internal sources as reinvestment earnings and depreciation, although the proportion available from within the business is declining. The remainder ($4.1 billion in 1970 and about $4.0 billion this year), must come from external financing. This outside capital has been raised, since 1964, from new debt issues — including last year's AT&T debenture offering of $1.6 billion. But there are reasonable limits to the amount of debt that ought to be incurred. AT&T's debt ratio now is nearly 44 per cent, and is expected to move above 48 per cent by the end of this year if the company continues to finance through debt offerings.

## Improved earnings: the primary need

In the near future, the Bell System must begin to attract new equity as well as debt capital. However, equity investors cannot be expected to risk their savings unless the potential return in dividends and market price combined holds some promise of being greater than the return on debt securities. At the present time, considering current earnings, an equity offering probably would not win a favorable reception from investors if the terms were favorable to existing share owners.

For one thing, the market price of AT&T stock has declined in each of the last six years — from a high of $75 a share in 1965 to the low-to-middle 40's registered last year. For another, AT&T stock is now selling close to its book value. Equity offerings under these

*Below: More microwave facilities have been constructed at Apache Junction, Ariz., where these Long Lines men work to assure quality transmission. Below, left: Long Distance operators in Pittsburgh help handle growing volume of domestic and overseas calls. Below, right: New England Telephone man in Taunton, Mass., works on computer-like Long Distance operator console, designed to help speed handling of calls.*

conditions obviously would dilute the value of the stock. In addition, over half of AT&T's present share owners paid more for their stock than it is worth today on the market.

Clearly, improved earnings are essential to attract the new equity capital required for construction programs. With today's economic conditions, overall earnings of at least 9.5 per cent are necessary if the Bell System is to meet its commitment to good service now and in the future.

## Rate adjustments the only answer

Projected earnings on interstate operations — assuming gradually improving business conditions and some easing of inflation, coupled with tight internal expense control — will fall far short of the 9.5 per cent required. Interstate earnings for this year, taking into account the impact of the $130 million separations change that took effect on January 1, are estimated at only 7.5 per cent or less.

With that earnings projection in view, it is obvious that rate adjustments are required to produce the $130 million in added revenue requirements transferred to interstate operations (which, of course, reduces revenue requirements on exchange and intrastate long distance service by an equivalent amount), and to increase earnings to a level of 9.5 per cent. The total amount of revenues produced by the contemplated rate adjustments would represent a 6 per cent increase in overall interstate revenues. This amount, coupled with cost savings due to anticipated changed calling patterns, would produce the required return of 9.5 per cent.

"This is the level we and our financial advisors feel is needed to attract investors and to meet future financial requirements," said John deButts.

The rate adjustments currently under consideration would not be "across-the-board," but would be applied with the aim of saving operating costs as well as increasing revenues. The increase would be centered on person-to-person and other operator-handled calls — which are, of course, more costly to provide. Increases in calls dialed direct would be limited to business hours and would be no more than about three cents a minute. Moreover, some interstate messages would cost the same *or less* after the adjustments.

The rate changes would be aimed at increasing the productivity of service operations by reducing the number of operator-handled calls—person-to-person, collect, third-number, credit card, etc. — and by spreading calling volumes across the less heavily-used hours to flatten out peak calling loads and provide more efficient use of the switched network.

The changes would be cost-related, bringing rates more closely in line with the actual costs of the service being provided. Consumers would pay, for example, a more equitable portion of the expenses incurred on calls requiring operator assistance. On the other hand, rates would not increase — and in some cases would be lower — on interstate calls dialed without operator assistance during evenings, nights and weekends.

## To sustain the good record

The individual consumer actually could avoid *any* increase — and perhaps save money — by dialing his own long distance calls during low-rate hours. The choice would be his. And this option would be of particular significance to the residence customer.

The Bell System record of providing communications service is a very good one indeed. The quality and reliability of interstate service has been going up while rates have been going down — for 18 years. Now this business finds itself in a situation where, for the first time in a very long time, increased rates are needed to sustain service of the kind it is asked to deliver and wants to deliver. But the rate adjustments contemplated will be moderate: With their approval and inauguration, the cost to long distance users still would be 14 per cent below the levels prevailing 18 years ago in 1953. □

# Bell Reports

### Manhole Module Makes Splicer's Work Easier

A new development in motor vehicles that will help to make the telephone cable splicer's work a little easier is a truck equipped with an underground splicer's module, containing its own power and ventilation sources.

Known as the "manhole module truck," the self-contained unit eliminates much of the time and equipment needed to repair and service underground cable. Since the power and ventilation units are located in the truck, the familiar propane tanks and other paraphernalia needed at the manhole site will be unnecessary.

It now takes two splicers approximately an hour apiece to set up at a job. Plant experts figure that use of the module will enable one man to set up in just 15 minutes. He has only to remove the ventilating hose from the back of the truck and drop it down the manhole and go to work.

The module was developed and introduced in Denver by Mountain Bell.

### Laser Pen Device Draws Electronic Circuit Patterns

A new machine developed by Bell Laboratories engineers makes use of a laser to draw patterns for tiny integrated circuits far more intricate than previously possible. These circuits are required for a wide variety of telephone equipment and services.

The Primary Pattern Generator, as it is called, employs a photographic plate on a moving table; an argon laser; modulators and lenses to control the laser beams, and a 10-sided mirror, rotating on air bearings, to reflect the laser beam and expose selected portions of the photographic plate. Its accuracy is such that it can produce the equivalent of a mile-long straight line with less than five-sixteenths of an inch deviation.

To attain such precision, it is necessary to operate the Primary Pattern Generator in a controlled-environment chamber, where the temperature is maintained within one-quarter degree Fahrenheit and each cubic foot of air contains fewer than 100 dust particles larger than one micron.

The new machine is so fast that it takes only 12 minutes to complete a highly sophisticated circuit mask which formerly required more than 12 hours of machine time.

The device will be used in the production of photolithographic masks to be used by the Western Electric Company to produce integrated circuits for Bell System equipment.

*Alfred Zacharias of Bell Laboratories Optical Device Department shows a complex integrated circuit mask produced in minutes by the new Primary Pattern Generator at the rear. The device, which employs a laser and a rotating 10-sided mirror, draws the intricate patterns many times faster than previous equipment.*

### The Operator Is a Basso

In the beginning, Bell System operators were men. But then the ladies, led by Miss Emma Nutt, arrived at the switchboards, and they have been a "no-man's land" ever since.

Now the men are making a comeback of sorts at the boards. For example, Steve Miller and Larry O'Meara, Roswell, N. M., high school seniors, are working at the long distance board for Mountain Bell as part of a distributive education program. The young men are the first males ever to work as operators in New Mexico.

They and six senior girls work part time under the program during the school year and full time during summer vacations. They may become full-time employes after graduation, as have many other students.

Women's lib take note!

### Picturephone® Service on Trial By President Nixon's Staff

In a test of Picturephone service's usefulness within an organization, The Chesapeake & Potomac Telephone Company has installed 10 sets in selected White House offices and in the nearby Executive Office Building. The trial is expected to run until April.

Picturephone service has been available within a downtown Pittsburgh exchange since July 1970 and on an internally-switched basis in Chicago since December 1970.

Internally-switched Picturephone service will be available in New York in the second quarter of 1971. Long distance service between Chicago and Pittsburgh will begin in the second quarter of 1971. Exchange service will be available in Chicago and Washington, D.C., in the second quarter of this year, and in New York City (Manhattan) by year's end.

*Cheryl Wilson, left, "talks" to Phyllis Levi during the first regular subscriber telephone call using Code-Com. The call, between the girls' homes in Columbus, Ohio, ended Bell System field trials that began almost five years ago. Code-Com sets enable the deaf and blind to tap out messages over regular telephone lines.*

### Phones for the Deaf and Blind

It was a desire to teach the deaf to speak that brought Alexander Graham Bell to America more than a century ago. Now the deaf and the blind are able to speak over the phone, though not with their voices.

Ohio Bell recently installed, for two young ladies in Columbus, the first two Code-Com sets for regular subscriber use in the Bell System. The sets—which contain a light, a sending key and a vibrating disc — enable the blind or deaf to tap out messages in code.

An ordinary telephone converts speech into electrical impulses that are transmitted and reconverted to speech at the receiver, but the Code-Com converts transmitted signals into flashes of light and vibrations of the disc or sensor pad. A deaf person watches the flashes of light; a deaf and blind person feels the vibrations of the disc. The key is employed to transmit.

The Code-Com set was developed by the Bell Laboratories Indianapolis lab and is now being produced by Western Electric in Indianapolis. The suggested subscriber cost for the set, which is now available on order, is $3 a month, plus the regular charge for telephone service.

Another way the Bell System helps bring telephone service to the deaf is through its program of donating surplus teletypewriters to the deaf under an agreement with the Alexander Graham Bell Association for the Deaf. These machines, used in conjunction with a telephone and an acoustic coupler developed by a deaf California scientist, enable the deaf to call any person with similar equipment and exchange messages.

The telephone handset rests in the coupler, which changes signals from the teletypewriter into sound, and back again. The rates are the same as for any local or long distance call.

### Sky View Aids Waveguide

A 113-year-old technique may prove to be the one practical surveying method needed to help lay the communications pipeline of tomorrow.

Aerial photography — which French photographer Gaspard Felix Tournachon first got off the ground in 1858 — is being tested by the Long Lines Department of AT&T in Indiana as a means of super-accurately surveying waveguide routes.

An 80-mile coaxial cable route is being surveyed by photogrammetry — 3-D aerial photography — which will be much less expensive than conventional surveying.

Waveguide — a pipeline of copper-lined steel about the diameter of a person's wrist — will some day carry more than 250,000 telephone conversations simultaneously or handle a mix of telephone calls, data transmission and Picturephone® service as well. Its operation demands a completely level trench, since its signals are sent in "millimeter" waves that lose strength in going around curves. Imperfections in roundness also cut efficiency.

Photogrammetry shows the most level ground for hundreds of feet at a time, without measuring every few feet or so as would be required by ground-level surveying. Infrared photography is being used on a 20-mile stretch to pick out variations in the soil that will be encountered. ▢

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# BELL

telephone magazine

*Painting: The Spirit of Service, by Ernest Hamlin Baker. Photo: Linemen Lee G. Boyles (on cover) and Kenneth Olson Jr. (below) of Cook, Minn. Photographed by Vincent Nanfra.*

# The Spirit of Service

The Greek philosopher Heraclitus observed: "All is flux; nothing is stationary." Look at a tree, a river or a person—they're not the same today as they were yesterday, just as they won't be the same tomorrow. Yet, they will still be Tree, River, Man or Woman. One million men and women comprise the Bell System, an entity that continues in a state of change. Equipment is changing, from electromechanical switch to Electronic Switching System, from wire on a pole to buried cable and microwave and satellite signals in the sky. And, more significant, people are changing. Bell people today as a whole are younger, they question more, they expect more, they move about more than did earlier generations. Yet, at the center of this flux is an undercurrent not unlike that of a river—running deep and strong, changing yet remaining the same. It is the Spirit of Service, depicted on our cover, the opposite page and two following pages, as it was nearly 30 years ago and as it is today. At left is Ernest Hamlin Baker's painting, *The Spirit of Service,* showing Lineman Angus MacDonald patrolling an open wire in a blizzard. The painting done for AT&T commemorates efforts of a small crew to keep open the only long distance circuits between Boston and New York during the Blizzard of '88. The cover photo, which continues onto the opposite page, captured the same spirit in two linemen at work near Cook, Minn. Appearing on the following pages are three other paintings done for AT&T, showing another lineman, an operator and a service representative, contrasted by photographs of their modern counterparts. The breadth and depth of the Bell System perhaps is best measured in its faces, not circuit miles or call volumes. The man on the pole, the woman with the answer, the voice with a smile — that's where the spirit is.

*Paintings, top to bottom: The Telephone Operator, by Richard Brown; The Service Representative, by Vuk Vuchinich; The Telephone Lineman, by Norman Rockwell. Photos: Cable Splicer Carl Face in Monterey, Calif., Operator Karen Kusek in Pittsburgh and Service Representative Sylvia McClendon in Jacksonville Beach, Fla. Photographed by Jay Maisel.*

# TALKINGATORTALKINGW

The prevailing situation is characterized by cynical assumptions that personal consideration is really expected in a network too powerful to be challenged from within. To be sure, after spending millions of dollars

Illustration: Bernie Karlin

# H?BYJOHNA.HOWLAND

Successful communications to and among corporate employees cannot be a duty delegated to an individual or an organization with a fancy title and then forgotten. Employee information is everyone's job, and when it isn't, the consequences can be formidable.

Within the greatest communications organization in the world we are hurt and puzzled by a seeming communications failure — the problem of talking with our employees. By all odds, with the media and money at our command, we of all companies should be *the* case history of successful internal communications. No other business has so much communication paraphernalia, technology and expertise at its command, and probably no other business spends so much time, thought and money filling pipelines of corporate communications media.

Yet, as we look around us, as we study the effect of this plethora of information, as we dip our toe into the chilly waters of employee attitudes and morale, the evidence is frighteningly consistent that — as is the case with every other large organization — there is a big difference between *information* and *communication*. Our employee body — at all levels — seems, if we can believe the multitude of research at our disposal, more confused, more misinformed, more distrustful, more alienated than ever. Furthermore, as we have grown in size, in numbers of people

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*Mr. Howland is Publications Director at AT&T. He entered New Jersey Bell from the advertising business in 1953 and prior to his present job served as a field information director – a liaison function between AT&T and the associated Bell companies–on public relations matters. For eight years previous, as advertising manager in charge of television, he was responsible for The Bell Telephone Hour, the Bell System Science Series and other corporate broadcast efforts. He is a graduate of Brown University.*

and in complexity of work, this communications gap has geometrically widened.

The fact that we are, perhaps, no worse off than any other comparable organization (perhaps even better) is small comfort. In a corporation of more than a million population, such a gap can be destructive. We should perhaps replace the omnipresent job safety plaque that says, "No Job Is So Important and No Service Is So Urgent . . ." with one that reads, "Communicate or Perish."

Within the Bell System we collectively spend several millions of dollars for employee information through company magazines, employee newspapers, management and employee bulletins, films, CCTV, booklets, discussions and other orientation programs.

Tons of paper, miles of film and tape — all magnitudes — all shapes — all sizes — all telling the company story — each giving off its own bit of light. All are edited or produced by competent, knowledgeable and professional information people — all working hard (and not necessarily by divine right) on what each feels best for his company.

But what of the collective impact?

## Confusion in communications

Dr. Napoleon N. Vaughn, president of Urban Market Developers, Inc., Philadelphia, recently researched attitudes of employees — mainly minorities but with all employees as a bench mark — toward internal information media. This qualitative study indicated that most employees—black or white—derive little from employee information that they feel is useful in their jobs and careers.

Vaughn describes our employee communication problem this way:

"The American Telephone and Telegraph Company is the largest communications system in the world, and yet its internal organization suffers outright confusion in the communications area. The irony of the individual employee isolated within the massive system is everywhere apparent. Workers are saturated with the minutiae of their own jobs, while knowledge of related positions and responsibilities is kept in shrouded secrecy. No direct line is open, so the employee is marooned on an island of limited access. The prevailing situation is characterized by cynical resignation. No personal consideration is really expected in a network that is too powerful to be challenged from within."

Black employees at Bell, says Vaughn, feel they are the last ones to know anything. They are forced to move outside of conventional channels of information and turn to their own communications network, the grapevine, which they recognize as unreliable but better than nothing. According to Vaughn, white employees who were surveyed showed little more love for company publications.

## Hardly a measure of success

This and other surveys indicate that many employees, especially those in nonmanagement and lower management positions, either ignore or at best scan their company bulletins, newspapers and magazines. Perhaps this is due to a second problem in the dimension of information *versus* communication, which employee information people do not discount — the question as to whether formal employee information channels (controlled, not free, media) *can* effectively communicate.

To be sure, after spending this time and money, something must be coming out of all this effort. And of course something is. A lot of material *is* real and *is* helpful to the employee or manager. But sometimes it seems that the best that can be said for most of our employee information activity is that it keeps a lot of people employed, and it doesn't seem to do any harm. Hardly a measure of success.

Yet every study taken reinforces the theory that the employee *wants* to know. If the wind is right and the moon in favorable phase, he just might listen and even believe. But to answer the question as to why we seem to fail in our efforts to communicate,

we must first, like Alice, ask, "Would you tell me, please, which way I ought to go from here?" To which the Cheshire Cat replied, "That depends a good deal on where you want to get to."

Why *do* we try to communicate within the employee body in the first place? A recent conference of Bell System employee information managers tried to answer that rather unsettling question this way:

"Through formal, organized programs, we try to communicate with employees in order to promote the welfare and usefulness of the business as a corporate enterprise and to promote the welfare and usefulness of employees in the business."

## To build support and understanding

Within this broad, overall objective, what are some specific reasons why we try to communicate with employees? The information managers said it was to build support and understanding for company and System goals of providing good service, staying socially viable, technically innovative and financially sound. They also agreed, or almost agreed, that we try to communicate in order to make employees effective spokesmen for the business in explaining changes — ANC, DDD, EDDD, etc. — and in defending policy — need for deposits, reasonableness of rates, etc. Another reason is to increase employee effectiveness and performance through improved safety, sales expense control, housekeeping and productivity. Employee information also should attempt to make the business more aware of and responsive to employee needs and desires by serving as a pipeline *up* to management as well as a pipeline *down* to employees. Information channels should serve to satisfy employee needs and desires to be informed on items of interest; to feel "in" on company activities, and to feel their efforts are worthwhile and appreciated. Finally, the managers agreed, information activities should strive to make implementation of basic business changes acceptable and possible by providing employees with knowledge they must have to effect the changes, e.g., building moves, benefit changes and work situation changes such as new hours, etc.

Whether or not this rationale is adequate, I leave to your own judgment, for I suspect that top, middle and first level management and the body politic all might have different definitions geared to their own vantage point and needs.

But "purpose" is a tough proposition — one of those words that force thinking through.

Simplistically, the purpose of any communications program is, indeed, in support of the purposes of the business, itself.

But purpose is double-edged. What of the employee? What is on his mind? What of *his* purpose?

I'm not sure that we know, or that any of our survey takers yet know, or for that matter that even the employee, himself, knows.

## There is no average employee

But we do know this: "Employee" too often connotes one amorphous mass to us. And yet we know there is no average employee. He is a conglomerate, an aggregate—functionally, professionally, ethnically, educationally — a company of individual people. We have failed in reaching these *people* probably because the efforts we exert are spent in a something-for-everyone approach that probably fails to satisfy anybody. The need is to communicate locally, personally and pertinently to the *person;* not to the impersonal employee.

We know about the faceless "they" who run this company — the shadowy forces that skulk behind all management decisions — the "they" who in their perversity ruin otherwise sound plans. No one can ever, of course, pin "they" down. But as an example of this *they* syndrome, we need only look at a recent management attitude pilot study conducted by researcher Stanley Peterfreund for AT&T:

"There's no evidence that management people have a consistent awareness of what company goals are, where the company is headed or how they fit

into the overall scheme. There's a view that top executives and those below them speak a different language, that each is tuned in to something quite different. Some feel their top executives don't have an accurate picture of the field because the information being fed to them is often watered down.

## Little contact with executives

"At a more fundamental level, there are examples of information breakdowns that have operational consequences. 'It's not,' said some respondents to the survey, 'that [we] are resistant to change. It's the *company, top management* or the *system* that's slow and ponderous in innovating.'" . . . (They!) "'Managers have so little direct contact with their top executives that they really don't know what the executives are thinking, what their plans are.'"

Our employee information media are *only one dimension,* and a not too satisfactory dimension at best, in this process of communication — a process that includes such intangibles as climate, trust, credibility, integrity, access, personal relationships, levels and other factors. We must keep in mind that our media in their communications dimensions frequently have little relationship to what the employee wants to know or even needs to know just to do his job.

## Information vs. communication

Furthermore, whether anything is put out through formal media or not, communication quite obviously is going on — implicitly. Silence communicates, visual impressions communicate, experiences communicate as do the environment and supervision with which every one of us works.

And this is where you — not I as an employee information practitioner — come in.

Peterfreund, who for more than 15 years has worked closely with the Bell System, as well as many other large clients in this area of employee communications, has said continuously that communications cannot take place unless every manager supports the maintenance of a positive communications climate. By that he means developing a working environment in which every employee has access to the information he needs and wants. An environment in which, when management had something to say, it would be heard and believed. When employees had something to say, there would be somebody listening; not because the book said management *should* listen, but because what was being said was potentially of value and because the person who was communicating was an important member of the company, with a contribution to make. Peterfreund points out, and I suspect he is right, that because each company has a staff group responsible for employee information — at least theoretically experts in their field, putting out technically fine publications, films, presentations and the like — that the rest of management falls into the trap of assuming that the job of *communications* is being done just because we're there — producing *information,* but not necessarily producing communications.

## Job-related information

Peterfreund has learned in virtually every study he has been associated with, whether for the Bell System or others: "If people feel well informed, their attitudes on every score tend to be better. Their interest starts high and is maintained at a high level until they become demotivated and frustrated.

"Their primary interest is in job-related information — in a very personal sense. They are concerned with *their* job, *their* department, *their* growth and advancement opportunities, the results of *their* work, how well *they're* doing."

Peterfreund continues:

"And it's here that communications most often break down — right on the job, itself — where the consequences are tangible. Where new practices and procedures aren't adequately explained. Where discipline is substituted for constructive corrective com-

munication. Where barriers to productivity — and waste — go uncorrected (and often undetected). Where the supervisor has no time (and sometimes no interest) in listening, in getting feedback. We find plenty of 'company information' — social news, peripheral subjects, etc. — but a neglect of the communication about the guts of the work, itself."

Communication is no more important than in times such as these, when job economies, rigid cost control and cost reductions are sought. "Yet," according to Peterfreund, "it's at times like these that communication is often curtailed, rather than expanded. Unless there is a mutuality of objectives, you're not going to get the benefit of your employees' ability to contribute to these objectives. They start off wanting to, but wind up frustrated and rejected."

## If it's propaganda, so be it

In large part, because there are too many in management who assume employees are opposed to company objectives, we communicate, I fear, accordingly. It is almost inevitable that the prophecy becomes fulfilled in these circumstances.

*Communication is important* because unless people *know* the company objectives, they can't associate them with their own. If conveying the company viewpoint is "propaganda," so be it. We shouldn't apologize for it. We should just do it well.

*Communication is important* because it's essential to the management of change. Without facts, understanding and acceptance, efforts to change are doomed to failure. Without well-directed communication, there isn't a chance.

*Communication is important* because without a communion, a sharing of ideas with others in a mood of mutuality, the gaps will never be bridged. The polarization that seems to plague the Bell System today will only become more pronounced.

So it boils down to this: Communication is *your* — the individual supervisor's — job more than mine or that of my colleagues.

You are the one who must articulate company objectives and develop communications channels that both satisfy management's desire to have its goals known and fulfill the employee's needs as well as his desires to know.

## It's your payoff

It is your job to foster a climate in which employees at every level feel well informed.

It is your job to know what's going on, what people think is really happening "down there."

No small order, but it's your payoff.

Some 15 years ago William H. Whyte wrote a series of articles for Fortune magazine called "Is Anybody Listening?" which dealt with this and other communications problems. He said: "Only with trust can there be any real communication, and until that trust is achieved, the techniques and gadgetry of communication are so much wasted effort. Study after study has pointed to the same moral: If management does not enjoy confidence, it has itself to blame. Either its policies have not been such as to be proof against animadversions or, more frequently, it does not realize that resentment and suspicion exist at all. It is easy for management to overlook this suspicion, for it will feel that company policies do not warrant any. They may not. But because of an absence of real communication, the present executives may be unaware of the fact that a stereotype born of policies long since past is still haunting their shop."

It may be reassuring to be reminded by that 15-year-old article that our predecessors were no wiser than we. But it also indicates we have not learned much in the intervening years.

And I would suspect that by his reference to "management," Whyte did not mean "they."

"If the people around you are spiteful and callous, and will not hear you," wrote Dostoevski in *The Brothers Karamazov*, "fall down before them and beg their forgiveness; for in truth you are to blame for their not wanting to hear you." □

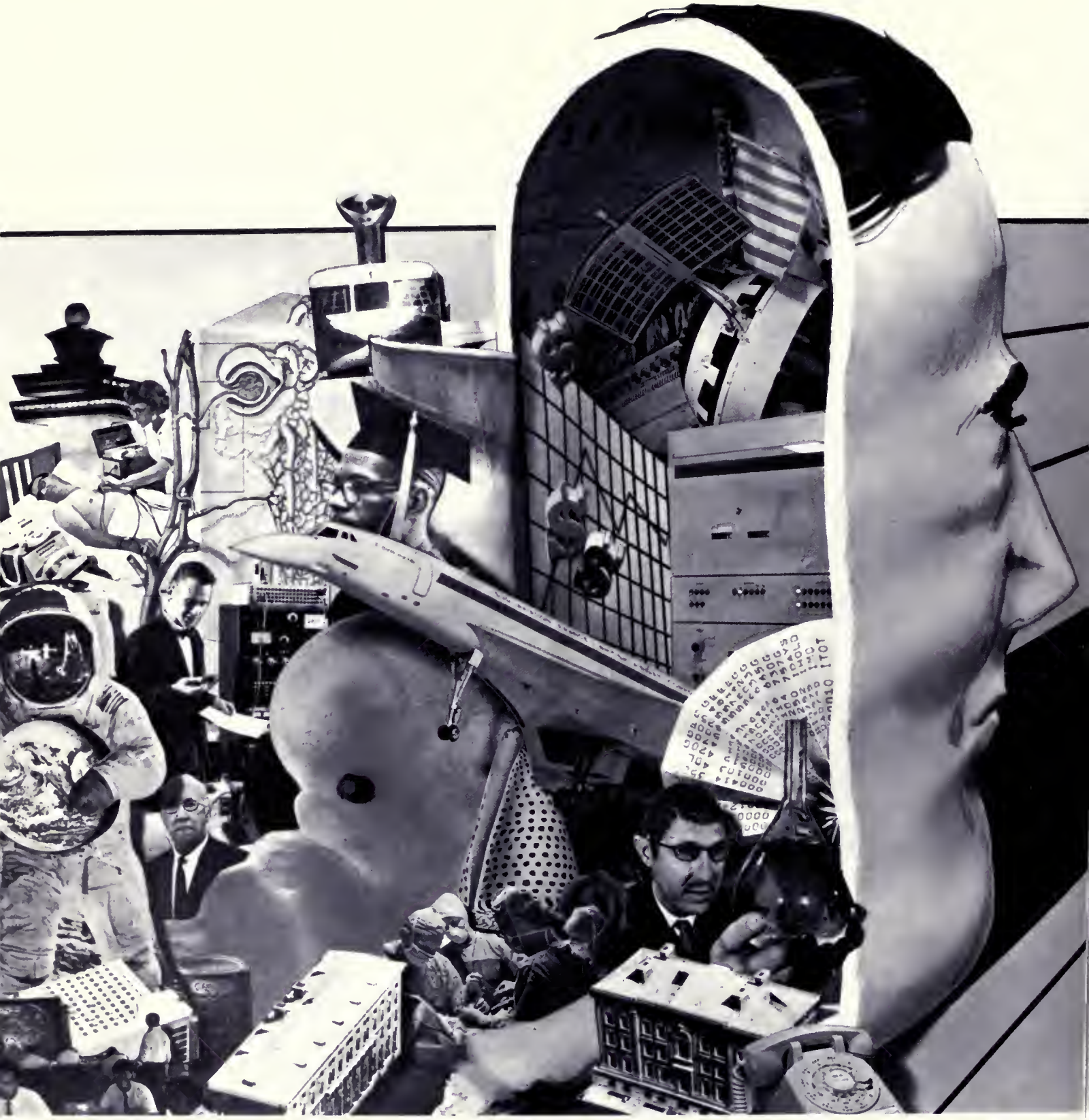

Illustration: Jerry McConnell

# President's Man

It's been six months since Dr. Edward David moved from Bell Laboratories' Murray Hill headquarters to Washington's Executive Office Building as the President's Science Adviser. How is he doing? What has he done?

**by Howard D. Criswell Jr.**

In Washington, the popular view is that President Nixon wanted Bell Labs' Dr. Edward E. David Jr. to sit at his right hand as Science Adviser to bring to government a pragmatic, technical approach in a day when science and technology are under attack and their problems seem to threaten the land.

If this reasoning is true, the President got what he bargained for. Dr. David, an engineer with a doctor of science degree, had been solving problems at Bell Labs for 20 years, the last five as executive director of the Communication Principles Division. No sooner had he arrived last Sept. 14 than Dr. David was called upon to start solving the thorny, practical problems of the fiscal 1972 budget.

"We have a tremendous priorities problem," Dr. David observed in his high-ceiling suite in the Executive Office Building. "There's always the question of how to use the money available. However, the main problem we face is the morale of the technical and scientific community."

To improve this poor morale, he believes the Ad-

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ministration "has to bring science into relation with national goals. The nation must depend upon science and technology to solve its problems and reach its goals. We *have* to do this," he emphasized.

In the forefront are environmental problems, to be faced primarily by the newly established Environmental Protection Agency. "We've taken components from Health, Education and Welfare, the Atomic Energy Commission, and Interior," Dr. David observed, "and put them together to reach the goals."

## Inflation takes its toll

"However, not all Government research and development is going to solve environmental problems. The money's not all going to practical problem solving, either. There's a great deal of money spent by agencies that still goes to basic research."

As for the financial plight of colleges, universities and medical schools caused by research cuts in recent years, Dr. David believes the situation is not now as bad as it once was. "In fiscal 1970," he pointed out, "there was 8 per cent more money appropriated than in the previous year. Unfortunately, inflation has continued to take its toll. Aside from the financial troubles, the big problem is the morale of the technical community. I see timidity and caution and a lack of courage among people who a few years ago would have been at the front of things. This attitude has been reinforced by a number of things beginning with rejection of a rational approach to life by students and other people."

After World War II, he noted, science and technology were considered the fair-haired of Government spending. "Almost anything done in the name of research was acceptable." Now the pendulum of public opinion has swung the other way, Dr. David believes. "Today, the big problem is rejection by society of science and technology. The feeling in many quarters is that technology and science have caused many of society's ills. This is a rejection of contributions that science and engineering are making. We used to be heroes, and now we're villains."

Dr. David believes it is not fair for society to point an accusing finger at science and technology. "Society, itself, had a strong role in the application, but science and technology have been picked as the whipping boys." He believes once the relationship of science to society is understood by the nation, once their goals are together, the solutions to the problems — including the priority problem of morale — will be that much nearer.

One long-range major goal will be a continuing search for a clean source of energy, which Dr. David foresees as an achievement of the 1980's. However, he acknowledges that the Administration is not ready to embrace this as a targeted goal. He added: "The need for clean air must be made explicit with certain fiscal caveats. An open-ended goal, for example, might be irresponsible in the fiscal sense."

## Millions for clean air

Toward the goal of clean air, he noted the Government already is spending millions of dollars yearly. This includes $200 million for a breeder reactor program to better utilize uranium in nuclear power plants and make its use commercially feasible. Another $100 million is being spent annually on such items as fusion research and attempts to remove sulphuric oxide from fuels used in commercial power.

He noted if this spending is continued, the total for the nineteen-seventies will exceed $3 billion.

Dr. David's offices are adjacent to the White House in the Executive Office Building, which is the Old State Department Building, a 100-year-old Washington landmark. The President's Science Adviser has quarters in the extreme south end of the second floor near the Vice President's office. Within the high-ceiling room, Dr. David is comfortable and at ease.

One of the first things he moved into the corner room was a lighted display case, some five feet high by six feet long. This he filled with his mineral and paleontology collection, which he noted with some

pride "is pretty good for a private collection. I like Washington," he said with relish. "It's very stimulating. And Government service is much more demanding than I had expected. I find it quite agreeable."

The Davids settled into a Washington house and enrolled their 14-year-old daughter in school, while he attacked a job that has been praised, criticized and often misunderstood.

## A shift in priorities

Just what are the functions of a Presidential Science Adviser? Dr. David took over after a particularly trying period that saw significant cuts in spending and changes in direction. In the final two years of the Johnson Administration, budget cutbacks in science began to be felt. When President Nixon took office, he began a shift in priorities as well as further cuts in basic, untargeted research money in favor of using Government money to solve scientific and technological problems affecting the nation.

Many Washington lobbying groups felt Dr. Lee DuBridge, whom the President appointed when he first took office, did not have a strong enough voice as Science Adviser and was not getting the point across that budget cuts were causing problems. This was particularly true of the effect the cuts had on the already hard-pressed medical schools whose operation depended upon research money, most of it awarded through the National Institute of Health.

Dr. Philip Handler, the Duke University biochemist who is president of the National Academy of Sciences, believes each Presidential Science Adviser "must decide for himself his real responsibility."

As the N.A.S. president, Dr. Handler is the nation's No. 1 science spokesman. In his opinion, the Presidential Science Adviser is not, as many scientific societies and groups believe, supposed to function as a White House representative of the scientific community to further their causes.

Of course, Dr. David, as other Science Advisers before him, is a member of the N.A.S. and thus privy to most, if not all, of the scientific problems of the day.

In Dr. Handler's opinion, the President's Science Adviser is first of all "the President's man 24 hours a day. His primary responsibility is to see that the vast technical apparatus of the United States is utilized to reach the President's goals.

"He's not there to frustrate the President," Dr. Handler continued. "He's there to see that the President's goals are achieved."

Another aspect of the Science Adviser's job that Dr. Handler considers important is its invisibleness. "What the public hears are the decisions about to be made by the President, the Department of Defense or perhaps the Commerce Department," he noted. "The work of the Science Adviser that went into the decision goes unnoticed."

Because he is an inner member of the President's team, Dr. David cannot with propriety discuss his role in decisions. Since being piped aboard, Dr. David mainly has been involved in discussions that concern Government spending of money for science in the fiscal 1972 budget.

## Science budget increase

There was a surprise when the President's 1972 budget was released, for it contained a 9.3 per cent increase for science and research. Proposed increases are earmarked for hard-pressed universities, medical schools and the National Science Foundation, among others. N. S. F. was scheduled for a $100 million increase, and another $100 million was earmarked for biomedical research.

Despite Dr. David's behind-the-scenes role, many of the proposed increases were generally attributed to the strong case he presented the Office of Management and Budget.

Dr. David sees his role as Presidential Science Adviser "to provide the President with the best advice on science and technical subjects.

"I see the President about once a week. He's extremely interested in the state of science and technol-

ogy. He knows you can't start a broad new health program without technical and scientific components."

Dr. David brought a new image to the Adviser's position with his almost boyish appearance. His predecessor, Dr. DuBridge, the former Caltech president, was the personification of the elder adviser sitting at the right hand of the leader. Kindly and almost gentle in his patience with Congress, the white-haired Dr. DuBridge brought the best of scientific and academic credentials to the job.

Dr. DuBridge's term was busy, filled with the emergence of pressing problems of large magnitude, many caused by the new Administration's spending restraints. One such problem was the plight of medical schools. When Federal research was cut, nearly every medical school felt the pinch at a time when society in general was complaining about the lack of physicians and a breakdown in health care in many areas. Because of the financial restraints, the Administration was forced to make choices, many of them unpopular with groups of institutions that found themselves left out. At any rate, this is but one example of the frustrations of the job, which must mix scientific expertise with the cold, hard facts of living within political bounds with Administration goals in the foresight.

Dr. DuBridge announced he was simply retiring from the demanding position that brought him to testify before Congressional committees 16 times during a 14-month period. Many of these appearances were long and protracted sessions in which he was asked questions that touched on nearly every phase of science and technology. The Congressional appearances were in addition to many long meetings with the Office of Manpower and Budget and conferences with experts on environment, space science and technology, national security, air traffic control, communications policy, life sciences energy, education research and development, academic science, international science cooperation and others.

The President's Science Adviser is a prime candidate as speaker for many scientific and technological groups. To this harried atmosphere, Dr. David brought a relaxed attitude and an ability to face the grind physically. At 46, he still looks like an undergraduate, friendly and wise beyond his years, although it has been 26 years since he was graduated from Georgia Tech. He followed that with a master of science (1947) and a doctor of science (1950), both from Massachusetts Institute of Technology.

Naturally, he has inherited all the problems that faced Dr. DuBridge. He began right off with long meetings with budget officials over distribution of science's share of the fiscal pie.

## The intricacies of budgeteering

Insiders have reported that in his meetings with Casper Weinberger, head of the Office of Manpower and Budget, Dr. David has been impressive with his knowledge and ability to pick up the intricacies of budgeteering, that never-ending Government game.

Since he took office he has talked privately with several senators and congressmen, appeared before the House Government Operations Committee and made two or three speeches in which he said he "kept a low profile." While he has been busy, such activities have been only warm-ups for the months ahead when the Administration must present its budget case and programs to Congress, particularly to appropriations committees.

Dr. David feels his job is not only to respond to Presidential requests, but to offer suggestions to initiate directions and programs. One such area he is suited to plug meaningfully is the use of computers in education, a subject on which he is considered an expert. With Dr. J. G. Truxal of the Polytechnic Institute of Brooklyn, Dr. David is co-author of "The Man Made World," a course taught in 400 high schools and several colleges. The course teaches use of the computer as a tool, simulating the real world.

"The advantage is that the student can gain insight into problems without direct experience. For example, in teaching about epidemics, population growth

or traffic patterns, the computer is a useful tool. A computer is not really awesome. It is possible to teach on any level a great deal about computers and how they work," Dr. David explained.

Dr. David pointed out that the executive director of Bell Labs' Research Communication Science Division, Dr. John R. Pierce, as a member of the President's Scientific Advisory Committee (P.S.A.C.), headed a panel in 1966 that reported on potential use of computers in schools and colleges. The time may be ripe now, Dr. David observed, to propose that the President have the report updated.

As the President's Science Adviser, Dr. David also doubles as the head of the Office of Science and Technology. Actually, the dual positions are one.

When the Russians launched the first earth-orbiting sputnik in 1957, the late President Eisenhower realized there was a lack of scientific advice available to him. He created the office of Presidential Science Adviser and the President's Science Advisory Committee, composed of 18 top scientists and engineers.

## A twofold charter

The Office of Science and Technology came in 1962, created by what is known as Reorganization Plan No. 2 during John F. Kennedy's aborted term. It was formulated around the Science Adviser's post and P.S.A.C. The O.S.T. has a twofold charter: To advise and assist the President on matters of national policy as they pertain to science and technology, and to evaluate and coordinate the total Federal program in science and technology. But President Kennedy also saw the Office of Science and Technology as an arm that would assess selected "scientific and technical developments and programs in relation to their impact on national policies."

Technology assessment and the effect of technology on our society is a facet of science advising that Dr. David expects to find occupying more of his time. The O.S.T. has only a staff of 25 and an annual budget of roughly $2.2 million. Often, when scientific or technological questions arise, they are answered by awarding contracts with experts in their fields who provide the response. One such contract is with the Mitre Corp. of McLean, Va., a so-called *think tank* that is studying how technology can be assessed and how its effect on society can be predicted.

## Different matter today

Fifty years ago, science and technology were not advanced enough to judge the impact of automobile exhaust on the atmosphere or the use of rivers as sewers. It is a different matter today, for the effects of the SST on the atmosphere or the encroachment of man into the Florida Everglades are determinable factors. Because of this, there have been suggestions to expand Dr. David's function and scope.

As an engineer, Dr. David knows well the impact of technology and the possible effects on ecology. In one of his first speeches after coming to Washington, he dealt with the problem before the Industrial Research Institute when he asked such questions as, "Who would assess the assessors?" "What should be the generic results of assessments?" "What is the difference between assessments as proposed today and the usual marketing study and decision-making process of the past?"

"My own prejudice leads me to believe that one output of assessments ought to be the identification of crucial data and information, and the design of selective economical experiments to obtain these critical items," he said. He concluded: "It's very clear that if we're to successfully continue industrial and technological progress in this country, we must develop a technique for assuring the public that its concerns are being duly considered."

Of technology, Dr. David said: "I don't think technology is going to overwhelm us as a nation. The American people have always been able to manage their affairs well. Technology should be used for what it's good for, not only for improving the standard of living, but also the quality of living." ▢

# Necessity and Bell— Mothers of Invention

The January/February issue of this magazine carried a story, From Concept Into Service, dealing with traditional Bell System emphasis on R&D, built-in service motivations, the unique organization of the business and other special qualities responsible for continuing Bell System technological achievements through the years. This is the second section of the two-part feature. Having reviewed the central reasons for Bell's technological leadership, BTM now looks at the events and inventions themselves. Alexander Graham Bell, whose fertile innovative mind spawned new ideas in areas ranging from aerodynamics to the breeding of sheep, urged his followers to "leave the beaten track occasionally and dive into the woods. You will be certain," he said, "to find something you have never seen before." The following pages provide a sampling of things seen for the first time by the scientists and engineers of the Bell System—of developments that have been of enormous benefit to telephone users as well as to the world at large.

## Fusing Sound and Pictures

In the early 1920's, when the Bell System was developing a means of sending still photographs over telephone wires to newspaper offices, some imaginative scientists and engineers saw the possibility of devising a method whereby they could transmit sound along with pictures and, in addition, accommodate motion. They spoke of this as "television." The first public demonstration of the medium came in 1927 when Herbert Hoover, then Secretary of Commerce, spoke from Washington and his voice and picture were received over wire at Bell Laboratories in New York. On the same day another TV program was broadcast, over the air, to New York from the Labs' facilities in Whippany, N.J.

Commenting on the new development, AT&T President Walter S. Gifford said: "It is our constant aim to furnish this country with the most complete telephone service possible. In connection with that aim, we endeavor to develop all forms of communication that might be supplemental to the telephone. With that in view, we shall continue to work on television, which although not directly a part of telephone communication, is closely allied to it."

In the years since, television technology, with the aid of many contributions from Bell Laboratories, has not only created a vast new industry, but has advanced to the point where an individualized, person-to-person service is practical; Picturephone® service enables the telephone user to "see while he talks." This goes far beyond broadcast television, for it places a compact TV studio, camera and all, in the home or office. The first field trial of the system took place early in the year 1969 between Westinghouse Electric Corporation offices in New York and Pittsburgh. Since then, Picturephone service has become available to the public on a limited basis. Among its newest users are key White House aides of President Richard M. Nixon. Successful trials in industry and government suggest that the service will become commercially attractive on a widespread basis in this decade.

## Radio Astronomy

In 1928 a young physicist, Karl Jansky, was asked to resolve a problem that was perplexing his Bell Labs associates: the problem created by a peculiar kind of "noise" that was disrupting the recently-opened transatlantic radiotelephone service.

By 1932, Jansky had established, with the aid of the Labs' sensitive new transoceanic radio receivers and a large rotatable antenna, that most of the noise was caused by lightning flashes, some from as far away as the opposite side of the globe. Some, but not all. He also detected a steady hissing whenever his antenna was pointed at one particular section of the sky — a section that moved synchronously with the shifting canopy of stars.

And so it was that Jansky had discovered radio astronomy.

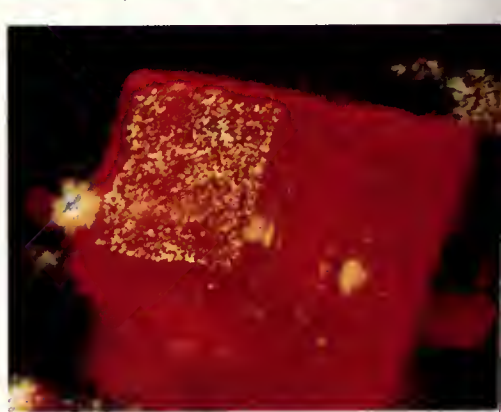
Bell System contributions to radio astronomy have continued to be important. In 1965 Bell researchers, using an antenna mounted on a hilltop in Holmdel, N.J., detected what appeared to be radiation remnants of an explosion that gave birth to the universe. Such a primordial explosion is embodied in the so-called "big bang" theory, which seeks to explain the observation that virtually all distant galaxies are flying away from the earth. Their motion implies that they all originated at a single point some

Integrated circuits

Picturephone® service

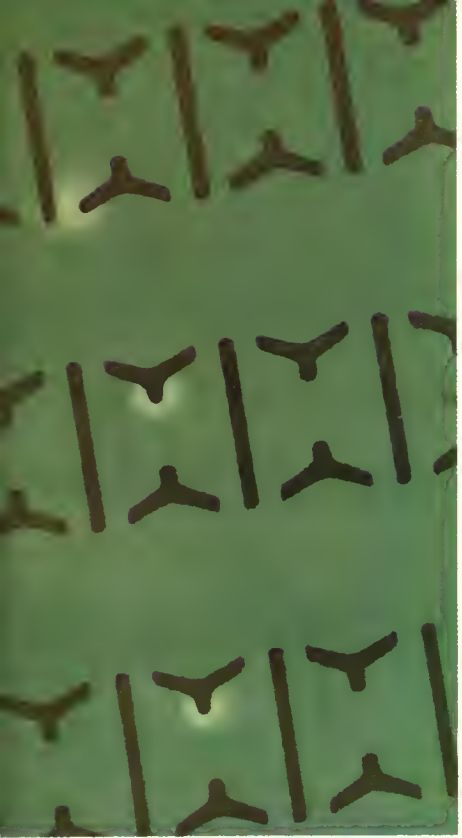
Diode memory cells

Dye laser



Gallium phosphide

Magnetic bubb



tic bubbles in garnet

Telstar communications satellite

Dr. Harold S. Black: negative feedback

ockley, Bardeen and Brattain: transistor

Waveguide

Radio astronomy

Crystal converts laser beam

10 or 15 billion years ago. The Bell observations were of radio waves that appear to be flying in all directions through the universe. Since radio waves and light waves are identical, except for their wavelength, these are thought to be the remains of light waves from the primordial flash.

## On the Nature of Matter

In 1927, as part of Bell Laboratories' effort to clarify the interaction of electrons and solids (which, hopefully, would enable the System to develop improved vacuum tubes), Clinton J. Davisson and Lester H. Germer conducted an experiment that was to add hugely to man's knowledge of nature.

The two scientists directed a stream of electrons at a thin slice of nickel crystal and determined how they bounced off. When the puzzling results were analyzed, it was clear that the electrons did not ricochet off the crystal like the small, hard balls they were supposed to be. Instead they rebounded in the form of waves. Thus a fundamental concept of quantum mechanics was given experimental verification.

Davisson shared the 1937 Nobel Prize in physics with George P. Thomson of England. Their experiments had convincingly proved the wave nature of matter on which the whole structure of quantum mechanics now rests.

## Negative Feedback

In the late 1920's one of the major problems confronting the Bell System was that of overcoming the distortion that vacuum-tube amplifiers produced in telephone signals. While ordinary radio work required only a single amplifier and the distortion could be held to acceptable levels, the extraordinary challenge to telephony

was to design improved amplifiers for boosting voice signals every few miles along continent-spanning wires and cable. The cumulative effect of even small distortions was intolerable.

The answer came in 1927, when the Labs' Harold S. Black, standing on the deck of a Hudson River ferryboat, conceived the basic idea of negative feedback — a means of subtracting a part of the amplifier's output and feeding it back to its input, thereby canceling the distortion. Black wrote on his newspaper an equation proving that this would reduce distortion by a hundredfold or more, and yield an equal improvement in amplifier stability.

In addition to its impact on telecommunications, Black's discovery provided one of the principles on which electronic control systems, such as those used for missile guidance and aircraft control, are based. The negative-feedback amplifier also has contributed greatly to the large "hi-fi" and stereo businesses. In the view of many scientists, the device ranks with the audion vacuum tube and the transistor as one of the three inventions of broadest scope and significance in electronics and communications of the past half century.

### The Transistor Effect

Shortly before World War II, Bell Laboratories, recognizing the need to supplement vacuum tube electronics in the rapidly-growing communications spectrum, built up a team of physicists to explore the behavior of electrons in solids — the so-called "solid state." Headed by William Shockley, the group concentrated its attention on silicon and germanium, curious elements that are only fair conductors of electricity.

Early efforts, aimed at building amplifiers out of these semiconductors, were unsuccessful. But in the late 1940's, John Bardeen, a young physicist who had only recently joined the team, proposed a new theory about the behavior of electrons that seemed to explain the initial failures. In the course of testing the theory, Walter H. Brattain made observations that enabled him, with Bardeen's assistance, to devise what is called the point-contact transistor — an amplifier that worked differently from those originally envisioned. Almost concurrently, Shockley conceived still another variation, called the junction transistor. It was upon the latter version that most subsequent development effort would be concentrated.

The three Bell scientists shared the Nobel Prize for their discoveries, in 1956. Their work had ushered in a new electronic era — and created a whole new industry in which thousands of firms are now engaged.

### Information Theory

By the late 1940's, the Bell System had spent several hundred man-centuries on research and billions of dollars on equipment to handle information expeditiously. But since there existed no means for measuring information or the capacity of communications channels, it could not calculate the efficiency of its handling methods.

The solution came in 1948, when Bell mathematician Claude E. Shannon published a paper called "A Mathematical Theory of Communication." Shannon had conceived a simple formula for calculating the information "bits" in any message. The formula also told how to compute the capacity of any information channel in terms of bits per second.

As further elaborated, Shannon's ideas were to have a profound impact in the fields of signal transmission, message coding and switching. In transmission, for example, information theory (along with the transistor) contributed to the widespread, practical application of Pulse Code Modulation — a technique that is more effective in overcoming noise than either AM, the ordinary radio signal, or FM. The first successful commercial system to employ the technique (T-1 Carrier) was introduced by Bell in 1962.

### Microwave Transmission

Research that would lead to the development of microwave systems began in the 1920's when Western Electric and Bell Laboratories undertook fundamental studies into the use of higher radio frequencies. By 1940, the System had spent some $46 million on these and related studies, and it was clear that microwave offered exciting potentials. The work of Bell Laboratories' George C. Southworth (in the development of the waveguide, the interior "plumbing" of microwave systems) greatly advanced the practical applications of microwave transmission.

Plans were established in 1940 for the construction of nationwide facilities for the transmission of both telephone calls and commercial television broadcasting, which was felt to be imminent. Before interrupted by the military needs of World War II, AT&T put into operation the first system which enabled many messages to travel the same radio channel, and executed preliminary plans for a single link microwave system.

Anticipation of postwar television demands led, in 1944, to the announcement of plans for an experimental microwave system between New York and Boston. When it went into service in November 1947, it was the first system capable of handling

both voice signals and video. Today, microwave radio relay systems carry about two-thirds of the nation's long distance telephone traffic and nearly all television network programming.

## Communications Satellites

In 1955, Dr. John R. Pierce of Bell Telephone Laboratories made the first engineering study of what would have to be done to build a working satellite communications system — assuming it would one day become possible to put satellites into orbit. In a technical paper delivered at Princeton University, Dr. Pierce envisioned two methods for communicating via satellites: by reflecting microwave radio signals off mirror-like "passive" satellites; or by transmitting to "active" satellites — performing microwave relay towers in the sky — which would catch and amplify the signals before returning them to earth.

In 1959, the feasibility of space communications was demonstrated when live voice transmission was accomplished from Bell Telephone Laboratories in Holmdel, New Jersey, to the Jet Propulsion Laboratories in Goldstone, California, using the moon as a reflector. The following year, Echo I, a 10-story high reflecting balloon satellite, was launched into orbit by the National Aeronautics and Space Administration (NASA) and the practicality of a man-made communications satellite was established. Voice and still photographs were "bounced" off the satellite in tests participated in by the Bell Labs' Holmdel station and the Jet Propulsion Laboratories on the West Coast.

Encouraged by the success of Echo I, scientists at Bell Laboratories moved ahead on the development of an active communications satellite. Less than two years later, the Bell System's Telstar® satellite was launched, with immediate and dramatic results. The world's first active communications satellite (and the first satellite built and paid for by private industry), Telstar made communications history on July 10, 1962, when Bell Laboratories engineers used it to relay voice communications and live television across the Atlantic within hours after it was put into orbit. In the weeks following the launch, over 300 technical tests and measurements of every phase of transmission were conducted with the satellite. More than 400 demonstrations, including multichannel telephone, telegraph, data, telephoto, television and facsimile transmissions also were made.

A second Telstar satellite was orbited on May 7, 1963. Telstar II's larger orbit permitted the first live television from Japan. During the next two years, Telstar II was used for various communications experiments plus the transmission of special television programs such as the funerals of President Kennedy and Sir Winston Churchill.

Satellite communications in all probability would not be a reality today if it were not for a number of key inventions and developments of Bell Laboratories. These include: the negative feedback amplifier (1927); the FM feedback receiver (1933); the horn reflector antenna (1939); the traveling wave tube (1945); the transistor (1948); the solar battery (1954) and the solid-state maser (1957).

## Data Communication

Although the Bell System is not in the business of providing data processing services, its researchers have played a key role in the development of this expanding industry. The common control switching systems introduced in big cities some 40 years ago were the first exemplars of real-time data processing, and the very first electrically operated digital computers were built 30 years ago at Bell Laboratories. All modern computers are born of the solid-state technology developed at the Labs in the late 1940's, and the whole concept of computers and other machines in data network has been conceived, designed and promoted primarily through Bell System initiatives. Today, the nationwide Bell Telephone network is providing data communications services in ever-increasing variety. (See Nov/Dec 1970 *Bell Telephone Magazine*).

## Laser Technology

Hundreds of scientists are exploring the awesome potentialities of the intense, pure light beams of the laser. The laser provides an entirely new form of energy, and many of its ultimate applications can only be guessed at today.

Scientists are certain, however, that continuing research into laser applications will uncover myriad uses. Already, several types of lasers are being utilized in such areas as scientific research, medicine, space exploration and the manufacture of communications products.

Experiments with the microwave portion of the electromagnetic spectrum led to the discovery in 1951 that microwaves could be amplified in a coherent, or "in phase," wave process. The inventor, Charles H. Townes, a professor at Columbia University and consultant to Bell Laboratories, called his discovery a maser (for microwave amplification by stimulated emission of radiation).

Shortly after, the Laboratories' interest in the maser's communications potential led to development of the first of the devices to use solid-state

amplifying material. These were the masers later employed to amplify signals from the Echo and Telstar satellites, and for study of astronomy.

The first paper on the amplification of coherent light waves (laser) was published in 1958 by Townes and Bell scientist, Arthur Shawlow. Two years later, scientists at Bell Laboratories invented the first continuous-wave laser and were able to transmit a telephone call over its pure and steady beam.

Extensive efforts are continuing at Bell Laboratories to find practical communications applications for the laser beam. Ultimately, the laser may be employed to transmit telephone calls, data messages and television. While a number of technical and economic problems remain to be solved, the potential is there to provide a variety of new services and to open a new band of frequencies.

### Integrated Circuitry

Radar, radio, television, computers, switching and transmission systems, and scores of other products today employ tiny devices known as integrated circuits. Packing 10 to 20 transistors and 40 to 60 resistors into the space of a tenth of an inch square, they provide cost, size and weight advantages that were once unattainable.

The new technologies developed largely out of Bell System studies in the field of microelectronics; and their widespread applications have been greatly accelerated by Western Electric/Bell Laboratories achievements in the use of "thin film" processes.

Several years ago, experiments conducted at Bell Labs suggested that integrated circuits could be produced economically and in large quantities. It was clear, however, that extensive development work would be necessary to make this practical and economical, and that altogether new manufacturing techniques would have to be devised by Western Electric.

Risking substantial amounts of capital, the Labs and Western Electric launched an investigatory program aimed at determining whether the problems could be overcome.

As a result of this collaborative effort, Bell Labs was able to demonstrate the great potentialities of silicon and thin film circuitries, and Western Electric's Engineering Research Center developed the necessary manufacturing processes.

Produced by the millions each year, integrated circuits are today playing an increasingly important role in communications progress.

### Electronic Switching

Bell System advances in solid-state physics, information theory, computer programming and a number of other fields led to the rapid development of electronic switching systems (ESS), which are being introduced at an accelerating pace.

Simply stated, ESS is a system that enables telephone central offices to switch calls electronically instead of electromechanically, using a concept called stored program control. This is the ability to contain in magnetic memory the millions of bits of information that are needed to provide services, process calls and help maintain the equipment automatically. Its development grew out of the Bell System's recognition that the country's need for faster, more abundant communications — in words, in data, in pictures, in symbols — would require a more efficient, more versatile switching system than electromechanical devices would permit.

ESS offers many advantages, including exceptional reliability and reduced maintenance costs. Also, its electronic "memory" features offer further opportunities to provide individualized customer services.

The first successful trial of electronic switching took place in Morris, Illinois, between 1960 and 1962. Three years later, the first commercial electronic central office opened in Succasunna, New Jersey.

The success of the Succasunna experience encouraged the Bell System to embark upon the largest, most complex project ever undertaken by a private industry — that of completely updating the nationwide electromechanical switching network with newer electronic systems. This is being accomplished at an ever faster pace.

Last year, for example, 58 electronic offices were added to the nationwide network, bringing the total number in service at the end of 1970 to 128. Another 108 electronic offices will be introduced this year, bringing the total to 236 by the end of 1971. The pace will mount even more rapidly in the next few years.

### Magnetic Bubbles

Locally magnetized areas that can move about in thin plates of magnetic material, magnetic bubbles are the basis of an exciting new technology announced within the last two years and presently under intense exploration at Bell Labs. Scientists there have long sought new technology to make possible low cost, low power, all-digital data processing and switching. In present computer and communication technology, connections between electronic components are a major factor in costs. In the new technology, bubbles can be created, erased, and moved anywhere in thin sheets of magnetic material without interconnection. They may interact with one

another in a controlled fashion, and their presence or absence can be detected. Therefore, devices employing the new technology may be made to perform a variety of functions — logic, memory, switching, counting — all within one solid magnetic material. The minute magnetic bubbles promise to provide compact and inexpensive data storage and processing for tomorrow's computers and telephone switching systems.

### Service for the Future was Focus of Bell Labs in 1970

Major developments aimed at expanding tomorrow's communications services highlighted the activities of Bell Laboratories in 1970. The new technology will help provide for growth in telephone, data, television and Picturephone service in the future.

Among 1970 developments was the announcement of a transmission system that will use a buried pipe to carry a quarter of a million simultaneous telephone conversations or more than 2,400 Picturephone signals. The signals will be carried through the hollow pipe, known as a waveguide, by short *millimeter* radio waves. Scheduled for a 1974 field trial in New Jersey, the system will probably go into commercial service in the late 1970's.

The first of a new type of electronic switching system, known as No. 2 ESS, was introduced in Illinois in 1970. Designed for use in rural and suburban areas, the system will provide versatile telephone service to many Bell System subscribers. No. 2 ESS makes new services available to medium size central offices handling 1,000 to 10,000 lines.

During the summer, Bell Labs scientists announced a major advance in laser technology—a new laser, smaller than a grain of sand, that can be powered by ordinary dry cell batteries. The tiny laser is a rugged, reliable and low cost semiconductor device that operates continuously at normal room temperature — the temperature at which typical communications systems function today.

A communications system using laser light offers the prospect of carrying telephone calls, data messages, television and Picturephone signals simultaneously in bundles perhaps 10,000 times larger than now possible with microwaves.

Another advance in long distance transmission is a new coaxial cable system which eventually can carry 90,000 phone calls simultaneously. It is being tested by Bell Laboratories and the Long Lines department of AT&T in a field trial which began during the summer of 1970. The new system, called L5, will be able to carry two and one-half times as many long distance phone calls as the largest present coaxial system. The L5 system was developed by engineers at the Merrimack Valley Laboratory of Bell Labs in North Andover, Mass., and is scheduled to go into commercial service in late 1973. Operating at full capacity, the system will cost about $1.45 per circuit mile, compared to $3.15 for the present system.

### Helping the Operator

An electronic switching system developed by Bell Labs to help long distance operators provide faster and more personal service to telephone subscribers was placed in operation at 13 locations across the country during 1970. The system, called Traffic Service Position System (TSPS), handles various routine details, freeing operators to devote most of their time to customers. It was cut into service at Cincinnati, Ohio; New Orleans, La.; Philadelphia, Pa.; Bloomington, Ind.; Memphis, Tenn.; Framingham, Mass.; Washington, D.C.; Rochelle Park and Morristown, N.J.; Dallas and Houston, Texas and Jacksonville and Miami, Fla.

Looking to the future, Bell Labs is working on a simple new semiconductor memory cell that may someday process information for telephone calls up to 20 times faster than existing equipment. The tiny electronic memory cell could help telephone companies to handle many more calls per hour than is now possible.

Lamps that can emit light continuously for about 10 years are being developed at Bell Labs. They will be used as indicator lights in future telephones and switchboards. Made of synthetically grown gallium phosphide crystal, the lamps are expected to be more reliable, efficient and economical than incandescent lamps now in use.

### Anticipate the Public's Needs

There are hundreds of other facets of Bell System innovation — in operating methods, in personnel development and motivation, in the pricing and marketing of new products and services, in quality control techniques, in new programs to help meet today's urban problems. The System works to stay alert to the forces of change.

It is essential that industry sense changing public needs and wants, and introduce new products and services to meet them. Bell Laboratories' drive to excel in the applications of science and technology derives from an early recognition that the ability to serve the public well depends upon the constant pursuit of invention and innovation on a broad scale. And strong, sound, continuous technical progress depends on the overall life-style of the organization and the mutuality of understanding among people working toward common goals. ▢

# The Third Revolution in Work

**by Robert N. Ford**

The "father" of the Work Itself effort in the Bell System comments on the lead story in the last issue of *Bell Telephone Magazine* and offers some personal thoughts about the promise of his Big Idea.

Our first serious study of Work Itself in the mid-60's started as a result of good-natured bantering. A good friend of mine, who was also a boss, repeatedly charged us in College Employment with hiring the wrong kind of graduate, the kind who quits in six months. To get him off my back, I countered: "You don't deserve the people you get. They're too good for that job." When he picked himself up off the floor, we started plotting a way to improve the job in question rather than elect the alternative—to hire poorer graduates.

After six months of hard work and a lot of help from some bright supervisors, we found that turnover could be remarkably reduced. Then productivity got better, customers started saying nice things about the operation. We felt we had isolated the catalyst: The important factor in work motivation was the work, itself! Enrich the job. Don't hope to offset a poor job solely through such maintenance factors as benefits, friendly relations and comfortable surroundings. The core item is the job.

In job enrichment, we get the family of supervisors to figure out what specific steps they could safely take toward turning a job over to a competent employee, even if it's risky. One person at a time. That's not too dangerous. Job enrichment focuses on privileges and responsibilities in doing a piece of work.

The Work Itself tent is getting crowded with well-meaning people who claim they have followed this theory of work motivation all along. But when you pursue them as to the job freedoms they give, you'll find many cannot distinguish consistently between the maintenance factors surrounding a job and the work, itself. Some parts of the concept, of course, are not easy to administer. For example, a major magazine recently captioned a picture of 20 operators at one of our switchboards thusly: "Some white collar work is as restrictive as an assembly line. Pacific Telephone's answer is rapid promotion up from operator." This Work Itself effort is, indeed, successful, and as a final step the management team does funnel its best operators into the service representative's job. But if the objective is to enrich a given job, then I'm afraid we concede defeat on that job if we recommend transferring people out of it rapidly.

Let me show, through illustrations from the article in the last issue of this magazine, a few other potential pitfalls. Many of those interviewed stressed that *trust* is the heart of this Work Itself effort. That's not quite right. The trust, the mutual confidence that arises in the work groups, is a result of enriching the jobs that employees have. Trust is not the cause of improved jobs. In my Bell System experience, the search for mutual trust as a precondition for improving rank-and-file performance has not paid off. The reverse approach has: Improve jobs so that performance improves, and you'll get employee trust and confidence.

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*Dr. Ford is personnel director for manpower utilization at AT&T. He received his Ph.D. from the University of Pittsburgh and taught sociology at Vanderbilt. After working on various personnel research projects for the federal government and private industry, he joined the Bell System in 1947. He resides in Chatham, N.J.*

If one permits some hundred-year comparisons, here's a view worth considering:

1770—*The Industrial Revolution*—Work leaves the cottager's home, to be performed in factories by the uprooted cottagers, tending power tools. Towns and cities grow.

1870—*The Scientific Managment Revolution*—Many engineers, notably Frederick W. Taylor and his followers, lay out work after making detailed time and motion studies. Task fragmentation and production lines lead to great productivity. By 1950, economists are attributing virtually all current growth in productivity to inventions and automation: None to the improved utilization of humans.

1970—*Manpower Utilization Revolution*—Principally through job *enrichment,* the releasing of employees to perform meaningful modules of work, significant contributions in productivity from the personnel component start to reappear. Job *enlargement,* a slightly earlier idea, contributes insofar as it makes possible the combining of tasks into a meaningful whole, not because of variety. The enlargers were banking on variety. And a third approach, job *rotation,* is now known to add virtually nothing to increases in human productivity.

There is no doubt the Bell System is the leader in this new revolution. This Third Revolution is grounded in the behavioral sciences, and my impression over 23 years is that this business in particular is beginning to tolerate human scientists. They are not yet admired, as are Bell Labs scientists, but that will come. The problem of scientifically understanding human work motivation is not a whit less complex than landing a man on the moon.

Some of us believe right now that we can predict certain work flows and job modules that will cause employees to stay with us and other variations that will drive them out the door. A trial of the idea in one department is under consideration and is encountering emotional opposition. The introduction of a radically new neoprene drop wire must surely be easier—a wire, say, with the insulation on the inside and the conductor on the outside. I'll bet Bell System managers would easily try such an innovation if the Labs said so. But Work Itself?

The need to know that human performance can be vastly improved is urgent. The need is urgent because many managers do not realize the turnover situation continues to deteriorate. Even the current economic recession has not stopped it.

We should determine to use as much of the new employee's ability as we can, not merely a fragment. Continued growth in sophistication here will keep us leaders in the manpower utilization revolution, just as Bell Laboratories has kept us well ahead on the hard science side.

We are learning three things: The best entry point for enriching jobs may be the first-line supervisor's job, thence to the craft-level job. A job enrichment effort is much stronger if district and division level supervisors act as their own key men, if they are responsible for their own followup work. Finally, we know that Work Itself is a waste of time if it is viewed as just a management training program.

Many managers in the movement say, as reported in the last *Bell Telephone Magazine:* "If we went back to the old way of managing, I'd probably have to ask for a transfer. I couldn't take that turmoil and the force losses, which I know would return. . . ." This kind of reaction occurs repeatedly.

Do we mean to imply that the Work Itself approach got all that gain? Much as I'd like to say *yes,* I'll say *no.* The truth is that Work Itself set the stage for cleaning up problems other than the work, itself. The concept deliberately capitalizes on the best we know in managing people, not only in the laying out of work.

The Work Itself approach is a reasonably successful way to start some needed change in managerial practice, to bring into being a way of life-at-work that appeals to modern, intelligent young people. Paraphrasing John Gardner, I'd say: Accomplishing this change is work for the tough-minded and the competent. Each of us has a share. Responsibility begins with us in management. It mustn't end with us. ▢

# HOT LINES TO HELP

**by Ivan Doig**

Back when men were starting to send words through spans of wire, Henry David Thoreau as usual looked closely and foresaw clearly. This gadget called the telegraph might be all right, he conceded in 1854, and perhaps even the giddy plans to web the United States with telegraph lines from Maine to Texas were acceptable. But he asked: "What is it, after all, that Maine and Texas wish to say to each other?"

Thoreau's point is as vital for households replete with telephone, television, intercom and radio as it was for the solitary thinker who shared the stillness of Walden Pond with hawks and shy deer. Our apparatus of communications is incredibly deft. But what *do* we communicate? Is youth's upstairs bedroom really in touch with the parental living room? The ominous cracklings between the urban ghetto and the sleek suburb — who, in either neighborhood, listens hard enough? And do the millions of us who are well-off hear the millions of us who despair?

In scores of communities across the United States, hopeful answers are waiting to be dialed. Groups of concerned citizens are manning the telephone to help anyone who is suicidal, haunted by drugs, fearful, miserable, confused or even just plain dark-gray lonely. Something else Thoreau said flashes to mind: "The mass of men lead lives of quiet desperation." Now many somebodies all across the country can be heard talking by telephone into that dark quiet.

In Buffalo, N.Y., for instance, the phone rings at the Rumor Control Center many times during the day. This time, a caller has heard there are gangs of boys roving near two local high schools. "Will you kindly check on this? We fear for our children."

Besides a small paid staff, the Buffalo Rumor Control Center has more than 100 volunteer workers. One is on duty now, cradling the receiver between ear and shoulder as she jots down the caller's ques-

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*Ivan Doig is a freelance writer who lives in Seattle. He has written for numerous national magazines, including recent assignments for* Parents' *and* McCall's. *He is former assistant editor of* The Rotarian, *and has a Ph.D. in American History.*

tion. Quickly she checks with school authorities and the police. Within a few minutes, she calls the nervous parent: Nothing to the report; simply another troublesome rumor.

In Corpus Christi, Tex., the fretfulness at the other end of the line is more dire. Suicide Prevention, Inc., this around-the-clock answering service is called, and it is harrowing work for the volunteers who take four-hour shifts at the telephone. Dr. George H. Kramer Jr., a clinical psychologist, teaches them what to expect, all right. "But," Dr. Kramer adds, "no matter how much knowledge about human behavior our volunteers have soaked up through our lectures, it almost always is an eye-opening experience when they take that first call."

## Lonely? Call Dial-a-Listener

Loneliness this side of desperation? Davenport, Iowa, fights it with Dial-a-Listener, friendly volunteers whom anyone can telephone and chat with.

In thousands of towns, the voice on the line is trying to escape from alcohol. Since its founding by the late William Griffith Wilson and Dr. Robert H. Smith in December 1935, Alcoholics Anonymous has been a national pioneer in using the telephone to link the desperate with someone who can help.

Telecare is a project of the Rotary Club of Hanford, Calif. Elderly citizens there phone a central number every morning. If anyone on the Telecare list hasn't called in by noon, a neighbor is promptly alerted to check on the person.

In Seattle, Wash., Crisis Clinic is a project of University of Washington students. Drugs, pregnancy, scholastic troubles, emotional tailspins — the campus number is open to all student problems.

Help Line they call it in Little Rock, Ark., and Chattanooga, Tenn.; Hot Line in Los Angeles; Crisis Center in Great Falls, Mont.; Crisis Line in Fairbanks, Alaska. Whatever the name and the needs that called forth new social efforts, these hot lines to help are becoming standard equipment in American communities. It is no tiny social indicator, for instance, to find Rotarians and college students working on similar projects. No less meaningful is the support that businessmen throughout the country are giving.

## 22,000 suicides a year

Lawrence W. Palo, vice president of the First National Bank of Oregon, is treasurer of Portland's Suicide and Personal Crisis Service. A volunteer in public health work for more than a decade and a key figure in establishing this crisis intervention office in 1965, Palo shrugs and explains: "It's one of those things. You take a part in the community's needs. This was a problem far more prevalent than people realize."

Prevalent, indeed. Each year about 120 suicides occur in the Portland metropolitan area.

Nationally, some 22,000 of us commit suicide each year. Untold others are saved, some by services such as those in Portland and Corpus Christi. Dr. Ernest Shneidman, who helped establish the pioneering Los Angeles Suicide Prevention Center in 1958, has put it bluntly: "The first telephone interview often spells the difference between life and death." Realizing the telephone line can become a lifeline, volunteer staffers are manning at least 200 suicide prevention centers in this country according to the federal Center for the Studies of Suicide Prevention.

## Rumor control centers

If suicide is a random fever among us, rumor and drug abuse are national epidemics. At least 19 cities now have rumor control centers, an innovation cited with approval of the National Advisory Commission on Civil Disorders. Raymond E. Jackson, as coordinator of Buffalo's Rumor Control Center, has heard fears born of street disorders and campus disturbances jangle into his office. He declares flatly: "Rumor centers, we are convinced, are important to the well-

being of the populace of any city in the country."

Somewhere in the earliest discussions about setting up a rumor control center will be Edmund B. Raftis. An attorney with Pacific Northwest Bell, Raftis was chairman of the local municipal league's committee on police-community relations when planning for the Seattle Rumor Center began early in 1968. The city had tasted racial disorders the previous summer, and the coming months promised worse. As many civic elements pulled together to get the Rumor Center into operation, Raftis was on hand to explain the steps for incorporation. He still serves on the center's board of trustees.

## PANIC hot line

The drug situation in this country perhaps is summed up in the acronym of a group that has set up a telephone hot line in Newburyport, Mass. — PANIC (Parents Alarmed about Narcotics In our Community).

Drug abuse among teen-agers is searing communities where the phenomenon is nearly as startling as a virus from a far galaxy. In Great Falls, Mont., a telephone Crisis Center was opened in December 1970 to take problem calls of all sorts. Many, it turns out, are about drugs. "We don't have the sophistication to handle the teen-age drug problems," executive board member Orvis Stenson admits. "Sometimes we don't even know the lingo involved in these problems. Now we're trying to utilize teen-agers, perhaps by having one on duty with each regular volunteer to help with calls of this sort."

What is there about hot lines that offers help both to the teen-ager strung out on drugs in Portsmouth, N.H., and to a housewife tense with "cabin fever" in the caging winter of Fairbanks, Alaska?

Dr. Benjamin M. Taylor, director of the psychiatric clinic for students at the University of Washington, has observed the Crisis Clinic on his campus since it was set up as a pilot project for the 1970-71 school year. The first value he sees in telephone services of this sort is that they offer troubled persons some human contact, even if it is a disembodied voice. "There are many persons who, because of various feelings, could not mount an effort to contact someone face-to-face. But they will talk to someone on the phone."

## Handle on the future

Second, Dr. Taylor points out, the telephone contact can provide the caller something to grasp, some handle on the future. "It isn't just saying, 'Well, this isn't my department, and I'll pass you on.' The worker on this service can say to them, 'Well, you can go into this clinic in the morning.' It's one thing to know there's somebody in the Great Out There who's going to help you, but good luck in finding him. It's another thing to people in a difficult situation to know they have a specific place to go at a specific time. That tides a lot of people over a tough period."

In a sense, the voice of American conscience is talking on the telephone these days. By now, our communities have so many people, and our lives so automatically click along narrow patterns within these communities, that we seldom cross in person into each other's concern.

". . . The automobile and the airplane are new wombs for personal withdrawal," Ben Bagdikian wrote in his book *In the Midst of Plenty*. "Private capsules that impel their passengers along predetermined paths of affluence." So are the suburban split-level and the apartment that is a replica of every other apartment in the building. So are the commuter train and the downtown bus.

Nobody rides down the road any more to ask how the missus is feeling and whether he can help with the chores. Capsuled, we go our own ways.

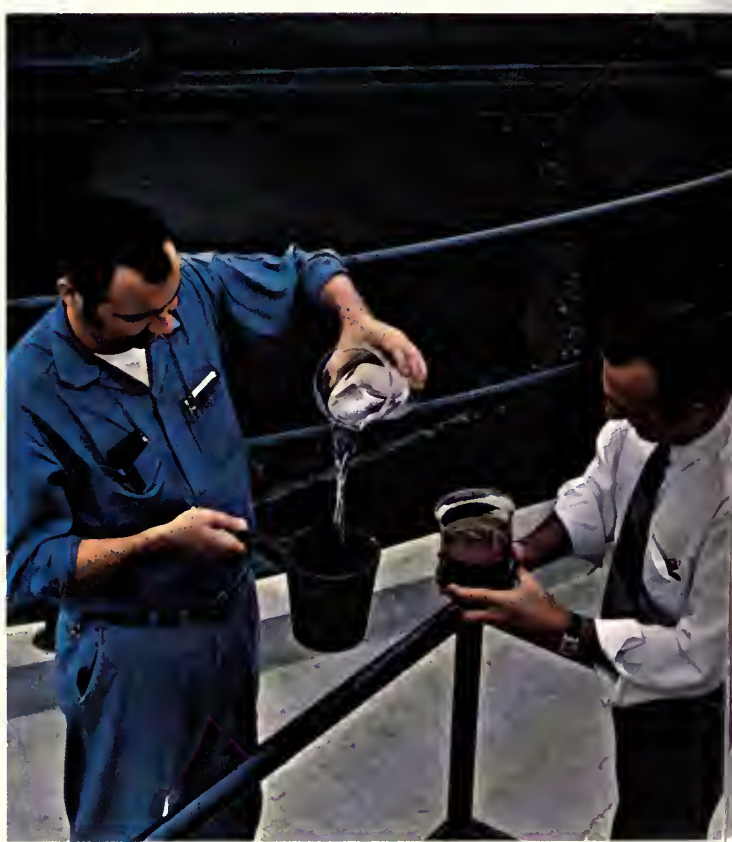
Help-by-telephone, however, is one way we pierce through to each other. The Lawrence Palos, the Edmund Raftises among us know this, and their heft behind these hopeful community projects is paying off — for all of us. ▢

# Backing up A Commitment

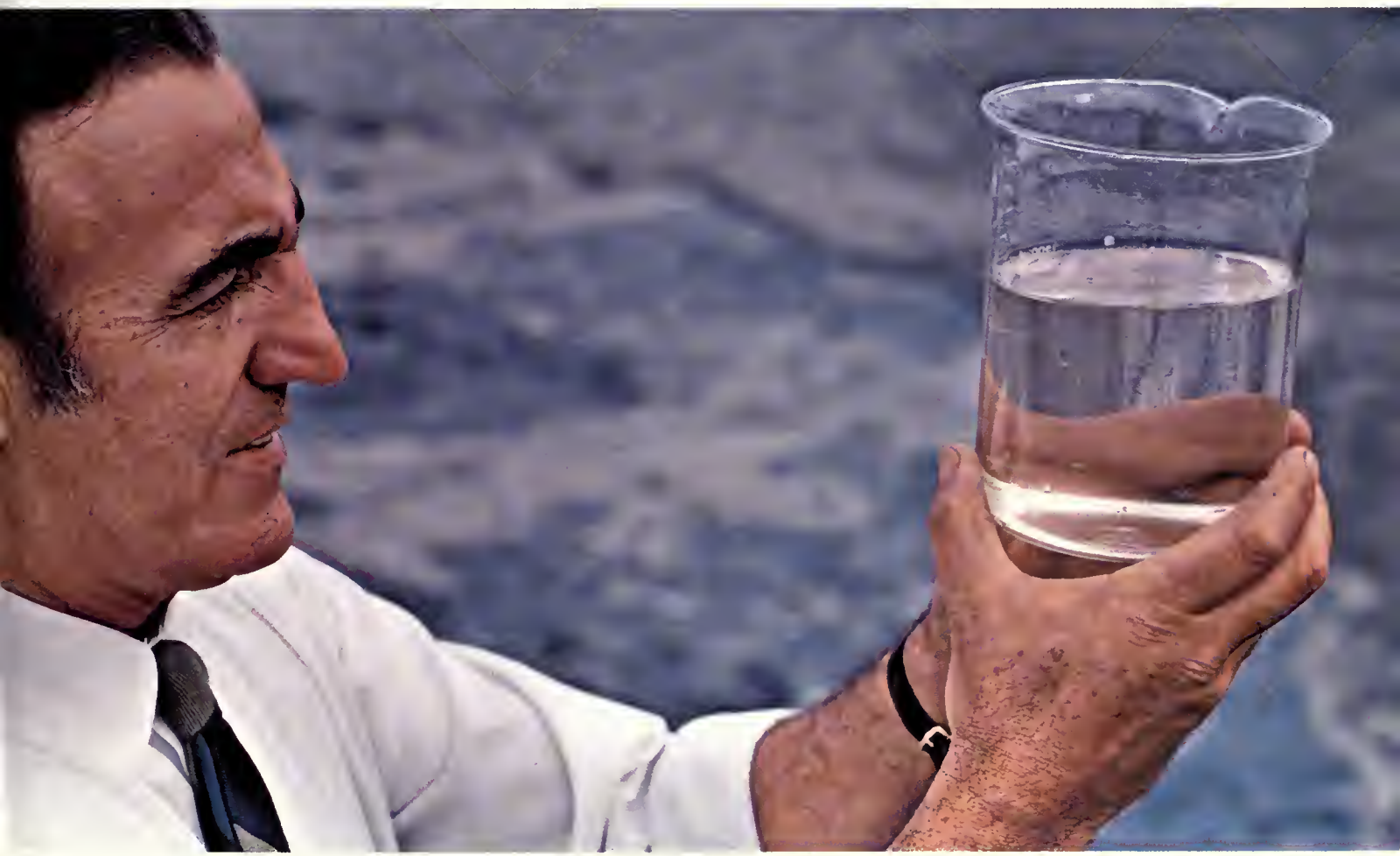
Western Electric, manufacturing arm of the Bell System, was actively concerned with the quality of the environment long before "ecology" and "pollution" became shibboleths on every tongue. While already working to control pollution from individual manufacturing processes, Western reviewed all its plants about five years ago to determine future needs. From this review grew a set of priorities and a schedule: modern waste treatment facilities are designed into all of Western's newer plants, and each of the older locations has completed or is undergoing similar modernizing.

Harvey G. Mehlhouse, WE president, declared recently, "We, as a company, are wholly committed to pure air and water. We have backed up this commitment with expenditures totaling many millions of dollars in the past few years and we will spend millions more in this decade."

Cleaning up the American environment clearly will be a long-term project. Western Electric plans to shoulder its share of the job.



*Above: Sampling exhaust from stacks on Western Electric's Phoenix, A plant determines proper functioning of air pollution control devices, also tifies contaminants in atmosphere itself. Below: Western's Merrimack Works has been cited by State of Massachusetts for maintaining the most gent standards of pure water output from its manufacturing processes.*



*At Western Electric's Shreveport, Louisiana Works, sophisticated chemical techniques – microscopic analysis in the laboratory and most modern waste treatment facilities – insure removal of toxic contaminants and produce water clean enough to drink.*

# A Different Window

This magazine moved its offices at 195 Broadway last month, and in the moving it lost its view. The feeling is that the move was worth it, for in losing its view, the magazine gained a *point* of view. It's not so much a matter of semantics as it is of windows.

From eight stories up on the north side of the AT&T building, BTM staffers looked out over St. Paul's Chapel and churchyard, where Washington and Hamilton worshiped 200 years ago. Past St. Paul's was City Hall Park, where construction workers began their thunderous tread down Broadway less than one year ago. From these windows the staff watched the World baseball champion Mets and the first Moon men take all the ticker tape New Yorkers could unload. On such proud occasions, the editors were not above ripping a copy or two of their product into small pieces and adding them to the festive flutter.

From their corner, BTM people were among the first to feel the thud and spot the flames when a gas pipe burst on Park Row a few months ago, killing a dozen people, including a Western Electric man from Newark who was getting a haircut. The Woolworth Building, Women's Lib, striking teachers, truckers and taxi drivers — the moods and movements of New York and the nation—were there for us to hear and see, outside the windows.

And to write about. What impact the proximity of such contemporary events had on the tone and contents of this journal is hard to say. It would be naive, though, to suggest that ideas generated by happenings outside did not filter in through the windows and appear in this publication.

The *new* windows, however, are several floors lower and on the other side of the building, and offer no such tumultuous social landscape. The most eye-catching scenes outside the new windows are of large signs advertising small loans and a bar. Journalists, of course, have traditionally received sustenance and inspiration from both loans and bars, but this new nonview has its own significant sign of the times for those involved in the move.

The message is that there is much happening here, within the corporate walls, that is exciting, explosive, profound, even revolutionary, and it needs to be recorded. The message admits that headlines are still being made outside the other windows. But it reminds us that the changes, pressures, involvements and achievements of business, and especially of this business, constitute life's true combat zone today. Here, inside these windows, is where the demands and the dreams lie. Here, inside these windows, is where it's happening, and here is where this chronicler is required.

From the other windows you might watch yellow cabs, lights ablaze, massing around City Hall to protest social and work conditions in which a driver had just been murdered while on duty. From these new windows, however, looking as they do into the backside of a building, one turns inward for inspiration. And you know what? Inspiration is there, and in spades.

One begins to think and report on the financial management of this, the world's biggest business, and on the record $7 billion construction budget. One broaches such sensitive subjects as competition, data communications and rate increases. One addresses himself to the stunning accumulation of technological achievements of Bell Labs, innovations that have given root and direction to the whole sweep of engineering and scientific progress in this nation in this century.

One realizes our corporate community now numbers more than one million people with attendant difficulties in communicating among ourselves. One ponders problems in the sheer physical size of our enterprise, of serving our customers, of meeting our commitments and demands on our abilities. And one recognizes that all these things — this specialized organization, this complicated machine, these innovations, these million people — are all dedicated to one end: service.

So the view is gone. But the point of view is back. And that's a satisfying idea, for there are no more absorbing subjects anywhere than the service mission of this enterprise and the million men and women who make it work. Introspection is in order. It is a new day. Such a day demands a different window, and we have one. ☐

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# BELL

telephone magazine



# The Nonyouth Bag

**"Has any man ever attained to inner harmony by pondering the experience of others? Not since the world began! He must pass through the fire."**

*— Norman Douglas, English writer*

A journalistic axiom holds that when a dog bites a man it isn't news, but when a man bites a dog it is. Similarly, when someone over 40 does something significant, the significance lies more in the achievement than in the achiever; but when someone under 40 or, better yet, under 30, pulls off the same feat, the doer is often more ballyhooed than what gets done. It makes sense. Ours, after all, is a youth-centered society. Some say it is a youth-obsessed society. The United States, still less than 200 years old, is a youthful nation among nations. And youths, as everyone knows, have made this country what it is. Haven't they?

Nearly 30 years ago there was an Irving Berlin musical called, *This Is The Army*. After several songs lauding that grand institution, a bunch of sailors took over center stage and sang, ". . . how about an orchid for Secretary Knox . . . how about a cheer for the Navy. . . ." Well, a mounting number of highly able and productive middle-aged people today are starting to feel a little like those sailors. How about a cheer for nonyouth? If youth, in its healthy zeal, is reassessing and revamping society, from big business and big government to monogamy and movies, it is the over-40 set that is keeping things perking and progressing until society gets sufficiently reassessed and revamped. Someone must, for if civilization, with all its flaws, were allowed to simply fall in a crack while awaiting refurbishment, there would be nothing left for youth to improve. Someone must mind the store, produce the goods, stoke the furnace, pay the bills, cure the sick, feed and educate the people — including youths — until youth can regenerate the system.

A retired Bell System gentleman from New Jersey recently expressed his fears in a letter to AT&T Executive Vice President Robert Lilley, that older people in this business seem to be getting short shrift these days. He commended Mr. Lilley, who heads Human Affairs for the Bell System, for his feelings about young people as stated in the January issue of this magazine. But the gentleman cautioned that if ". . . the System does not recognize that attitudes of older employees are of greater importance, it will be making a grave mistake. . . ."

### Promotion from within

In his reply, Mr. Lilley said, ". . . we are re-emphasizing our policy of promotion from within. More importantly, we are taking steps to make sure that this happens. I too feel that we must attend to the needs of our older employees, the backbone of our organization."

Backbone, indeed. And brain and muscles, too. As one digs into the seemingly stolid subject of nonyouth, one is reminded that while youth may seem to merit more news, venerable nonyouth is also in there working, griping, growing, sweating, learning, leading, deciding, sacrificing, creating, helping, pushing and pulling, losing and winning, getting things done. And so it has always been.

Consider the role of nonyouth in this business. When they announced the invention of the transistor in 1948, the Bell Laboratories' William Shockley, John Bardeen and Walter Brattain were 38, 40 and 46, respectively. Not exactly in their harvest years, but they'd long since lost their baby fat. Another in-house example: Among the most demanding jobs in the Bell System, few would disagree, are those of AT&T's officers. The average age of the 22 men who lead the world's largest business enterprise, at the time they reached their present levels, was 51. Their average age today is 56.

### Presidents and politics

The record is similar in the "outside" world. There have been seven men inaugurated as President of the United States while still in their forties. That's news. But the other 29 were in their fifties and sixties on inauguration day. The average age of the 36 men elected President, at time of inauguration, is 54.

Sticking with Presidents and politics for a moment, it is pointed out frequently that most of the 56 original signers of the Declaration of Independence in 1776 were young men. They were. But not by the standards of contemporary youth. To those who trust no one over 30, which is a sort of tribal battle cry among those who are presently and temporarily under 30, only three Declaration signers were young enough to have been considered as possibly trustworthy. One of them was a 29-year-old establishment lawyer, who would have qualified by the skin of his teeth, at best. The average age of those who signed was 44, and several were in their sixties and seventies. Ben Franklin, for instance, was 70. Eleven years later, a slightly younger assembly of 39 men signed the Constitution, but that august body, too, had an impressive percentage of men in their fifties and sixties. Franklin was there again, at 81.

A cursory review of the names most identified *(continued on inside back cover)*

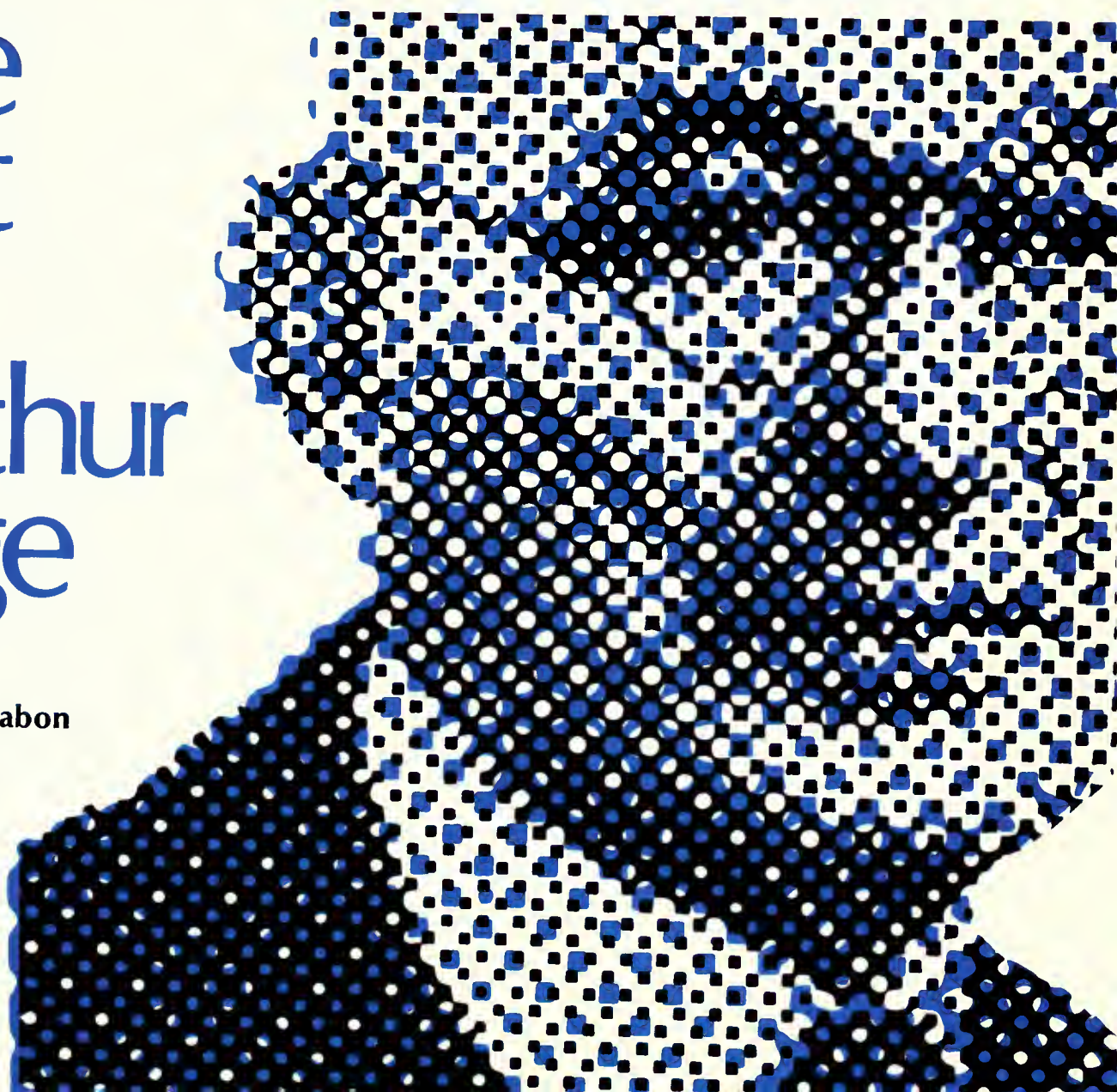
# The Art of Arthur Page

by
**Prescott C. Mabon**

One day in 1946 a vice president of AT&T walked into a meeting of middle-management people to give a little talk. He had left a battered hat in the coatroom; put his pipe, still warm, in his pocket; and now, after being introduced, pulled a manuscript from another pocket as he rose to speak. He made a joke about something or other — I forget just what — and then, in a rather dry conversational tone, with no trace whatever of platform manner, proceeded to say what was on his mind.

The substance of what he said was very simple and in line with the homely title he had scrawled in pencil across the top of his manuscript. The title was "The Measure of the Kind of Folks We Are." For more than five years, he said, as everyone in the room well knew, public demand for communications service had been dammed up because of the war. Materials and manpower to expand the communications system had simply not been available. War needs had had to come first. Now, however, the war was over and the heat was on the telephone companies to catch up with public needs just as fast as was humanly possible.

People depended on us, people needed us, Arthur



Page said. What were we going to do about it? Page in effect was making a plea. But — and here is why I am starting this note about him with this particular recollection — his essential approach to the managers and engineers he was talking to was not that the telephone company would get into trouble if we didn't do a supremely good job. It was not that we had a great business opportunity, although he certainly knew that too and did not underestimate it. No. The essential line of his comment and appeal was just what his homely penciled title suggested: What kind of people were we, anyway? What was our *character*?

This insistence on character, in my opinion, lay at the heart of Arthur Page's success. He had skills too, of course, and I shall come to those later. Yet this was the foundation. He was never pious or moralistic about it. There was nothing didactic or preachy in anything he said or wrote. But the plain thought that good public relations depends on performance, and that performance is an expression of character, was central in his mind and life.

## "Instant" vice president

Page was vice president in charge of public relations for American Telephone & Telegraph Company for 20 years, starting in 1927. He was in fact the first person to hold that title and responsibility. Publicity and advertising matters had previously been assigned elsewhere, and the broad public relations function had rested in the top group headed by the president.

A North Carolinian by birth, son of Walter Hines Page, who was ambassador to England before and during the First World War, Arthur Page came suddenly from an editorial career (with Doubleday Page) to AT&T at the invitation of Walter S. Gifford, who had become president of the company a couple of years earlier. He was, therefore, an "instant" vice president who not only made good, so to say, in the Bell System, which was — and still is — full of reasonably hard-boiled, line-organization people who have to be shown that public relations pays off, but also, within

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*Prescott C. Mabon served as assistant to several chief executive officers of the American Telephone & Telegraph Company and retired from the business in 1969 as vice president-administration. A graduate of Harvard, he lives in Madison, Connecticut, and serves as information consultant with the United Nations Development Programme.* 

a few short years, he won wide reputation as one of the very limited number of real wise men in the still vaguely bounded practice of public relations.

## Prosperity followed by crash

What was the range of Page's talent? Before I give my own answer to the question, it may be well to indicate at least something of the range of the problems that he and his colleagues faced. Page's term as AT&T's chief guru in relation to the public began with a couple of years of prosperity, followed by crash, followed by depression, followed—and accompanied —by an ex parte investigation of the company by the then newly constituted and crusading Federal Communications Commission, which did not even allow AT&T lawyers to question the commission's investigators. These events in turn were followed by war, followed by the first year or more of breakneck effort to catch up with the public's pent-up, unfilled demands for communications service. Yet all through this roller coaster ride, AT&T and its associated Bell System companies had reasonably good success in maintaining public respect and understanding for their efforts. And to this result, it seems to me, Arthur Page made several significant contributions.

First and foremost, he really rubbed it in *within the organization* that all business, including the telephone business, begins with the public's permission and can proceed only with the public's approval. The operative part of that sentence, by the way, says almost word for word what Page, himself, used to say over and over again in his own talks and writings. The thought of course (like most of Page's thoughts) is simple enough. What is far from simple, however, is getting it over to management with persuasive force. This Page was able to do with patience, humor and a quiet, steady flow of his own particular brand of homespun good sense. He knew it was essential for everyone in the top councils of the business to get a firm grasp of the main idea, and he worked all the time to keep the idea fresh in everyone's mind.

The second point I would emphasize is closely related. Most people know that the Bell System is not only a company but a group of companies, with AT&T at the head. Responsibility for service to the public is diffused through some 25 regional organizations, each with its own officers and directors. In most instances (as with AT&T) back in the 1920's, there was a publicity and advertising manager — sometimes called an "information" manager — but generally this assignment was not one of the top jobs, and the broad public relations responsibility really belonged to the president, who might or might not have the feel for it that the situation required.

Through the years, after Arthur Page came to work, this situation changed. With his advice and encouragement, and above all through the power of his example and tutelage, the regional operating telephone companies one by one staffed the public relations job with people of officer caliber, put them in the top management, and gave them the authority their responsibilities deserved.

So we have now, first, the basic concept being advanced persuasively within the top councils of the business by Page, himself; and second, thanks largely to Page, we have public relations officers where they need to be. What next?

## "Giving hostages to performance"

The third source of Page's strength, in my view, was his insistence on public commitment. What would the business commit itself to do? What would it say that would obligate and bind it to action along certain specific lines? This of course is a matter of stating goals — but the question is, what kind of goals are they going to be? One can state objectives in all sorts of mushy ways — in terms of hopes or fond expectations, or conglomerate-wise perhaps, in hand-rubbing terms of more and more and more. Page's notion of goal setting, however, was different. To use some of his own words, he thought of making policy commitments as "giving hostages to performance."

And here I am reminded that less than a year from the time when Arthur Page became public relations vice president of AT&T, Walter Gifford, the president, made a speech before the National Association of Railroad and Utilities Commissioners in which he defined AT&T policy and objectives in absolute terms. The purpose of the company, he said, would be to render the best possible service at the least possible cost consistent with financial safety. That sounds a bit pious and general, but the full text delineated the obligations and goals of AT&T quite specifically, and the speech became, in fact, a landmark in Bell System history. As to the exact extent of Page's influence here, I can only give my own surmise, which is that it was considerable.*

## Not mere hot air

Commitment via the enunciation of policy may be said to be a matter of strategy. But in addition to this, Page made impressive contributions to the tactics of public relations.

For example, when one affirms (as he did) that public relations is 90 per cent doing and only 10 per cent talking, the very affirmation strengthens the confidence of budget-minded management that the talking will not be mere hot air. At the same time, Page could successfully insist that the talking *was* essential and must not be dispensed with. But it would have to be skillful, he had no doubt. After all, as he pointed out, on any rainy morning the average citizen is more interested in where he put his rubbers than in how the Bell System is getting along. So his attention would have to be wooed to be won.

Equally important, Page set great store on listening and learning. Specifically, his encouragement of the development and use of opinion survey techniques by AT&T in the 1930's helped make the company a leader in the field. This activity had its beginnings in an effort to find out what impact public awareness of various aspects of the Bell System had on public opinion. If people knew, for instance, something about Bell Telephone Laboratories research and development success, would this have any measurable effect on their over-all attitude to the Bell System? And in related terms, would time and effort and a little money spent on programs to let people know something about the System's technical achievements be well spent?** Page wanted to know, and with the help of Arthur Richardson, C. Theodore Smith and their associates, he was able to develop measurements that told far more about the actual results of certain institutional advertising than could ever be learned from quantitative readership surveys. Incidentally, I doubt that it is generally known that Richardson and Smith, spurred on by Page, were among the real pioneers in designing opinion survey procedures. Studies of this kind have since become indispensable to AT&T in the development of new communications services, in marketing and in the analysis of month-to-month service results — in fact, in hundreds of ways. While there is no question that these methods would have had to be developed and used in any case, nevertheless the fact remains that Arthur Page was instrumental in getting them into use more than 35 years ago.

## Distinct, formidable talents

When it came to the actual business of talking and writing — the 10 per cent of public relations so much needed in support of the remaining 90 per cent — Page had distinct and formidable talents of his own.

**It must be added here that Theodore N. Vail, president of AT&T from 1907 to 1920, had for years, in many public statements, set forth the company's aims and what he considered to be its obligations. So Page and Gifford were not exploring uncharted seas. They were unquestionably, however, giving well-timed hostages to the future. One other point: It is not intended to suggest here that policy commitments announced in the 1920's are still appropriate today.*

***The answer to these questions, in the climate of the 1930's, was a decided "yes."*

Beneath his quiet, casual manner he concealed great energy. For instance, when it appeared, in the wake of the F.C.C. investigation in the 1930's, that AT&T would be well advised to say a few words in its own behalf (which it had not been allowed to do officially as part of the investigation record), one item called for was a book about the business. This Page produced in about six weeks.

## Dignity, calm and humor

It was a plain and simple book, under the plain and simple title of "The Bell Telephone System," and its undisguised purpose was simply to state the record of, and the case for, the company. It did this well — at least in the opinion of one prejudiced reader — and notably, it proceeded from beginning to end without any hint of irritation as to F.C.C. tactics, with dignity and calm, and even with a certain humor. For example, commenting on the company's need for people who would exercise initiative but keep, withal, a decent sense of timing and order, Page remarked that after all, "The bull in the china shop was full of initiative." More seriously, but still calmly, when he turned to the subject of government regulation, he said: "If the tendency toward rigidity against which all business managements, big and little, have to struggle is increased by commission rules and regulations, the effect will be bad. The most serious problem before regulation is self-restraint. The question for the public and its elected representatives is what is most likely to produce energetic able organizations that have vision, take risks, and are likely to be competent and prepared at all times. . . ."

In World War II and during the year and a half that followed (Arthur Page retired from AT&T at the end of 1946 to become an independent consultant, although he remained on the company's Board of Directors) the main public relations problem of the Bell System, as already noted, stemmed from its inability to give all the service the country wanted. Page accordingly led a vigorous effort to help people understand the reasons. Advertisements pointed out that the copper needed to make telephone wire was going into bullets. They told readers that there were honest-to-God reasons for giving priority to war-related calls — that 72,000 calls went into the making of a Liberty ship — that the general public could help a lot if they would refrain from making unnecessary evening calls and "save 7 to 10 for the servicemen" — and so on. This was hard going, sure enough, but on the whole I think it was managed well — and surely few could doubt the rightness of the basic theme that the first demand on communications was to help win the war. No one, I might add, made a better summary of the scale of the Bell System's wartime involvement than Page, himself, when he said, with his usual simplicity: "When you have a little part in every effort, it adds up to quite a lot."

## His meetings were plain fun

No recollection of Arthur Page would be even half complete if it were to leave out the fact that in appearance, manner and conversation he was a unique and delightful man. It is now nearly a quarter of a century since he held his last conference with the public relations officers of the Bell companies, so it is hard to recall specific remarks or turns of phrase. However, one can never forget the delightful informality of these meetings, the easy flow of discussion, the insights and humor that Page brought to the consideration of problems posed for review. He never raised his voice. He was never heavy-handed with a conference member who might have fumbled something. He never tried to hammer a point home. What he did do was bring to the meeting a clear idea of what he hoped to see it accomplish, and then informally, adroitly and in the friendliest sort of way engage the interest of his associates, so that time after time I have heard them say that no other meetings ever gave them the same sense of enjoyment, of plain fun, that they experienced in Page's conferences.

If it seems to the reader that I am here putting more

emphasis on manner and style than they deserve, I must strongly disagree. Page's style was in fact essential to his accomplishment. If it is not easy to be wise (as he, himself, once remarked in a talk he was pressed into giving with no time for preparation) it is even more difficult to use whatever wisdom one has in a way that gets other people favorably excited.

## Succinct to the utmost degree

This is not to say that Page was verbose. On the contrary, he was sometimes succinct to the utmost degree. I might recall here, for instance, as typical of this hyper-brevity, one piece of correspondence that consisted of a two-page letter from a Bell company officer, and Page's two-sentence reply. The reply said: "Dear Bill: I gather some are doing as you say. I hope you won't. Sincerely, AWP."

On other occasions, Page might make a suggestion or request in a sentence or two that assumed that the person addressed knew a lot more about the subject than in actual fact he did. If a personal reference may be forgiven, when this first happened to me I had already learned that someone else in the same boat had made the mistake of bombarding Page with requests for particulars, whereupon Page concluded that he would prefer to rely on someone else. As a result, I was more than once in the situation of saying: "Okay, will do," or words to that effect, then bounding out of his office to spend the next half hour in trying to figure out what on earth he really wanted.

One more anecdote may help to reveal the quality of the man: Years ago one of his sons, as a small boy in school in New York, one day found the school lunch not to his liking. When he was asked why he didn't eat, he didn't want to hurt the cook's feelings, so in a desperate flash of inspiration he murmured that he had become a vegetarian. This was puzzling, indeed, to the person in authority, who promptly called the boy's home. As it happened, Arthur Page was there and answered the telephone. He listened with astonishment but gave no sign, and when it was

## Words that made history

**by Noel Griese**

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Arthur W. Page wrote what were probably his most widely read words in August 1945 for President Harry S. Truman.

"Sixteen hours ago," the Truman statement began, "an American airplane dropped one bomb on Hiroshima, an important Japanese Army base. That bomb had more power than 20,000 tons of TNT. It had more than two thousand times the blast power of the British 'Grand Slam' which is the largest bomb ever yet used in the history of warfare."

Page had been called to Washington in April 1945 by his long-term friend, Secretary of War Henry L. Stimson, ostensibly to assist the Army's Bureau of Public Relations.

"It was a month after I got there before I discovered what the Colonel (Stimson) was really bothered about," Page says in his 1959 *Reminiscences* for Columbia University's Oral History Research Center. "It was the atomic bomb."

According to Page, Stimson "had a great conscience about whether he ought to use this doggoned thing or not, and if so, how." In short, Stimson wanted someone to talk to, and he chose his old friend, Arthur Page.

Ultimately, the bomb was used at Hiroshima on August 6, 1945. Page together with Lieut. Col. Charles T. Arnett, prepared statements for both President Truman and Secretary Stimson.

"Arnett is the man who really wrote the whole business," Page says modestly in his *Reminiscences*. "We had two reports to write, finally. One was the Presidential message, and the other was the Secretary's report. Arnett sat down and wrote the Secretary's report . . . And I took his report and squeezed it down and changed it around . . . and wrote the President's. . . ."

time to answer said, "Vegetarian? Vegetarian? Well, er — of course he's a vegetarian!" Of such parental support is filial devotion born.

I have little first hand knowledge of Arthur Page's work after he left the AT&T vice presidency, save that he continued his career as a consultant uninterruptedly until his death in 1960. His judgment was valued by several corporate clients, and he labored mightily as head of a commission that grappled (alas, with no great success) with the problem of mass transportation in the New York Metropolitan Area. In the main, I venture to say, his contribution to the art of public relations counseling — if it is an art — was centered in his career with AT&T.

On reflection, I think I chanced to use the word "art" in the sentence above for the reason that it seems appropriate in any consideration of Arthur Page. He thought of management as an art and in his talks and writings often so described it. While he was all in favor of practical reasoning and common sense, his essential approach to problems was not scientific but intuitive, and he had great faith in the ability of individual men and women to flourish and create in an atmosphere of freedom. "What makes a country is freedom and big men," he said, and that is where he put his trust.

## Limited understanding of unionism

In fact, it would be hard to think of any individual more quintessentially American than Page. He not only believed in progress, he could feel it coming. In the years before World War II, it will be remembered, the Temporary National Economic Committee of Congress, headed by Senator O'Mahoney, took the view that the economy had become static and was in grave danger of staying that way. It was characteristic of Page that he studied the committee's contentions thoroughly and then and there found them (as others have since) altogether wrong.

Everyone has shortcomings, and this applies to Page as it does to the rest of us. In Page's case I would say that his natural temperament, his boundless faith in personal freedom and his instinct not to accept the contrary, perhaps limited his understanding of unionism and the prospects for the permanence of union power. Although he was a plain, unassuming man, friendly and gregarious, Page was nevertheless also something of an aristocrat, a member of a leading North Carolina family, a man with the people rather than of the people — not an up-from-the-ranks man but one who by reason of both family and abilities lived all his life at the top, albeit modestly and without pretension.

## Quality performance, good character

Does this make any difference in how one gauges the long-range impact of the unions on social and economic life? Perhaps not. But in any case, if there was a hole somewhere in Arthur Page's thinking, I would locate it here. He simply did not understand that the unions were not going to go away.

Against this, however, one can set great strengths. To sum them up in a few sentences:

Page persuaded management to put public relations in the forefront of management responsibilities. He knew that business could proceed only with public approval and that quality performance based on good character was the absolute requirement. He called for policy commitments that would serve as hostages to performance and for the understanding of policy by all concerned. He insisted that talk — the explanation and interpretation of performance — was essential to help bring about such understanding. To measure both talk and performance more accurately, he instituted and encouraged techniques that improve industry's ability to listen and learn. By the exercise of his own personal talents for communication, he imparted to many other able people something of his own enthusiasm for doing a first-class job. These are accomplishments, I would say, of which any man, and also any business with which he may be associated, can be proud. □

# Citizens or Inhabitants?

by
Gordon L. Hough

"Citizens shall be guaranteed freedom of speech, of the press, of assembly and of demonstration.

"Citizens shall have the right to elect and to be elected to (public office).

"The vote shall be universal, equal, direct and secret. All citizens who have reached the age of eighteen years shall have the right to vote.

"The State shall guarantee the equal rights of citizens. No restrictions of these rights and no discrimination in the exercise thereof on grounds of nationality, race, sex or religion shall be permitted."

Americans have given their lives to protect such rights as those words describe. As Stephen Vincent Benet put it, "It took a long time to buy them, and much pain." The only catch is that every one of the rights listed above appears in the Constitution of the Socialist Republic of Romania and in the constitutions of other countries whose notions of life, liberty and the pursuit of happiness differ markedly from our own historic standards.

The point is obvious. Words alone, no matter how eloquent or straightforward, do not guarantee liberty or the successful functioning of the democratic process. To preserve the best traditions of the American system, open the full benefits of that system to all citizens, and further improve those tenets of government that are not without flaws is a responsibility to be shouldered anew by each generation. Lacking such effort by succeeding generations, this system, wrought by men and women of every national origin, faith, color and political belief, could be lost. "Born of idealism, died of apathy" would be an unlikely and ignoble epitaph for the American idea. Yet, such

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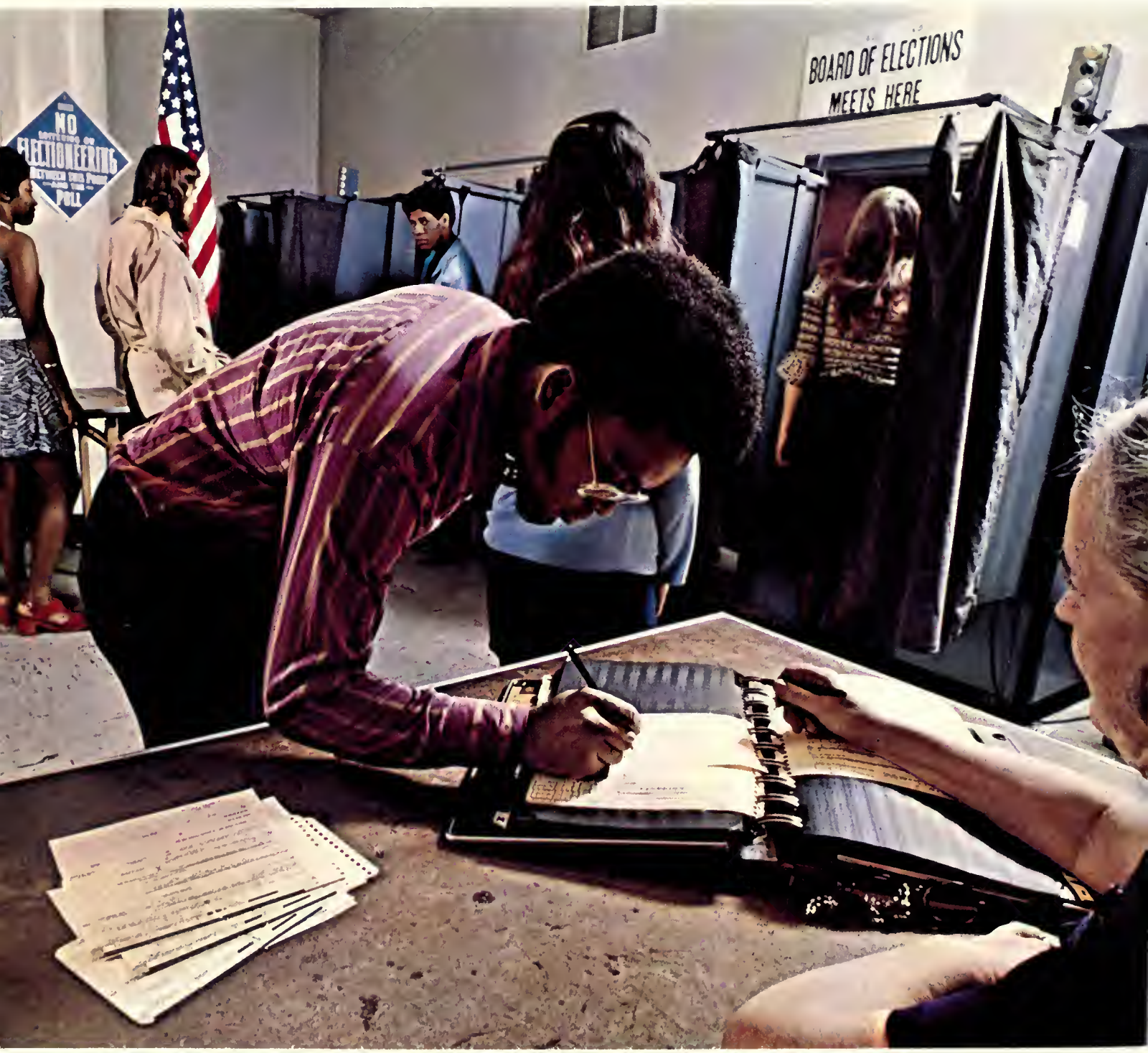
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a fate is not without precedent in the histories of nations who have abdicated their futures to ill-informed, irrational, irresponsible zealots.

Recent changes in the law mean that more than 11 million 18-to-21-year-olds will be eligible to cast a ballot for President and many important legislators next year. Some 103,000 of those affected by the law will be working for the Bell System.

Also added to the rolls will be one million new voters now banned by literacy tests and another five million now banned by residency requirements. The new law states that all previous residency requirements, which have differed from state to state, will now be uniform for federal elections throughout the United States — a period of 30 days.

The impact of the 18-year-old vote on 1972 election results is a subject of wide speculation. Many experts seem to think the turnout will be light and the effect negligible. I disagree. I am confident that the vast majority of young people — including those in the Bell System — will fulfill their obligations of citizenship, participate in politics, and have a beneficial impact on the decisions made by our public officials in the years to come.

It is refreshing indeed to see so many of the younger generation today taking a sincere interest in preserving and improving our resources and our society. Their enthusiasm and sustained interest and involvement in the process of government can, if continued, make a meaningful contribution to needed social changes. And this is as it should be.

There is ample room for all of us in achieving these goals, and I salute those of you who have supported and actively participated in action programs dedicated to these goals. Never before has there been a greater need for volunteers to participate in these programs. And the choice is wide enough to appeal to almost every talent — helping a child to read better, working in health and rehabilitation agencies and neighborhood youth organizations, assisting the elderly, and hundreds more. In addition, our whole process of government — local, state and federal — is crying for enthusiastic, dedicated people to participate in electing representatives who will make the needed changes that will lead to a better life.

I have faith that the new generation of citizens recognizes the challenge that confronts our nation today and will respond. These are not, after all, ordinary times. The central issues of politics during the seventies will deal with more than alternative ways of improving the quality of our society. It may be only a slight exaggeration to say that these central issues will deal directly with the *survival* of our society.

Democracy is not an easy job. Democracy depends on each of us.

It is up to each of us to learn about candidates. What are their experiences, philosophies and abilities? Do they live up to their commitments? Are their ethical standards exemplary and do they have the courage of their convictions?

It is up to each of us to learn how to be effectively involved in the processes of democracy and to seek out opportunities to become involved. We cannot wait to be asked, for we may not be. And we mustn't be afraid of the small causes. While we cannot all have a measurable impact on the ultimate solution of the world's major problems, we *can* all contribute to improving the quality of the life we share.

It is up to each of us to insure that our government respond to the needs and aspirations of the people. It is one thing to criticize public officials to our heart's content while watching the evening news. We will help them do a proper job, however, only by becoming personally involved, earning influence and communicating our views to others in the community.

Democracy is built upon the willingness of people to compromise on the issues, to accept victory or defeat with a sense of equanimity. But there are, on both sides of the political fence, increasingly demanding elements in our society who insist on all or nothing, who emotionalize issues, who refuse to allow sincere and serious debate. The danger is that though it is possible to reach a compromise

born from objective disagreements, it is nearly impossible to compromise on emotions.

This is all a part of what some call a "loss of community" in America. It seems as if we have lost our unity of opinion, our shared belief that we know where we are going. There are serious observers of the American scene who question whether or not it is possible to redevelop a community of interests in an urban environment whose neighborhoods have decayed, whose people isolate themselves from their neighbors and whose problems loom so large that they make the effort of one individual seem futile.

Compounding the problem of growing alienation is our increased frustration at seeing problems grow worse, while our capacity for solving them has never been greater. We have become the first people in history to possess the technological and scientific genius to solve nearly all of our most threatening problems. What is not yet clear is whether or not we have the wisdom and the will to make the most constructive choices. Possessing in abundance the material and intellectual resources to create in our lifetimes an American Renaissance, we seem to lack only a unity of purpose.

That we have lost our unity of purpose is one of the great shocks of our time, for it has been the secret of the American achievement that the vast majority of our people have agreed on the basic goals and have pulled together in attaining accomplishments others had always thought impossible. To the sixth President of this country, John Quincy Adams, the American achievement was demonstrated in his belief that this nation, "in the assembly of nations, has uniformly spoken among them the language of equal liberty, equal justice, and equal rights." Mr. Adams said that in 1821, and it's as true in these complex times as it was then.

Equal liberty, equal justice, and equal rights: the American achievement. It embraces the hope and promise that launched this system in the first place, and a 200-year track record showing how that hope

and promise have been achieved for millions and millions of people. It is the right to think, speak out and act on socioeconomic and political issues—according to one's conscience, and critically when it's called for — without fear of being repressed or punished or banished. It is the right of each man to advance to the boundaries of his own ambitions and abilities—educationally, politically, culturally, financially, athletically, socially or toward whatever objective he sets for himself. And that, too, is a big part of this system of ours: the freedom to select one's own goals, to exercise one's own tastes, to be true to one's self. If one wants to march to the beat of a different drummer he's free to do that here, for the American system encourages individuality and encompasses the right to disagree. But most of all, the American achievement is what Teddy Roosevelt meant when he described our system as ". . . a question of principle, of purpose, of idealism, of character. It is not a matter of birthplace or creed or line of descent."

Now there's nothing at all wrong with those kinds of goals and ideals. Simply because we have not fully achieved them, the American idea cannot be allowed to die. The fact that we have not always been true to its ideals is no reason to reject it. The only thing wrong is that we have not yet achieved its promise. We are still trying. And that is what counts.

When he visited America 100 years ago, Thomas Huxley wrote: "I cannot say that I am in the slightest degree impressed by your bigness or your national resources, as such. Size is not grandeur, and territory does not make a nation. The great issue . . . is what are you going to do with all these things?"

What are we going to do with all these things? Only time, of course, will tell. But one thing is certain: whatever the future holds will be largely determined through the democratic process and by those individuals who become involved as voters, volunteers in politics and in civic and community affairs, and participants in the political dialogue.

Because the thoughts I have expressed here have been inspired by the great promise held out to the nation by the newly enfranchised 18-to-21-year-olds — and particularly by the knowledge that more than 100,000 of them are fellow employees in the Bell System — I am tempted to say that these new voters, especially, are challenged to become effectively involved in the search for answers. But that would be wrong, because the challenge belongs to each of us. I am, however, aware that we are creatures of habit. And so I think it is particularly important that young people discover early in their lives the rewards and satisfactions which result from helping to find solutions to some of our problems, to expressing opinions, to having a voice in determining the direction of our society. As for the obligations of citizenship, I ask everyone — new voters and old — to join together in the hard work that must be done if the democratic process is to work for the betterment of our own lives and the lives of mankind everywhere.

I am proud of the role the Bell System has played over the years in encouraging its employees to become active, as individual citizens, not only in their civic and community affairs but also in the democratic process of government on a local, state and federal level. There are also thousands of Bell System employees who serve in hundreds of ways as school board members, city councilmen, volunteer tutors, on special committees, charitable organizations and many other social, civic and governmental groups.

It is gratifying to know that our business is more than just serving communities with communications. The corporate responsibility also involves being a good citizen—directing individual and corporate expertise to help solve the problems of society. Our company has made a commitment toward this end.

The decision to become involved, of course, is yours. Becoming involved in the party or organization of your choice can be a most rewarding, self-satisfying experience. If you make this decision, you can enjoy the opportunity of being a proud citizen participating in the workings of our society — instead of just an inhabitant. □

# Growing Their Own in Comptrollers

**by Bob Wolfenbarger**

Associated Company comptrollers turn to systematized training techniques in preparing computer people to meet growing service needs.

When the nation's largest computer manufacturers decided to "unbundle," or separate from computer hardware costs, their charges for training and other support services, the comptrollers of the associated companies of the Bell System last year found themselves confronted with a new set of problems — including training of their thousands of computer hardware and software people. It was estimated that such

unbundling throughout the computer industry would increase training costs to the Bell System by as much as a million dollars a year.

New computer systems were spawning new techniques and procedures. The prospect of a number of interdepartmental business information systems with such acronyms as BISCUS, TIRKS, ICIS and DIR/ECT alluded to an oncoming change in the Comptrollers departments that would be no less revolutionary than the changes wrought by electromechanical switching in the operating and engineering departments. Pro-

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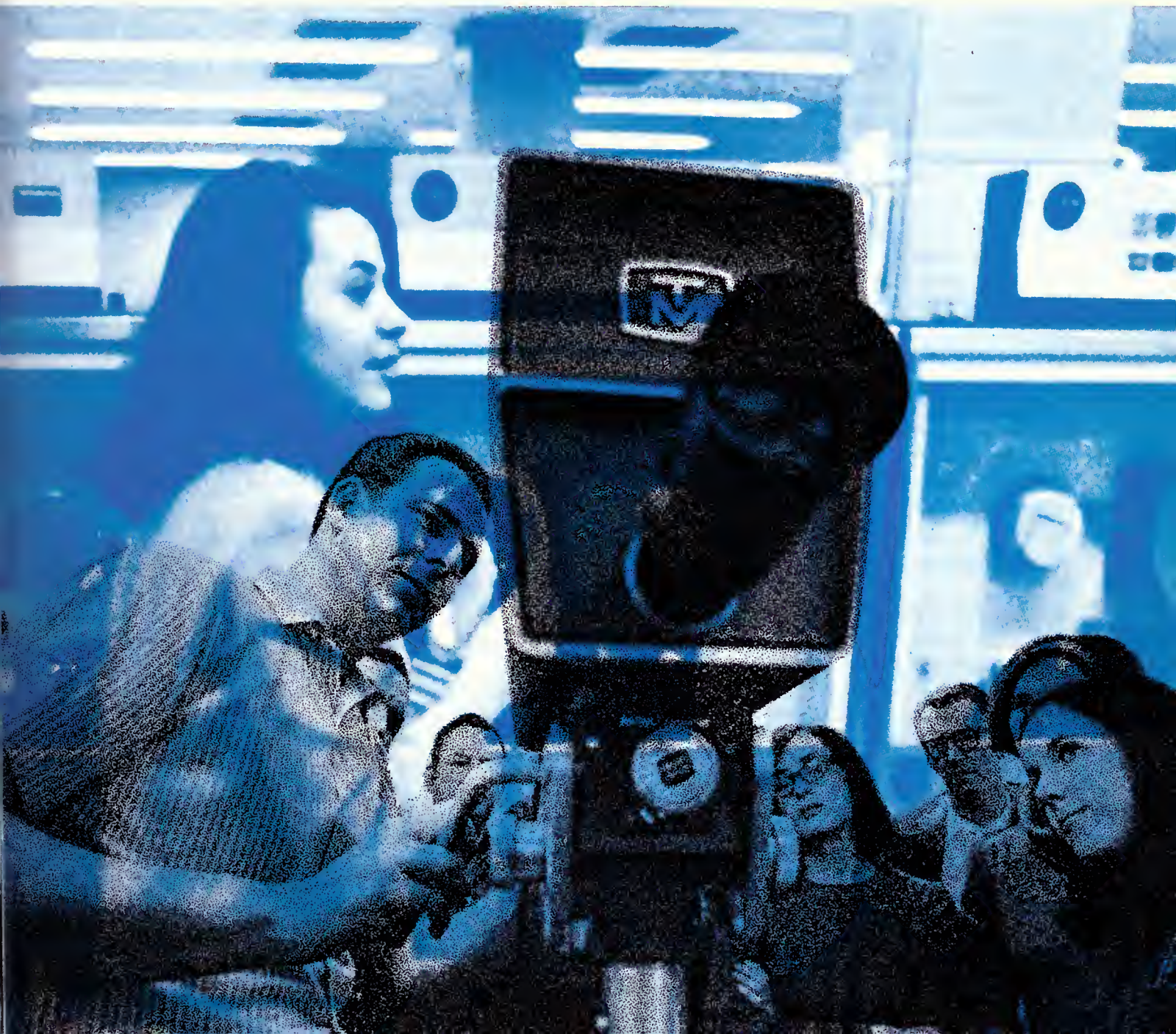


jected computer costs for a typical telephone company called for an increase from five million dollars in 1968 to nearly 30 million dollars by 1978. Part of this would be spent on the Business Information Systems (BIS) plans in computer-based information retrieval systems emerging from Bell Laboratories.

Training of computer operators and supervisors around the System is not analogous to training of, say, Electronic Switching System (ESS) technicians. Much of the telecommunications equipment, such as ESS, used throughout the System is standard. But in the Comptrollers departments, one computer center does not resemble every other center. Comptrollers offices around the System just don't have the same configuration of computer hardware.

## Influx of new computers

Compounding the problem is an influx of new families of computers — IBM 370 systems and RCA Series Seven processors. The computer industry, which more than any other entity has accelerated today's technological advancement, has its own vehicle of technology in high gear, with computers helping to design newer generations of computers. There is no end in sight to the burdens placed on data systems training organizations to develop more intensive instruction for computer operators, supervisors, programmers and analysts. Development of training is historically an operating company function, and most companies teach basic programming and operating skills. But few can offer advanced systems training, and with unbundling, a number of companies have been making plans to build larger training staffs. Generally, the old method of training involved tapping second level managers to throw together a training package, collect some dummy training material and turn the task over to first level supervisors. The unit supervisors, faced with demanding production schedules, often turned the training over to their top clerks. The result usually turned out to be another round of routinized instruction programs — show-and-tell sessions — that characterize too much of present-day vocational training. Good training became, in the words of one observer, "the most talked about and least understood thing we do."

## Fixed the eye on training

The unbundling decisions fixed the eye of management on training like no other event in the recent history of Comptrollers. Southern Bell's vice president and comptroller, John McIntyre, former head of the Comptrollers Operations Division at AT&T, told the Associated Company comptrollers in December 1969: "With the decision to unbundle prices, the time has come to once again reaffirm and re-emphasize the need for data systems staff support. If nothing else, these decisions have focused our attention on support services." McIntyre told the comptrollers in that meeting — a month before the computer manufacturers' unbundling policy was to take effect — that AT&T was considering establishing an instructor training school "for the primary purpose of helping your companies expand and improve your own in-house training capability. We think that potentially the idea of an instructor training center has a great deal of merit. There is the prospect for direct savings. But more important, the benefits gained from a centralized training facility would be measured in the increased expertise you could develop for your own staff."

## Training reflects priorities

There was an awareness that the techniques and technology of the revolution in information processing and communication could be used to turn on the employee who had been turned off by the pallid blackboard and textbook brand of group instruction. Talk of instructional technology, systems of learning, multimedia programmed instruction and centralized training development served to stimulate growth of vocational training in Comptrollers unlike that of any other period in its history.

Traditionally, training has reflected priorities of the organization that created it. Where it has strong support, training groups offer a broad curriculum taught by instructors armed with closed circuit TV, films, teaching machines and programmed instruction. Where support is lacking, training languishes.

New York Telephone's Eastern Manhattan Division, which produces billing for 190,000 residence customers and 60,000 business customers on the East Side, is typical of the large accounting offices in hard-boiled urban nerve centers. Employee turnover there is a wilting 53 per cent. Customers are ever more demanding of billing accuracy. Last December, the entire Downstate Territory of New York Telephone changed to a new service order form that would be used by all departments as the basic document of a customer's telephone service. This was the first dramatic form change in 18 years. The job of training more than a thousand clerks to accurately process the form in short order was a mind-boggling task — and would have been even in a sedate office.

## "It would have been chaos"

"If we'd tried to make the conversion, training the old way, it would have been chaos," says Al Nelson, district accounting manager, who has 200 clerks in his office. Instead, New York Telephone adopted a new training technique pioneered by Pacific Telephone comptrollers. More than a dozen other telephone companies have embraced the technique, known as multimedia programmed instruction. This is an intensified style of training that couples slides and tape-recorded lectures with self-teaching programmed instruction — a *McLuhanesque* approach to programmed instruction that allows the student to swallow instruction in bite-sized lessons and test himself as he goes. Proponents of the method say retention is higher, instruction is standardized, less teaching time is needed and when used with large numbers of employees, costs are less than for chalk-talks or chart lectures.

New York gambled that multimedia would work as well for a conversion as it would for routine training. It paid off. As the conversion deadline neared, some 2,000 clerks and supervisors from White Plains, in Westchester County, to Massapequa, on Long Island, went through tightly scheduled sessions in one or more of three sequential training packages. Mary Reinert, accounting training supervisor, says: "By far this is the best method I've seen in vocational education."

## Production stayed up

One clerk commented: "It really holds your interest. It's precise and to the point."

During the conversion, production and accuracy indices in at least one office stayed up despite changes to the new service order form. Service order processing did not decline, nor did the number of service order investigations mount — usually a clue to a rising tide of errors. Training required a third as many trainers as would have been required with a lecture technique, and training time was halved. John Garone, district accounting manager, says: "I don't think there was any other way we could have trained our entire work force in the time we were allowed without the use of multimedia."

## Some guarded reactions

Multimedia training is only one tool for reaching today's clerical worker, and it's a powerful one. Still, there are guarded reactions among some training people and clerks who have used it. "I'm not sure we don't lose personal contact with it," says Anita Kleinhammer, a methods assistant in Brooklyn who was one of the trainers.

A service order clerk in Manhattan says: "I'd rather be taught by an instructor and be able to ask questions as I go along."

Even so, multimedia training is a great step forward for Comptrollers, says Al Nelson. "Normally," he says,

"accounting is at the end of the line in development of training. A lot of people still think of accounting as a green eye-shade kind of operation." After 22 years in the business, he says the new training technique is "the first thing I've seen that's really dramatic."

New York Telephone's switch to multimedia in the department last year illustrates the sweeping new trend taking place in the department to professionalize training.

## Favorable consensus

The consensus emerging from talks with the comptrollers and their top managers following McIntyre's statement in 1969 was overwhelmingly favorable, especially among companies with limited training staffs. It was agreed that support for an instructor training center would come primarily from the companies, with each telephone company paying a pro rata share of startup costs and costs of development of training materials. In addition, tuition costs of $250 a week would be charged the companies for each student enrolled. Financial support for the school was patterned along the lines of two other Bell System specialized training centers, the Plant Training Center in Atlanta and the Center for Technical Education in Lisle, Ill.

Meanwhile, AT&T's Comptrollers Operations Division selected William K. Kays, a 14-year Bell System veteran manager, to head the training center. Kays, formerly a district data processing manager with The Chesapeake and Potomac Telephone Company of West Virginia, was immediately confronted with a barrage of questions about the purpose, curriculum and site of the new center.

Meetings with operating company training managers were called in May to hammer out priorities for courses to be developed and to lay groundwork for future operation of the new center. "Generally speaking, these people didn't understand our concept of centralized training development. A lot of time was spent discussing the role of the center versus that of the companies," says Kays.

## Chronic need for assistance

Out of the meetings came one development that revealed the breadth of training needs in the companies. "Although the center was originally planned as a data systems training center," says Kays, "it was readily apparent that there existed a chronic need for assistance in management and clerical training as well." Each company was polled for its feelings about plans for the center.

Along with a go-ahead from working level management came requests for development of more than 150 courses — in one sense, an overwhelming endorsement; in another, a thinly veiled challenge. Heading the list were requests for workshops to teach training people how to create multimedia programmed instruction. But generally, the list could be broken down into four categories: data systems, management training, clerical training and training in teaching techniques.

For the next seven months, as the center moved into its permanent home and as the staff was recruited from telephone company training organizations, company requests came under careful review. Each course was translated into specific modules, each with a description of prerequisites and objectives.

## Denver won out

Following those early conferences in the spring of 1970, Bill Kays visited Denver, Lisle and other cities in search of a training site. Eventually, Denver was selected. It won out as much for its promise as a transportation hub as for the availability of moderately priced office space and housing. Moreover, Mountain Bell lent its fullest resources to the search. In Denver, Comptrollers people found space in the Writer's Manor office and motel complex, close to computer centers and the mushrooming bedroom suburbs edging south of the city.

The boom of multimedia training in the department was fueled by the first courses to be offered in Den-

ver. The first multimedia workshop, held in September, was taught by a specialist in multimedia teaching who was recruited from the Pacific Telephone office that pioneered the technique. Along with him came copies of more than 160 Pacific Company courses that, with minor adaptions, could easily be offered by any company with similar hardware and procedures.

## Created for astronauts

Originally created to train Apollo astronauts and Air Force pilots, multimedia training offers business the benefits of a technology that will make its instruction equally productive and individualized. "There are many applications for the new technology throughout business," says Glenn Gollihur, assistant secretary and treasurer of Pacific Telephone and "father" of multimedia training in the Comptrollers Department. "Any organization with a need for speed learning of technical skills is a prime candidate for its adoption. It's economical for use with large numbers of people with similar jobs, and it's fast and effective for training new people, with or without the skills we need in business. Multimedia also has been successful in teaching subjects as diverse as math in ghetto schools and research in law schools."

## Clearinghouse for ideas

But the Comptrollers Training Center aspires to be more than a multimedia training center. It hopes to be a clearinghouse or focus point for training ideas for the department.

The literature of training these days abounds with references to "systems of training" and "training standards." Indeed, a look into the future suggests that a new Bell System technology, perhaps as broad-based as that which is going into design of communications systems, will emerge from such centers as Denver, Atlanta or Lisle. Training technology is now in its infancy, and to be effective it will need to be systematic and standardized. That means developing training with a clear idea of what a trainee knows about the subject, what he must know to do the job, and how to test for how well the training readies him for the job.

The Denver center, though, does not intend to build a Comptrollers training technology from the ground up. Their approach is unique, simple and inexpensive. Although the staff expects to create some courses, they'll also borrow experts from the Bell System to write or recommend the purchase of carefully evaluated courses from vendors. Or they'll adapt existing training courses for wider System use. Almost 300 courses in data systems, teaching technology, clerical and management training are now available for use almost anywhere in the Comptrollers departments. Three recent courses for instructors offered by the center came about this way. Classes in advanced BIS-COBOL, a computer language, and an Introduction to Total Systems Development, which deals with Business Information Systems, development, were adapted from courses originally developed by Bell Labs. A course in instructional technology to train students to improve classroom techniques was modified from a Mountain Bell course.

## $6.8 million a year

Efforts like these are expected to measurably improve the standards of training in the Comptrollers departments. All in all, the department spends $6.8 million a year on training, and that's only the measurable cost of manpower, facilities and materials used in formal programs. One cannot expect the training center, with a staff of seven, to raise the level of training by itself. Much of the course development will still be done by the companies. But for Comptrollers, Denver is a symbol, a standard, an expression of the need for more systematic training for a more sophisticated age. It exists to serve the companies' growing needs for more relevant training. Yet it will be no better or worse than the standards the companies demand from training. ▢

# SERVING THE

## The booming newspaper industry is changing—with

### We're stuck with print

Marshall McLuhan to the contrary, what you are reading at this instant — the printed word — is likely to be around in predominant form for decades to come. Radio and television have not killed the newspaper or the magazine. The number of daily papers in the United States has hovered around the 1,750-mark for the past 25 years, and, indeed, the number rose in 1970 over the year previous. This despite 24-hour-news radio stations, network and local TV specials and other increased emphasis on broadcast news.

The fact is, even a slow reader can absorb more words per minute via print than he can via radio, TV, or tape or disk recording. And the reader is finding that with a little effort, he can increase the speed of his reading as well as his comprehension and retention. Add to this the superior portability of printed matter, as opposed to even the most miniaturized tape recorder, plus the fastest human scanning and random selection features of all the mass media, and we're stuck with print, like it or not.

Tomorrow, as today, the leaders will be those who do not rely on the spoken word, but base their knowledge on the written word, whether they're leading a nation or a family.

By far the largest form of graphic arts is the newspaper industry, which is the tenth largest in the United States in value of shipments (more than $6 billion last year) and one of the 10 fastest growing in the country. Newspapers are starting to take a hard look at electronic means of converting raw words and graphics into a final printed product and transmitting at least some of that product to the consumer. Pinched on one side by mounting production costs and on the other by increasing consumer demands for fresher news — even in printed form — newspapers are casting a pragmatic eye toward the computer, video display terminal and high-speed data transmission to meet these challenges.

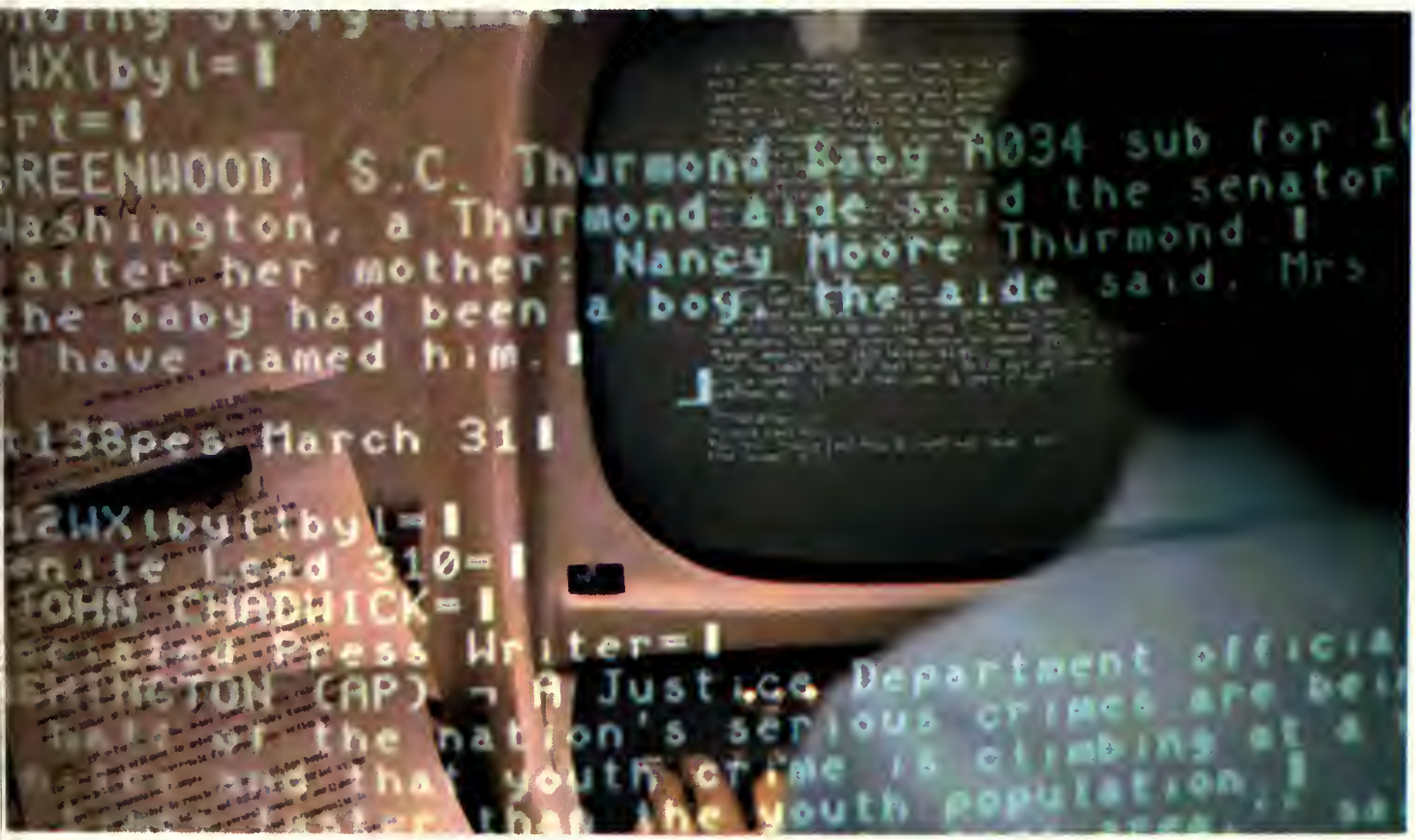
They are breaking their traditionalism and preparing to change production methods as they've not been cha since perhaps the advent of the Linotype machine. And change will come greater demands for better telecomm cations services, likely along with unsurpassed compe between the Bell System and cable television systems. S ing production will be only part of the newspaper's to rush news into the home. The newspaper of tom probably will incorporate multimedia to dissemina information — video display of information and fac reproduction based on *interest profiles,* aimed at hon formation centers that probably will be fed by both phone and CATV companies.

Newspapers recognize that not everyone will wan same commodity. Many will continue to content thems with an easy chair, a cup of coffee or a slug of Scotch the front page, sports section, business pages or amuse of their daily paper. Others will want to call up capsu the news — sports scores, the weather report, stock m quotations, the recipe of the day, or the status of the probe of Mars. They may do this with Touch-Tone® se receiving the report on a Picturephone® screen direct a newspaper's computer. Or they may call up a CATV pany and get what they want in color on their 24-inc screen, or in high-speed print-out form or by facsimile. of course, would involve two-way communicatio cable, unheard of as yet. But CATV owners, about 8 pe of whom are publishers, realize the potential of their

Undoubtedly the most forward thinking in the news industry is represented in the American Newspaper lishers Association Research Institute (A.N.P.A./R.I.) in York. And one man who is most attuned to the conc tomorrow's newspaper is Jules S. Tewlow, the insti director of special projects. Tewlow is a graduate of Virginia Wesleyan College and Johns Hopkins Univ and has worked for newspapers in various capacities cluding editorial and advertising — since 1945. Before j

# ESS IN THE 70's

## ased dependence on telecommunications services




*wspaper is beginning to evolve into a multimedia entity, whereby sumer will have a choice in the form in which he receives his daily n hard copy as he does today, or through electronic means that will ionize the news industry.*

..N.P.A., he was manager of industrial research for *lew York Times.*

ever talk beyond 10 or 15 years," he says. "Because you talk about 10 years from now, you're talking blue nd beyond that, it's black sky." Tewlow describes the paper of tomorrow this way:

ie newsroom will be rather quiet — no clacking of typewriters and frantic scenes such as you often see today. Typewriters will be replaced by video display terminals (V.D.T.'s) with typewriter keyboards and 'light pens' connected online to the newspaper's central computer. Let's assume a reporter arrives at his office from a story assignment. First, he may go to a centrally located inquiry display screen station and type a request to the library for abstracts of stories appearing in the last 90 days pertaining to a Mr. Ed Jones, city controller, and to new business taxes. After viewing the abstracts of stories, the reporter requests a full print-out of two items. A 2,400-line-per-minute printer next to him be-

gins to hum, and in a few seconds the stories relating to his subject are electrostatically generated.

"Returning to his desk, the reporter begins typing the story on his own typewriter display connected directly to the computer. As he types the story, it will be shunted by the computer to a secondary storage device, perhaps a disk file. Should he wish to read over any part or all of the story he has completed, he merely calls up or 'rolls back' the page, and it appears on the display screen in front of him, section by section. Should he desire to revise a particular sentence or paragraph, he merely deletes the unwanted material with a light pen and types in the new text.

"While various reporters are typing their stories, editors in the 'bullpen' begin receiving a print-out list of completed 'takes' or stories in process from a printer in their area. Sitting in front of each editor is a typewriter display set on which the editor may call up copy stored in the computer. The copy is flashed on the screen in front of the editor, and he begins the process of revising the copy, using his electronic light pen and typing in changes, which then appear on the face of the screen. The story is processed through a hyphenation-justification routine and is stored temporarily on magnetic disks for page make-up.

## Several newspapers leading way

"One of the most critical jobs on the newspaper is that of the wire editor, who must decide which of the millions of words a day generated by the Associated Press and United Press International are going to be offered to the newspaper reader. With similar electronic devices, he will be able to review and select stories with greater speed and efficacy.

"Does that sound like 'blue sky'? Well, both Associated Press and United Press International editors in New York are starting to use V.D.T.'s to edit wire stories. And they're going to expand their systems to regional offices around the country in the next year."

Tewlow cites several newspapers that are leading the way toward 21st-century production. "*The Los Angeles Times* has video terminals as well as a satellite printing plant at Costa Mesa, about 35 miles from its main plant in downtown L.A. The Orange County edition of the *Times* is edited, laid out and printed in Costa Mesa by a staff of 450 people. It's all made possible by computerized copy preparation and high-speed data transmission between the two plants. Various electronic methods of production are being utilized or planned by newspapers in Worcester, Mass., Huntington, W. Va., Daytona Beach, Fla., Plainfield, N.J., Ithaca, N.Y., North Platte, Neb., Norwich, Conn., and Washington, D.C."

## Computer timesharing

One of the keys to the newspaper of tomorrow will be the concept known as computer timesharing. Not only will all departments of a newspaper — including editorial, advertising, composing, circulation and business and accounting — share the same machine, but other newspapers and their various departments may share, also. "We have several situations in the United States today where two newspapers share the same press," Tewlow points out. "It isn't inconceivable, considering the monthly cost of hardware, software and peopleware, that newspapers will share computers with other newspapers or other businesses. You must keep in mind that because of the computer's incredibly fast capability, many people can use it at once with the feeling that they, alone, are communicating with it. And coded access systems can easily be incorporated into a computer to deny access to the opposition."

Tewlow holds that newspapers will be in the software business—are now. "The newspaper business, for all its conservatism and tradition, has been for years one of the most progressive businesses in America. It has been utilizing some form or other of telecommunications for more than a hundred years. And remember, the newspaper came up with assembly-line production long before Henry Ford opened his plant in Michigan. But now the industry is faced with

the necessity of pushing forward anew. No major improvements have been made in the Linotype machine or facsimile devices since they were invented. The cost of getting into computers, V.D.T. equipment and high-speed data transmission is going to be enormous, not to mention the cost of new presses. You don't just junk several millions of dollars worth of presses because something new has come along. And when you do junk them, about the cheapest thing you can do with them is dig a hole as close to the plant as possible, drop the presses in and cover them over. Nobody wants them. But newspapers are going to have to consider the long-haul savings in electronic production, along with the new competitive position electronics will give them with regard to the broadcast media."

Tewlow sees improved distribution of the final product as half the battle. "Satellite printing plants such as the one operated by *The Wall Street Journal* are designed to beat the freeway jams and get the product to the reader faster. The next step will be to bypass the route truck, at least with part of the product, and shoot it into the home."

*Proofreaders at the Daytona Beach, Fla., News-Journal make type corrections on video display terminals, one example of how newspapers are adopting electronic methods of production.*

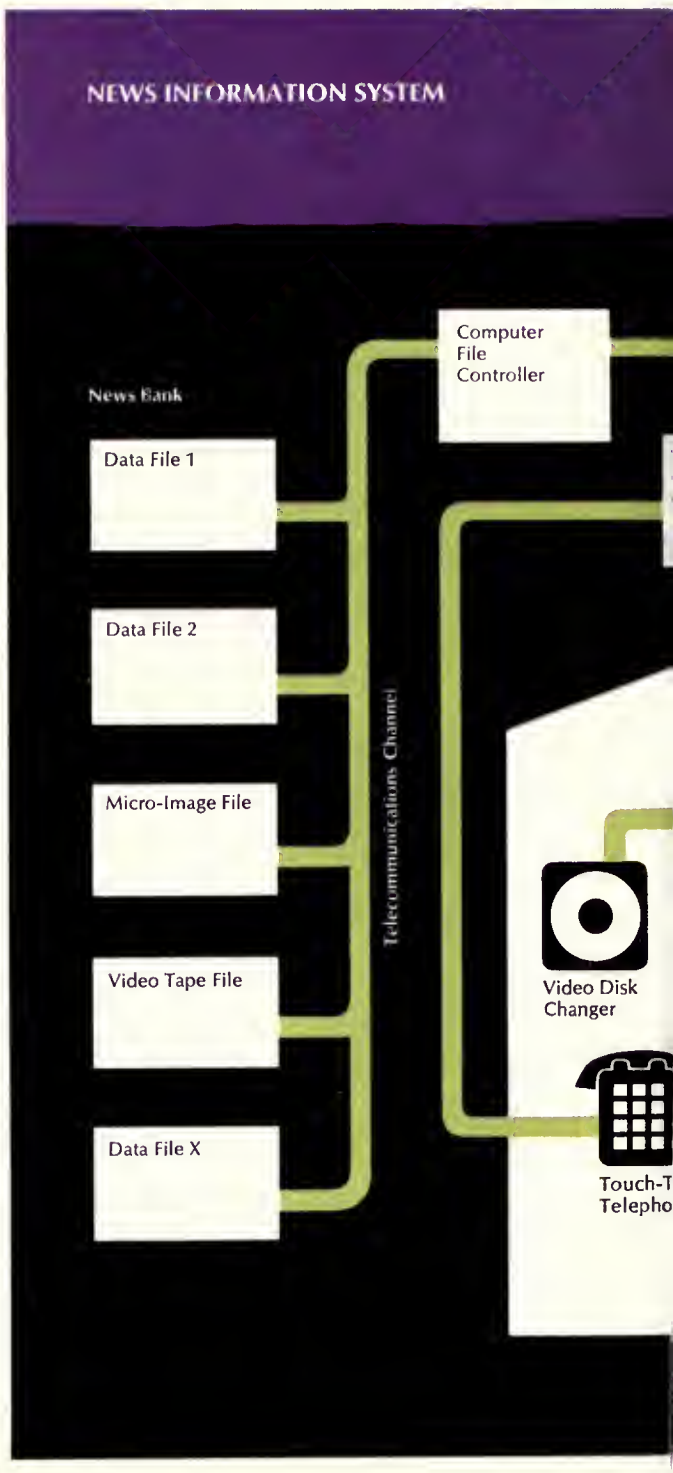
## Newspapers redefining purposes

In mentioning localization of the news, Tewlow zeroes in on another problem of newspapers: "They're having to redefine their purposes for existing," he says. "Radio and TV killed the extra edition. Also, while people are still vitally interested in national and international news, they're mainly interested in what's going on around their hometown and state — really, their *neighborhood*. Witness the success of the small suburban dailies and neighborhood weeklies. Magazines, on the other hand, are having a hard time. They've been trying to serve the general interest. Some have folded, and others are threatening to. But the newspaper has a unique capability that distinguishes it from other media — the capability of collecting, editing and disseminating information, in depth, on a time-critical basis. And it will continue to appeal to the general interest, because each reader can take advantage of the departmentalization of a daily paper, take what he wants and ignore the rest."

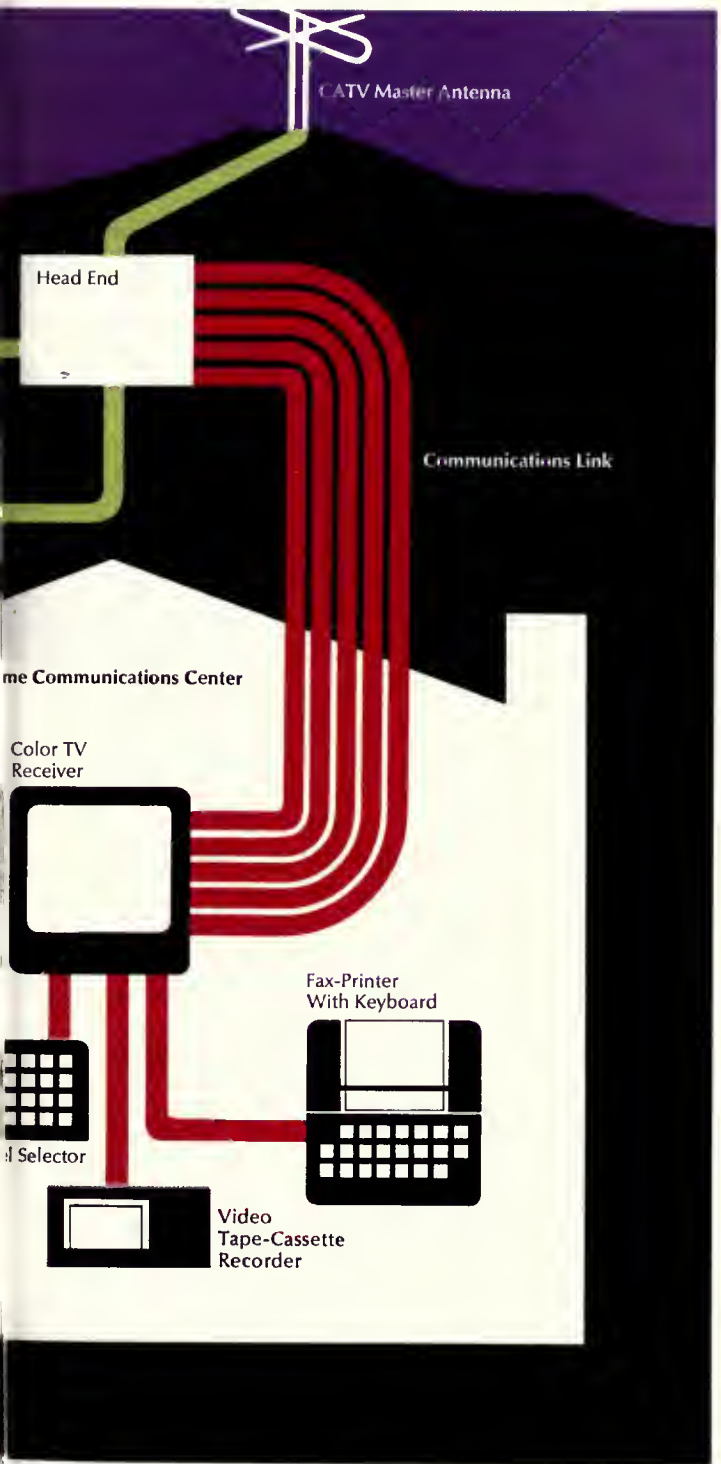
On the subject of telecommunications support of newspapers, today and tomorrow, Tewlow is ambivalent. "Europeans say we Americans are spoiled by the 'Rolls-Royce' telecommunications service we get. I remember after a demonstration a few years ago of facsimile, in which page one of *The Times of London* was transmitted by satellite from London to San Juan, Puerto Rico, where the A.N.P.A. was meeting, we asked for one more demonstration transmission. AT&T, Comsat and all the other companies involved groaned, but the American carriers said they could do it in half an hour. When the British learned we wanted another shot, their post office people advised it would take an hour. But when we told them we were setting it up on our end in 30 minutes, they came back at us: 'Well, if the Yanks can do it in 30 minutes, we can do it in 15.'

"In some ways Bell is superb. In others . . . well, they could stand improvement. We at the A.N.P.A. have observed a number of problems encountered by newspapers in getting telecommunications equipment needed for remote typesetting and related functions. Delays in shipping equipment and getting it installed have hamstrung too many newspapers, we feel. Sometimes the Bell company representative in charge of a newspaper's account doesn't alert the paper to the delay in time to at least plan for it and alleviate the problem somehow. There have been times when certain types of equipment that we felt should have been stockpiled by the Bell System were unavailable, and your people had to scramble around looking for it — and sometimes get it from other customers. One daily newspaper in the South was all ready to go last year with a computerized photocomposition system conversion program, when the telephone company suddenly said: 'The Dataspeed® equipment can't possibly be delivered on time.' Well, the rockets went up. It made no damned sense!

"We have another problem. You don't tell us about




Home communications centers, such as the one in the house at right, some day may receive late-breaking news and capsules and indexes of information from a master CATV antenna. Signals would be routed through a "head end" installation similar to a telephone switching office. Information received in the home would be stored automatically on video or data tapes, disks or cassettes. Each family member would constitute an "interest profile," as they do today. That is, one may want sports and national news and another, business or homemaking items. After reviewing what has been transmitted to them, they would call up the newspaper's computer file controller with a Touch-Tone® telephone and order the desired additional information. The computer would extract the information in seconds from supplemental storage units and transmit it by video, facsimile or high-speed teletypewriter, through the "head end" facility and into the home over a broadband telecommunications link. Written and graphic data could be received over a Picturephone® set or TV equipped with additional channels. At the same time, it's likely the old-fashioned newspaper on the doorstep or newsstand will still be around for those who prefer to digest their news like they did in the good old days.




your new services. We had one newspaper publisher stand up at a meeting and tell us about a 'marvelous new service' he uses in his classified ad department, called INWATS. 'You know,' he said, 'I raised hell with the telephone company because they didn't come in 18 months sooner and tell me about it. That delay may have cost me $100,000 in lost advertising based on my increased revenues since I put the service in.' And when we ask a telephone company salesman for literature on new equipment and services — have you ever read a Bell brochure? For-get it. It assumes that the reader is technically oriented, and there aren't a dozen newspapers in this country that have directors of communications, who know what's going on from a telecommunications standpoint. Laymen read this material, and it's too abstruse, too abstract."

## Super-industrialized society

Tewlow also complained of the way Bell companies move their Marketing people about with a frequence that precludes them from getting to know their newspaper accounts and *vice versa*. "Most of your people don't know enough about the newspaper business, its objectives and its problems to provide it the kind of service it needs," he says. "And they had better start learning the newspaper business, because, while we're demanding Rolls-Royce-grade service today, we'll be demanding S.S.T.-grade service tomorrow. This will be forced upon us by the super-industrialized society that Alvin Toffler talks about in his book, *Future Shock*. Newsmen, I think, are well equipped to roll with the punch of future shock, because they deal daily with change — they report it, they stay in tune with it. This may be a young man's business, but I've seen a few older editors lead the way toward modern electronic processes. The newspaper industry is going to demand more of the Bell System, because it's going to be more dependent on telecommunications to get its own job done. And the more dependent a newspaper gets, the more vulnerable it gets."

In the super-industrialized society, Tewlow be-

lieves, the newspaper will continue, despite technological change and new formats, to be a chanticleer. "Most news is bad news," he says. "The newspaper probably will continue to inform, to provoke thought and perhaps to persuade — although its powers of persuasion may be debatable. Its power to provoke probably will increase through use of multimedia, and as long as it provokes *positively,* not negatively, it will be performing its proper function."

Gene Gartner, division sales manager for the Long Lines Department of AT&T, has been working with the national news media — the wire services and some national publications — at AT&T since 1929. He is a 1927 graduate of the Columbia University School of Journalism, and Jules Tewlow calls him "the man who knows more about the news media from a telecommunications standpoint than possibly any other man in the United States."

Says Gartner: "The Bell System needs more knowledgeable people contacting newspapers with less emphasis on the revenue those newspapers generate. We also need to consider development of equipment adaptable to newspapers, such as portable teletypewriters, which would help speed production."

## Wire service crises

The interview with Gartner in his midtown Park Avenue office was interrupted by a crisis call involving the A.P. After attending to that, he returned to his interviewer: "We should make available to the press some of the tremendous knowledge we have at the Bell Labs."

The telephone interrupted again. This time it was a crisis involving U.P.I. That taken care of, Gartner continued. "Yes, we need to improve considerably in our service to the wire services, but one shouldn't overlook what all we've done for them, which is the other side of the coin. Some newsmen I deal with are mad at us for filing for an increase in their rates. That case is before the Circuit Court of Appeals in Washington now, and it may go all the way to the Supreme Court. The longer it's in an appeal stage, the longer the rates will stay where they are. But consider this: We have a history of meeting press demands for fast, efficient service — clock-hour schedules on teletypewriter service. Low telephotograph rates. Specially arranged network setups that improve reliability for the wire services. Special arrangements to handle fast-breaking news stories that require special coverage.

## Long Distance rate reductions

"Telephone rates in general, including rates to the press, have been reduced substantially over the past 20 years. If in no other way, the press has benefited by the countless reductions in long distance rates because of its heavy use of these facilities. Now we're allowing wire services to use multiplexing equipment on voice-grade channels, where they can get 18 or 20 teletypewriter channels on one circuit. We're letting the wire services jointly use service, as long as each user has station service on his premises — with some added charges.

"The basis of our position in the press rate case is the belief that customers should pay like rates for like services. There are 28 telephotograph customers. Six of them enjoy lower rates than the 22 others. They all should pay the same rate for the same service."

Gartner says that for most press users, the cost of telecommunications represents a small portion of their over-all operating expenses. "The per cent increase in their cost of doing business would be slight if AT&T's press rate increase is upheld," he says. "In engineering and constructing our network of basic facilities, we include facilities needed to serve the press *along with* those required for all others. Therefore, with respect to these aspects of our operations, no distinction can be made between the press and other customers. But, when we look at the services of which the press is a major user, such as private-line telegraph and telephotograph services, and when we look at voice-grade data service, we find there are identifiable characteristics introduced by the complex

nature of press operations. These characteristics indicate that press service is no less costly to provide than services to others. It probably is more costly."

In an effort to assure good press service, AT&T's headquarters maintains a full-time specialist in its Marketing Department. His name is Joe Lullo, and he came to AT&T from Illinois Bell in Chicago, where he helped coordinate telecommunications support for the last Democratic National Convention, despite a telephone work stoppage. Lullo's job is to keep abreast of the newspaper industry's changing communications needs and make them known to the Bell System operating companies. He also attempts to keep the newspaper industry informed of communications equipment and services available or under development and provides coordination and guidance to the telephone companies with respect to press and broadcast media service. He has a working knowledge of editorial, advertising, composing and press operations and is on a first-name basis with many editors around the country. He and Dr. John Pierce of the Bell Labs are the Bell System's representatives on the American Press Telecommunications Committee, through which they have helped introduce many of the telecommunications techniques being adopted by newspapers in their production today. (The A.P.T.C. was a brainchild of Lullo's predecessor, Walter Swancey.)

## Conferences to help press

"About 95 per cent of the responsibility for serving newspapers lies with the Bell operating companies," says Lullo. "We at AT&T have tried to supplement their function through such means as presenting exhibits around the country to demonstrate how newspapers can better utilize telecommunications. We've put on such shows for the A.N.P.A. and the National Newspaper Association (N.N.A. — composed principally of weekly newspapers). Right now we're preparing to go to the Bell companies with a working conference designed to identify and help solve problems relating to telecommunications service to the news media — both print and broadcast. We expect this conference to result in strenghtened relationships between our Marketing and Sales people and the news media toward the end of better understanding the media and their problems and providing better service to them more quickly."

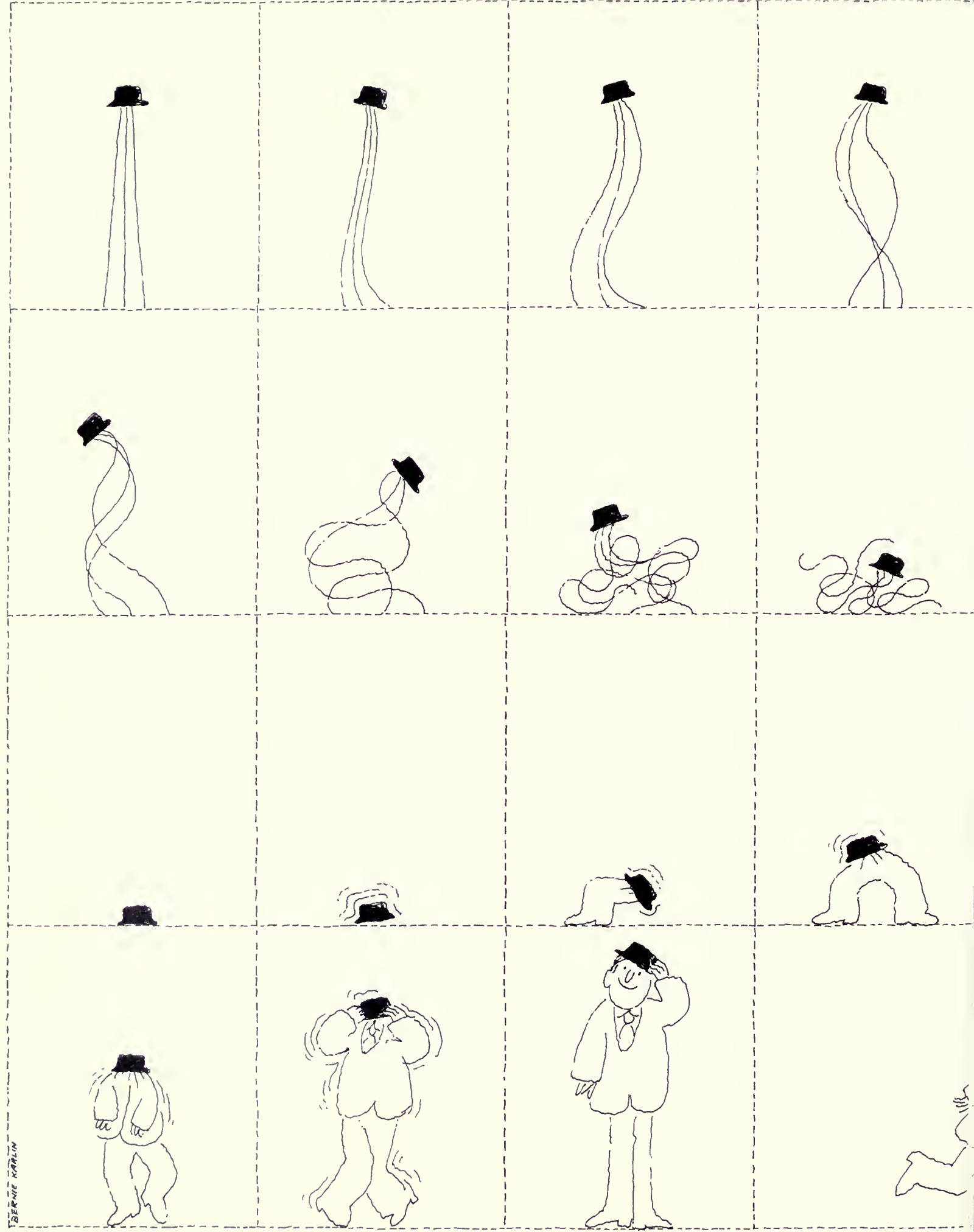
## Two natural allies

Lullo and Gartner agree on the need for more knowledgeable Bell people to coordinate with newspapers. "On the local exchange side," says Lullo, "I think there are certain telecommunications instrumentalities that could be developed to help the newsman to do his job, like certain telephone transfer features. In the long run, we should work more closely with the news industry, confer with the planning people on *each* paper or broadcast station, because they're not all going to plan the same thing."

"One of the really helpful services we have today is WATS — and INWATS — which can be a boon to most newspapers in their editorial and classified advertising operations. We need to make these and other services better known to the industry."

Lullo spends perhaps a third of his time troubleshooting press telecommunications problems. When a paper can't get what it wants locally, its editor or business manager calls the A.N.P.A., the N.N.A. or Lullo direct in New York. Like Gartner, his ringing telephone often signals a crisis, which could be hanging in Detroit, Los Angeles or Chicago.

AT&T, its Long Lines Department, the Teletype Corporation and the associated companies are attacking the problem of improving service to the news media. They have to. As the 21st century begins to collide with us, generating ever more psychic shock, two natural allies appear in focus: the mass communicators and the telecommunicators. Each will depend to some degree on the other for survival, while society will depend on both for intelligent movement and use of information.—*Marco Gilliam* □


BERNIE KARLIN

# Psychologists and Technologists— A New and Promising Partnership

Through the years, this business has earned a reputation as the best of the best in the physical and managerial sciences. Now, imaginative and practical new applications of behavioral science benefit Bell people, the technology they lead and the service they provide.

No doubt, back in the 1920's when the first businessman added a psychologist to his planning staff, he was considered as one in need of a psychiatrist, instead. Few people then could see how these seemingly "odd ball" professionals could help business operate more efficiently or increase productivity. Thinking is different today. Psychologists have won widespread acceptance in industry, and nowhere more so than in the Bell System, the leading industrial employer of psychologists.

This is true whether one uses the strictest definition of psychologist—a person holding a Ph.D. in the field, membership in the American Psychological Association, and professional experience; or a looser rule of thumb — anyone with a college major in the subject. About 50 Bell System psychologists meet the more rigid requirements.

Speaking solely of psychologists at Bell Laboratories, Dr. John E. Karlin, head of the Human Factors Research Department, says their employment alone represents the "greatest commitment in private industry to hiring psychologists for commercial engineering research and development work. Other organizations have hired psychologists in large numbers for defense work, but that, of course, is paid for by the Federal government," he says.

As evidence that they have long passed the days when their shaky alliance with business rested upon proving that they were not all that different from other corporate contributors, Bell System psychologists note that one member of their profession has been named vice president of an operating company, and one an assistant vice president. Both H. Weston Clarke Jr., vice president, Bell of Pennsylvania, and John J. Hopkins, assistant vice president, South Central Bell, are psychologists.

Here are some of the functions psychologists are performing in the Bell System today.

**Selection tests:** They have been used in the Bell System in some form since the 1930's, but their use has been refined since the late 1950's, when more psychologists were hired full time. The tests are mainly aimed at determining whether a person can learn to do a job. The philosophy behind them is that a properly conducted testing program results in hiring people of greater ability, more efficient placement and more sophisticated manpower planning. Recently, most of the work of AT&T's Dr. Donald Grant, Personnel Manager-Research, and his assistant, Dr. Sydney Gael, has been devoted to assuring that Bell System tests meet nondiscriminatory guidelines established under the Civil Rights Act of 1964 and by the Office of Federal Contract Compliance. Grant and Gael coordinate employment test research in the operating companies. They have made studies of tests for plant craftsmen and service representatives, and tests for operators and clerical personnel are now being studied.

**Management selection and promotion:** In an effort to learn more about the characteristics and development of young businessmen as they become, or try to become, middle and upper managers of a large concern, the Bell System initiated a Management Progress Study in 1956, under direction of Dr. Douglas W. Bray. Four hundred and twenty-two men from six operating companies were involved in the study. Two-thirds of them had started as new college graduates, and the remainder were men who began their careers as vocational employees and quickly ad-

vanced to lower management positions. All were deemed middle-management potential.

Each man went through an assessment center designed to discover abilities, aptitudes, motivational and personality characteristics, attitudes and interpersonal competence. Although the Management Progress Study was instituted as a long-range program, it produced some short-range results. Among its effects were changes in college recruiting standards and methods, and in the handling of college recruits during their first years in the System.

In 1958, at the request of Michigan Bell for help in the selection of supervisors, the first permanent assessment center was established. Since then thousands of Bell System employees have gone through such centers. Psychologists within and outside the Bell System hail the centers as one of the highest achievements in the state of the art.

**Human factors research:** Nothing projects the image of the psychologist as a Dr. Strangelove more quickly than mention of human factors engineering. Conjured up is the image of man enamored of his machine. But the Human Factors Engineering Department at Bell Laboratories does not seem so intent upon making one love his machine, as tolerate it.

"We work in the crack between man and machine," says John Karlin. "Fundamentally, we study man's communication abilities, limitations and preferences."

In layman's terms, this means the Human Factors Engineering Department assists in developing principles for design of communication equipment, studies man's ability to use them, and determines why he prefers to communicate in one form rather than another. Proposed systems and services are simulated by the group to test reaction to them.

**Voice and data transmission:** Dr. Richard Hatch, an engineer who heads Bell Labs' Voice and Data Transmission Department, is assisted by two psychologists. Their mission is to keep a constant check on quality of the entire network. Since 1962, they have been setting systemwide transmission objectives. Because a network totally free of impairment would be too costly, the voice transmission section determines the optimum point where cost of improvements and user satisfaction coincide. The section also sets design, manufacturing and maintenance criteria. AT&T incorporates the maintenance objectives in practices for craftsmen.

**Behavioral Statistical Research Center:** Currently directed by Dr. Max Mathews, the Center began as the Communications Social Science Research Laboratory in 1955 and, since 1963, has concentrated on mental and visual research. Under leadership of Bell Labs' Dr. Oliver Holt, it was here that programmed instruction was shaped into a powerful training tool in the Bell System.

The Center is now studying man's ability to absorb, store and retrieve information, attempting to provide better tools for analyzing data, investigating psycholinguistics and probing the human memory.

**Office of Training Research:** The first Office was set up by AT&T in 1962 to utilize principles of programmed instruction developed at Bell Laboratories and elsewhere. Bell System psychologists boast that the System also was among the first in industry to include task analysis — determining the job to be done — as an integral step in developing training programs. This has allowed the System to develop training programs that set work performance standards for both trainee and instructor, eliminating irrelevant instruction.

A training research group now headed by Dr. Harry Shoemaker at AT&T assists all departments in developing training packages, improving their managerial procedures and designing jobs.

The training of traffic operators, however, is a full-time job directed by AT&T's Dr. Richard O. Peterson, the only psychologist assigned to an operating de-

partment. Peterson's group constantly updates training programs and redesigns traffic jobs as new technology is developed. They attempt to keep the operator's job challenging by incorporating duties the machine cannot perform.

**Business Information Systems:** This program, directed by Dr. Oliver Holt, has the largest contingent of Bell System psychologists — 40 of the 65 members of Bell Labs' Human Performance Technology Center. Whereas the Human Factors Engineering Department "works in the crack between man and machine," the performance center is concerned with performance of people who use machines, especially computers. The center assists B.I.S.P. design groups in developing "personnel subsystems" or the activities of people who are a part of computer-based information systems. The assistance takes three forms — practices and standards for developing personnel subsystems, training in design and skills needed to develop personnel subsystems, and technical direction and support through hands-on assistance from qualified specialists. The Systems Training Department in the center also provides all B.I.S.P. training for computer subsystems development.

**Management resources development:** This Western Electric organization, under Dr. Paul Patinka, handles everything from training of ghetto youth in Newark, N.J., for entry-level jobs, to maintaining an inventory on top managerial potential. The resources division is developing training programs, experimenting with job enrichment and an assessment center and performing manpower forecasting. It also administers college and supervisory development programs — a high-risk-high-reward program for college graduates and second level employees.

**Interpersonal relations:** Almost nothing angers Bell System psychologists more than being called "shrinks." Perhaps the only Bell System psychologist the term might be alleged to fit is Walter Smith, group supervisor for management development at Bell Laboratories, Murray Hill. Smith is on extended leave at the University of Arizona, obtaining a Ph.D. in psychological counseling. As part of the Administrative Appraisal and Placement and Development Section at Bell Labs, Smith and his group attempt to develop what they call the "interpersonal competence" of Bell Labs managers. The group develops seminars on human relations communication (Talking with People), managerial accountability (supervisory responsibilities) and administrative and urban minorities workshops.

The human relations and urban minorities workshops resemble the average person's image of the work of psychologists. In the latter program, Smith says the laboratory attempts to change behavior patterns and claims some success. But Smith doesn't attribute his success to any "tricks" of the behavioral scientist. Behavior patterns are changing, Smith says, because his group is convincing participants that the weight of the institution is behind the practices and procedures they teach.

**Management Sciences:** The section employs two psychologists who have among their assignments the task of ensuring that the human element is considered in long-range corporate planning. Among their concerns are such areas as labor force, the future economy and changing values about work and life-styles.

The work described in the foregoing examples obviously represents a more refined use of the psychologist in industry than during earlier times when business hired him mainly to handle problems of efficiency resulting from boredom and worker fatigue, or, immediately after World War II, when employee selection captured attention.

Things also are far improved from the days when psychologists felt compelled to hide their doctorate degrees. But as well received as psychologists are in the business world today, some do not think their

role is always properly understood or their contributions the best they could make. They do not blame industry for lack of support but cite members of their own profession whom they say have not always been honest in explaining what psychologists can do.

The result is that stereotypes still linger, they say, and psychologists who want to do things outside the popular concept of their role find themselves treated cautiously or ignored.

"The biggest problem is the application of results," says Paul Patinka. "I think we know a lot more than we can possibly use.

"It's the line managers. They want us to simplify things. They want something they can get an easy handle on, or they will reject it. It's very difficult to be a professional where everyone is an expert," he says.

Dr. William Fox, manager of the Personnel Subsystems Department, B.I.S.P., says the problem lies with the "eminent *Dr. Everyman,* who has become an expert on behavior through behaving and observing others behave, especially his children." *Dr. Everyman* deals with psychological problems on a superficial level, says Fox.

Fox says the nonprofessional's fixation with "frills" has led to efforts of questionable value such as sensitivity training and attempts to change racial attitudes through role playing. "Having black people put on white masks and white people put on black masks has considerable face validity, but its true effectiveness is uncertain at best," says Fox.

All psychologists don't share these views. Donald Grant thinks many industries and especially the Bell System are making exceptional use of the psychologist's professional expertise and at the same time are providing excellent support.

Grant says that the work of Bell System psychologists, and the psychologists, themselves, are highly regarded outside the company. He notes that Douglas Bray, Personnel Research director, is president-elect of the Division of Industrial and Organizational Psychology of the American Psychological Association. Grant is secretary-treasurer.

Fox and Oliver Holt note that psychologists, themselves, haven't always applied a relevancy test to their own work. They cite their activities in B.I.S.P. as an example of what can be accomplished when psychologists are fully accepted and "*Dr. Everyman's* influence is at low ebb." Max V. Mathews, the engineer who heads the Behavioral and Statistical Research Center at the Bell Labs, supports that position.

"There is no shortage of behavioral problems in the world or the Bell System," he says. "In fact these are the most difficult problems we face. What is not clear, though," Mathews continues, "is whether psychology has developed significantly enough to have an impact upon these problems. We think it does have a definite impact upon certain areas, and these are the ones in which we are working."

Functioning in the area of interpersonal relations, Walter Smith also thinks he must do what is practical. "These are scientific minds I am dealing with here," says Smith. "You can't hand them any psychological mumbo jumbo. These are the type of people who, if their wives say *I love you,* ask: 'How do you know that? To what depth? What scientific evidence do you have to support that contention?'"

About $6 billion spent nationwide in behavioral and social science research during the past 10 years has yielded much information that is waiting to be used, says Fox. "We cannot afford to ignore this body of knowledge. Behavioral science, not just psychology," Fox says, "must be placed on a developmental product-oriented basis, charged with producing implementable programs, packages and plans measured solely on their benefit to the system."

Fox points out that the Bell System is in a "people crisis." "The turnover rate is increasing, more sophisticated technology is being introduced every day, and more people are pushing from every side to do more social things," he says. "The System must find better ways to use the talents of its professionals. The Bell System has led in taking advantage of knowledge in the physical sciences. There is no reason it should not lead now in the use of the behavioral sciences." □

**The Nonyouth Bag**

*(continued from inside front cover)*

with leading the Allied forces to victory in World War II — a critical national necessity for Americans at the time, no matter what one's age, position or politics — gives further clout to the nonyouth case. When Winston Churchill gave his epic "We shall fight on the beaches . . ." speech to the House of Commons during Britain's blackest hour in 1940, he was 66. In 1944, when the Allies had turned the struggle around in Europe and in the Pacific, Admiral Mountbatten was 44, General Bradley was 51, Generals DeGaulle and Eisenhower were 54, Field Marshal Montgomery was 57, General Patton and Admiral Nimitz were 59. General MacArthur was 64.

As in business, political and military leadership, the loftiest names in medicine and physiology, starting with Hippocrates, have been those whose uncommon abilities and determination were nurtured by experience.

**Nobel prize winners**

Dr. Jonas Salk was 40 when he introduced the first hypodermic vaccine for poliomyelitis in 1954. Dr. Christian Barnard was 45 when he performed the first surgical transplant of a human heart in 1967. Alexander Fleming was 47 when he discovered penicillin in 1928. Louis Pasteur discovered methods for inoculation and vaccination against anthrax, rabies and chicken cholera between 1880 and 1885, when he was 58 to 63 years old. The three scientists who shared the Nobel Prize for medicine last year were 58, 59 and 65. Nobel Prizes for Peace, Literature, Physics, Chemistry and Economic Science went to men whose average age was 57.

In athletics, the man bites dog maxim takes a somewhat different twist. The older the performer, the more newsworthy his performance. Such examples as golf's Arnie Palmer, Pancho Gonzalez of tennis and pro football hero George Blanda, all past 40, further illustrate that nonyouth is not sitting around on its duff waiting for rigor mortis. John Unitas of the Baltimore Colts, no slouch even to under-30 sports buffs, is 38. And it should warm the cockles of many a middle-aged heart to know that the world's longest tightrope walk was accomplished last year by 65-year-old Karl Wallenda. He walked 821 feet over a rocky, 750-foot gorge with no net beneath him. He took 20 minutes. On the way, as a sort of added fillip for onlookers, Mr. Wallenda did a couple of headstands.

**Sixty-year-old champion**

There are countless other examples of nonyouth athletic expertise. Jersey Joe Walcott won the heavyweight boxing title in 1951 when he was 37. Pierre Etchbaster reigned for 27 years as the world amateur tennis champ, retiring in 1955 at age 60. A few years ago, C. Arthur Thompson of British Columbia shot a 96 in golf when he was 97.

Whatever the endeavor, nonyouth has done its share through the ages, and then some. Mankind's newest and boldest venture, space exploration, is a continuing case in point. Alan B. Shephard Jr., who led the most recent Apollo team to the moon and hit a golf ball on it, is 47. John Glenn, the first American to make an orbital flight, was 41 when he made it in 1962. Neil Armstrong, the first man on the moon, was 39 when he stepped down from the Lunar Excursion Module *Eagle* onto the Sea of Tranquility in 1969. Edwin Aldrin, who followed him, was also 39 — about the same age as Shockley and Bardeen when they and Brattain invented the transistor and transformed the electronics age. Such men, and thousands of men and women of that age and older in this nation and in this business, are the ones Mr. Lilley meant by "the backbone of the organization."

The nation and the business depend on youth with its idealism and energy. But certainly no more than on those who have been through the fire. □

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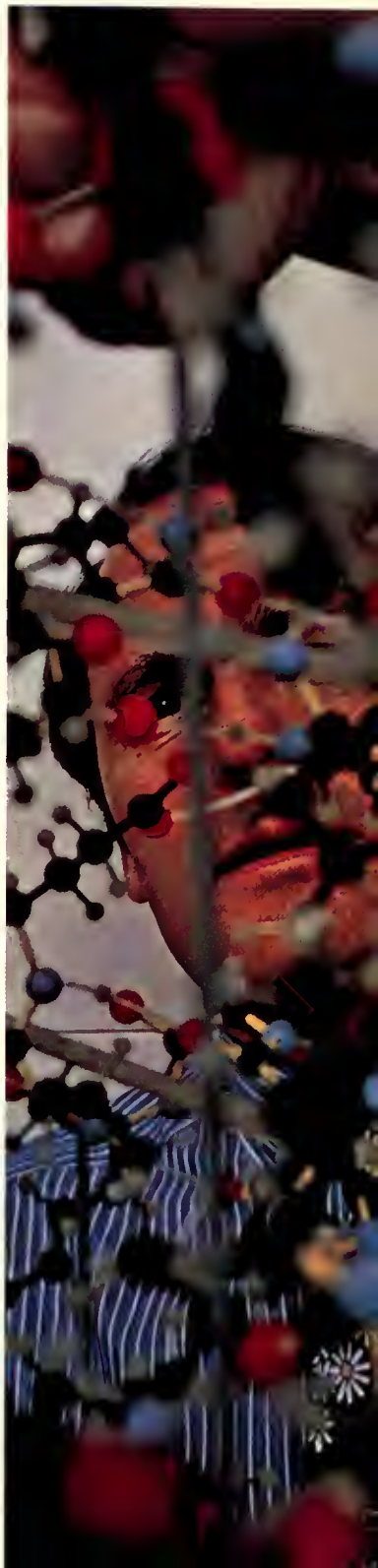

# The Spirit of the Cobbler

*"The high prize of life, the crowning fortune of man, is to be born with a bias to some pursuit, which finds him in employment and happiness."*
*—Ralph Waldo Emerson*

In a small building on the main street in the town of Mountainview, in the Pocono Mountains of Pennsylvania, is a man who makes and sells shoes. He wears a leather apron, his sleeves are rolled up over his elbows, and his working quarters are a mess. He is well known in the town, for he is an elderly gentleman and he has been there a long time, making boots and shoes. The demand for his product is strong, both from residents of the communities thereabouts and from tourists from Philadelphia and New York and other large centers who visit the nearby winter and summer resorts.

The shoemaker has been trying for more than a year to hire a suitable helper, a man he can train to take over the business, a man to be his own boss, a man to put in the exhausting hours and shoulder the responsibilities such a vocation requires. But no one wants the job.

It is not surprising that the shoemaker cannot attract an apprentice. He offers no company-supported savings, health and insurance plans, no pension, no vacation arrangements that automatically expand with an employee's additional years in the business, no potential for an impressive salary or administrative authority. What the cobbler offers is long hours, hard work and the opportunity to feel indispensable. It is hardly the stuff of which public status is made. It is not at all the objective of the vaunted faculties who prepare the nation's youth

in the engineering, business and liberal arts schools.

While it is fact that countless aerospace scientists, stockbrokers and advertising executives are without work these days as the shoemaker labors mightily to meet the steady demand for his carefully fashioned product, that is not the paradox — interesting though it may be — with which this article is concerned. The thought that occurred to a visitor to the cobbler's untidy but bustling premises was that cottage industry, for all its quaintness and flaws, has something important to say to big business about *individual indispensability* in this age of task force technology, multilayered management and diluted accountability.

In the opening pages of this magazine, Peter Drucker discusses some of the people problems inherent in the shift from manual to knowledge workers in the U.S. labor force. Yet, this same blue-to-white-collar transition, the present phase of the more protracted evolvement of cottage industry into a technology-based economy, poses threats to corporate organizations quite apart from the personal needs — such as second careers — of knowledge workers themselves. Foremost among such threats is the lack of individual importance that too many people in big business and big government seem to feel, as compared, for example, with the total-involvement ethos that marks employees of very small businesses. While feeling half-used is unhealthy for any man, when this feeling is compounded many times within an organization, it has a dangerously debilitating effect on the large enterprise as an entity.

An earmark of a well-run organization, of course, is depth and versatility of personnel to such degree that people can be reassigned or lost to retirement or competition without the enterprise losing so much as a beat. There is a personal, psychological by-product to such organizational capability,

*(continued on inside back cover)*

# Managing and Measuring

# The New Knowledge Worker

by Peter Drucker

In considering factors in the business environment today that affect not only the telephone industry but all business, one may logically start with productivity. This is an area of the economy which, 15 years ago, most of us thought we understood and were working with effectively. Not so today. We no longer can assume that we understand productivity and know how to improve it.

There has been a tremendous shift in our work force: Fifteen years ago manual workers were the central productive factor in this society. Today in our society, and increasingly in *all* developed societies, the central cost factor — which is not quite the same thing as the central productive factor — consists of *knowledge* workers. These people do not work with their hands, do not use brawn or manual skills. They use concepts and theories. In that sense, file clerks and computer programmers are knowledge workers.

So society's center of gravity has been shifting toward knowledge work, but we don't know how to make knowledge work productive. At least, we don't know how to measure its productivity. We made manual work measurable at about the turn of the century. It was only after we had learned that manual

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*A native of Vienna, Peter F. Drucker is a noted management consultant, economist and teacher. A former professor of philosophy and politics at Bennington College in Vermont, since 1950 he has been Professor of Management at New York University's Graduate School of Business. His books include* The New Society, Landmarks of Tomorrow *and* The Age of Discontinuity. *This article is drawn from a talk he gave to an AT&T management group.*

productivity is not a matter of working harder and of sweating more, but of working smarter and of making manual work manageable through *managing* it, that we could see the possibility of improving productivity. We achieved that competence when we realized that productivity is the design of the job and not the sweat of the workingman's brow.

We haven't yet reached that stage in knowledge work. All we know today is productivity of knowledge work is vastly different from that of manual work.

## Making the institution innovative

Productivity is the central problem of economic policy, and I think it will be in all developed countries for the next 15 years. One of the things about productivity which makes it a problem lies essentially in the fact that the knowledge worker is becoming the cost center of our whole economy. Education, for example, is becoming the major social expense in every country, far ahead of defense, far ahead of health care, far ahead of housing.

Yet, even with a shift from measurable manual productivity to a nonmeasurable knowledge-based productivity, we do have to increase the profitability of our economy, for two reasons.

First, we suddenly have a major new demand that will greatly increase the cost of production: the demand to protect and restore our environment. The need is great, but the danger is also great, and there are many people who toss environmental needs around without thinking. The time has come to think them through: In what areas can we achieve results? How much are we willing to spend? What is the payoff level? The cost structure of our economy will go up very rapidly, and there just isn't any way to pay for it, except by higher prices or higher productivity.

Secondly, we need business profits. The profits reported the last five years are an illusion. Business has been running at a dead loss the last five or six years, because of inflation. If business adjusts depreciation charges fully to inflation — in other words, if it maintains the physical plant — it has no profits.

And we *do* need more profit, because the number of people entering the labor force in the next few years is going to be significantly larger than it's been in the last 15 years. The babies born in the big baby years, from 1947 until 1957, are the ones who will enter the labor force. We will have to create jobs for three to four hundred thousand young people each year. And a job in the American economy requires a 10- to 20-thousand-dollar capital investment.

We don't know any answers yet, if only because we can't really define productivity of knowledge work. But productivity is the first requirement, and it's going to be increasingly the challenge to the younger people in the world's business community.

If productivity is the first problem area of economic policy now and for the next 15 years, the second problem area is that of learning to make the large institution innovative. During the last 70 years we have spent a lot of time and thought on learning a little about managing large institutions, which at least is an objective we could already define.

## Technology travels more slowly

About 60 years ago, for example, nobody had ever tried to do what the builders of the Bell System and other industrial giants then started to do: namely, manage large and complex human organizations. That was, indeed, something new under the sun. Armies, the oldest complex organizations, were always very shortlived. After a campaign the army was disbanded or went back to where it came from. Other than for armies, there was really no need for large organizations, and certainly not for organizations which brought together many people of different knowledges and skills for joint performance.

The large, complex organization is a creature of this century. We had to learn how to run it. Perhaps we don't do a perfect job even today, but at least it doesn't fall to pieces every five seconds.

Now we face a period of exploding technology.

Fifteen years ago the telephone looked like a very secure monopoly. It is by no means that secure today. Technologies are exploding in unexpected ways; we now face a period much akin to the last third of the 19th century, in which a new major invention, creating overnight new major industries, appeared, on the average, every 17 months.

I do not, however, believe that technology travels quite that rapidly these days. It is demonstrably slower than it used to be. The one significant advance of the Middle Ages in health care was the development of spectacles. Friar Roger Bacon, in the wilds of Yorkshire, made his experiments in 1282, and by 1285 glasses were common both at the Papal Court in the south of France and at the Court of the Sultan in Cairo. Three months after Edison had finished in Menlo Park, Edison light systems were installed in London. Three months after Alexander Graham Bell had filed his patent, the English Bell Telephone Company sold telephones in London. Few technologies travel that fast today. *Information,* on the other hand, is diffused much faster now.

## One of the few exceptions

The significant change is that today's innovation may not originate within the large enterprise, but will have to be developed and marketed there, because that's where the two necessary ingredients for development and marketing are: money and people. It is in development that the money is needed, not for innovation. And people are needed for development and marketing — trained, skilled, professional people. Today such people are found mostly in large organizations — in the knowledge organizations.

The large, developed business will have to learn to be innovative, which it has rarely been. One of the few exceptions can be found in the Bell System. That organization set out many years ago to make it possible for a very large enterprise to build a uniform system over a continent. To this day it is essentially unique. Nobody has imitated the Bell System in its basic thinking. But, generally, large institutions are not innovative. They can modify, but they cannot innovate. They can do a little better than what is already being done, but they cannot easily do the radically new, if only because almost everything that's new looks so small.

If an enterprise runs several operating divisions of 50 million or 100 million dollars each, it has enough work to do. One thing one learns about operating is that there's always a crisis, and it always has to be taken care of "yesterday." And so one doesn't usually put one's best men on the new — on the things that are only important rather than urgent.

I think the Bell System with its Bell Laboratories, taught a basic organization lesson: Corporate innovation requires a separate innovative organization, which must be integrated into operations. This is not easy. Even Bell Labs was not an instantaneous success. It succeeded because top executives believed in it and worked at it.

Let's look again at the knowledge worker whom we will have to manage and whose productivity we must learn to measure. The knowledge worker will have to be productive and, at the same time, achieving. By the nature of his talents, he is not satisfied merely to earn a living. If he becomes satisfied, he soon ceases to be productive. Knowledge is a peculiar resource. If it does not improve and grow, it deteriorates quickly. It cannot be stored. What *can* be stored is information. And most of what the world thinks of as information is simply raw data.

## Knowledge should be productive

Knowledge has to be improved, challenged and increased constantly, or it vanishes. The knowledge worker, therefore, is right in not being satisfied with just a living and a career. Incidentally, in that sense there has been a profound change, a change which I happen to approve of in our society.

The knowledge worker is a different kind of worker, not only in what he brings to his work but in his

expectations. He is right, because he expects knowledge to be productive. We will have the challenge of making the knowledge worker productive and achieving. I believe that Bell System people have made large strides in job enrichment, especially for manual and clerical employees.

But what is business doing today that is comparable for its managerial, professional and technical people? I don't know. And yet that's where the need is greatest. That's where jobs today for the young people are most tightly confined and defined, are least challenging and do not permit learning.

Two most important truths young people have to learn that we don't allow them to learn: First, to get the sense of achievement by doing something they think they aren't really capable of doing. Anybody who has ever done this seldom loses that thrill. It is the only motivation for knowledge people.

Secondly, one also has to learn what one c*annot* do. One has to fail. One has to crawl back with one's tail between one's legs and say: "I can't do it. This is beyond my capacity." Again, one has to know what one c*an* do, because what has been done once can be done again. If our young people don't have those twin experiences, they haven't learned anything.

We're depriving our young knowledge people of the learning experience. We're making it impossible for them to achieve, and we're making it impossible for them to fail. We are looking at yesterday's assembly line worker and transferring practices appropriate *then* to the young knowledge worker *now* — and such practices simply do not fit. It is leading to a demoralized knowledge force.

## A need for a second career

We will also have to accept the fact that in most knowledge work a man needs a second career after 20 years. The great demographic achievement of this century is not the extension of life span, but the extension of *working* life span. Two generations ago most people went to work at age 12 or 14, but they had a working life expectancy of not more than 20 to 25 years, particularly on the farm. By their late 30's, people were disabled by accident or arthritis and were tired and worn out.

The ditch diggers who were hired a little earlier to build the transcontinental railroads had an average working life of 18 months. After that time, they were gone, finished off by syphilis or work or accidents or drink. Nobody expected them to last longer.

If one looks at the earliest pension plans, such as those for civil service, it is clear that not a single one was designed for the retiring employee. They were established to look after the widow and children. The oldest plan happens to be of Austrian origin, dating from 1803, which provided no pension for the employee. If he lived to 65, and retired because the emperor accepted his petition to do so, the emperor would then consider a pension — a case which rarely arose. But there was a vested annuity for widows and children, right from the start, and that provision remained unchanged until Hitler went into Austria.

## Working life is too long

People didn't always die early, but they commonly grew unable to work. Today we expect most people to retire at 65, physically and mentally in working order, capable still of doing most kinds of work. That's a tremendous change. We have responded to the change by keeping people in school much longer; not because we need education or because they're necessarily learning anything. We keep them there because we don't want them in the labor force: Their working life would be too long.

Even the 45 working years of the average knowledge worker today is probably too long. But the longevity of knowledge work is perplexing. Manual workers retire and move to Florida, where they are perfectly happy not to do anything. Manual work tires, and years of rest are welcome. Conversely, knowledge work exhilarates and excites. The knowledge worker gets into the habit of working, and he

doesn't want to quit, even though by age 45 most knowledge workers have lost their zest. This isn't true of the few who get to the top and of the few who really excel, but it is true of 90 per cent. The condition is less pronounced in business, because business has the greatest job mobility of all major institutions. People can move from one company to another, and frequently do. Still, in knowledge work the good market researcher who at age 29 was enormously excited about the toy market knows all about the toy market by the time he's 45 and is really not very excited about it any more.

So we will have to work very hard at systematically finding second careers for knowledge workers. I have in the last ten years personally placed some 200 ex-military officers. Before coming to my office, somebody had told them they needed Ph.D's. They were convinced they couldn't otherwise get a job. They were far more convinced than their civilian counterparts because they had lived an isolated life and did not consider themselves fit for civilian work. The fact is, if a man has been an accountant at a naval base, it isn't that different from being an accountant in some other place. But retired military people don't know that, and they feel defeated before they start a second career.

I have had to talk them into being willing to be placed, and to disabuse them of the notion that Ph.D, degrees were prerequisite to success. I placed all of them in such positions as business managers of law firms, accounting firms and small colleges. They're happy people. They have come to life again. They weren't burned out at all; they were just tired.

## Special purpose institutions

Provision for second careers is going to constitute major social change, because our institutions are totally unprepared for it. We will have to learn that what used to be considered the professions are essentially careers for older workers, if only because in a profession where a man is on his own, experience and judgment are far more important than knowledge. We have to come to look upon these professions as essentially opportunities for the knowledge worker to have a second career. But we will also have to learn to use this need and this opportunity for increased mobility among institutions.

The young know that our society has become one in which every social task is carried out in and through a special purpose institution that is highly organized: the hospital, the university, the armed services, government, business, labor unions, research labs and so on. Youths see an institutionalized world, and they are right. But their most radical reaction to it, "Let's tear it down," isn't going to get them anywhere. The challenge before today's youth is not to get rid of institutions, but to make them perform. That is a tougher challenge.

## Opportunity for improvement

Youngsters see reality. We often do not. We accept instead the myth of seventeenth century political and social theory, which is still being taught in our schools, in which there is no institution; society is molecular; there's only one vehicle — the state, the government. Or we see the business enterprise as the exception to a noninstitutional world, when in fact, the business enterprise was merely the first institution to grow.

Today we have a multi-institutional world. And in that world is opportunity for social improvement, because the institutionalized world provides the freedom to solve the problem of the tired knowledge worker. Many need only a lateral shift to find renaissance. The man who moves from being an accountant in a business to being an accountant in a hospital does exactly the same thing, but with a different vocabulary, different values, different relationships and challenges. He comes to life again. It's all he needs, very often, to revive. We must do what we can — and that is a great deal — to see that he *does* revive and remain productive. Concurrently, we must continue in our quest to measure that productivity. ▢

# Society and the Balance Sheet

## by Robert D. Lilley

Statements and articles on corporate social responsibility have flowed in recent years from the mouths and pens of such eminent people as John Kenneth Galbraith, the economist and author; former Harvard Law School Dean Eugene J. Rostow, and consumer advocate Ralph Nader. *The Wall Street Journal, The New York Times* and other leading newspapers have carried countless articles on the subject. Milton Friedman, perhaps the country's best known conservative economist, has dealt with the issue, as have M.I.T. Professor and Nobel laureate Paul Samuelson and *The National Review* editor William F. Buckley Jr. Major articles on corporate social responsibility have appeared in such national magazines as *Time, Newsweek* and *Fortune*.

Why all this concern about the social role of the American corporation? Probably the principal reason is the activities corporations are engaging in today.

Partly due to the failure of other institutions, corporations have felt compelled, for example, to train poorly educated blacks; to assist in the development of black-owned businesses; to build or provide mortgage money for ghetto housing; to operate child-care centers; to help strengthen the management of urban school systems; and to make direct contributions to all kinds of efforts and agencies directed toward social improvement. Many people believe, perhaps with justification, that such activities go well beyond the classic function of the corporation. Some go so far as to say the corporation, by engaging in such activities, actually undermines our economic system and threatens to pre-empt the role of government.

As I interpret the current debate, the issue is not so much a question of whether the corporation has a role to play, or a contribution to make toward social improvement. Rather, the issue seems to be: *What should that contribution be,* and under what circumstances should it be made?

Milton Friedman, for example, contends that the social responsibility of business is "to use its resources and engage in activities designed to increase its profits." But even he concedes self-interest might dictate that corporations engage in *limited* kinds of socially directed activity.

Economist Paul Samuelson takes the position that the large corporation today really hasn't much choice. It not only is *able* to engage in socially directed activities as a result of court rulings and established business norms, but it is *expected* to. According to Samuelson, it is no longer possible for a large corporation to ignore the public interest and operate on the basis of immediate profit. If it did, according to Samuelson it would be in trouble, not only with other businesses, but also with the stock exchange and the Securities and Exchange Commission.

Columnist William Buckley Jr. has made the point that under a "free enterprise" system it is not the altruism of management, but the "anonymous mechanisms" of the marketplace — principally competition — that should regulate the allocation of surplus re-

sources. "If it has surplus resources," states Mr. Buckley, "a successful shoe company desiring to benefit society should lower the price of its shoes. That — not gifts to local charities, or profit sharing with employees — is the impartial way of distributing its benefactions."

Eugene Rostow has stated, in effect, that business has enough to do just taking care of business. He feels we should concern ourselves solely with the maximization of profit and remain indifferent to the public interest. Mr. Rostow some years ago contended that the public does not regard the corporation as an appropriate institution through which to set public policy.

This statement may have been true five or six years ago. But public opinion changes.

## Pass the ball to business

Two years ago, a third of Americans were of the opinion that the elimination of poverty, for example, was a responsibility of government *and* business. And one out of every eight were of the opinion that this was *entirely* the job of business. In November 1970 a poll by the Opinion Research Corporation indicated that 60 per cent of the general public considered a main responsibility of business to be keeping the environment free of pollution. They rated this right alongside taking care of customer needs.

According to that same 1970 poll, 47 per cent of Americans felt another important responsibility of business was to help sustain full employment. Thirty-eight per cent felt a main responsibility of business was to hire and train the disadvantaged. Another 29 per cent included among the major responsibilities of business that of assisting in cleaning up and rebuilding big-city ghettos. Stockholders, however, according to a recent poll, generally want corporations "to attend to business, stay honest and pay dividends."

It seems pretty clear that we are witnessing a shifting of public expectations. Obviously, many people do feel that business *does* have a social responsibility. And they expect this responsibility to be discharged in many ways.

## For the greater good?

I would have to agree that there has been, in the past, some hypocrisy surrounding the social role of the corporation. I think this is changing. I recall, for example, the early days of the civil rights movement, and the movement for equal employment opportunity. It seemed then that every action by corporations to improve conditions for minorities always was preceded by a pronouncement on why — always after a great deal of soul-searching and moral agony — the company felt compelled to "do the right thing." Not in its own interest, mind you, but always for the greater good of mankind.

Fortunately we are getting away from this. In the Bell System we have tried to develop a sound rationale for what we are doing to help bring about social improvements. Several years ago we came to grips with this problem of just what should be our involvement in helping to improve social conditions. Whatever this involvement was to be, it needed justification. It had to be justified in terms of our business and in terms of the unique resources we had to contribute. In seeking our justification, it became increasingly apparent that our business was overwhelmingly dependent on the health of the cities. We were, in effect, an urban business. Our resources of people, land and facilities were centered largely in the cities. And the cities were decaying.

Our business depends on people. At last count there were about a million people working for Bell System companies. This includes AT&T, the telephone companies, Western Electric and Bell Laboratories.

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*The author is an executive vice president and a director of AT&T, with responsibility for Personnel, Environmental Affairs, and Information. He is a former vice president of Western Electric and former president of New Jersey Bell.*

We have estimated that half of the people we will hire in the next decade will come from the school systems in the big cities. We depend on those cities as the major source of entry labor for our craft jobs. And a large and growing percentage of their inhabitants are black. Black people today account for 25 per cent of the total labor force in central cities. Thirteen of these central cities—where 37 per cent of the blacks in the United States live — probably will be more than 50 per cent black by 1984. Two of these cities — Washington, D.C., and Newark, N.J. — already are.

I don't mean to suggest that the adjustments to be made are solely within those eastern cities which have a growing black population. We are somewhat unique among corporations in that our business is spread geographically throughout the nation. And in California — which contains 40 per cent of our Spanish-surnamed employees — and in southwestern cities like Santa Fe, Phoenix and Albuquerque, we have had to adapt both our service and our labor market requirements to a large Mexican-American and American-Indian population.

More than one-third of the employees of telephone companies — nearly 262,000 people — come from the 30 largest cities in the United States. These same 30 cities contain more than 25 per cent of the Bell System's physical plant and generate 25 per cent of its revenues. As an example, New Jersey Bell has assets in the state — comprised of land, buildings and equipment — of more than $2 billion. These assets are spread among nearly all municipalities of the state. But approximately 30 per cent is in just 13 principally urbanized communities: Newark, Paterson, Trenton, New Brunswick, Camden, Jersey City, Elizabeth, Plainfield, Atlantic City, Clifton, Hackensack, East Orange and Irvington. Such concentration makes it logical for us to focus our involvement on city problems. And particularly the "people" problems that arise from conditions in the cities.

This has led us into programs of training and remedial education for the un- and underemployed. It has led some Bell System companies to experiment with child-care centers as a potential means for improving employee retention and reducing absenteeism. In this connection, The Chesapeake and Potomac Telephone Companies and the Ohio Bell Telephone Company have opened such centers in Washington, D.C., and Columbus, Ohio. Bell System companies in some cities also work with school systems in setting up work-study programs, remedial reading programs, vocational training programs and guidance programs for students, and business management programs for school administrators. In addition, we donate financial and technical assistance to agencies working to improve communities and to meet the needs of people, particularly in the cities.

In 1970, Bell System companies contributed $15.6 million for a variety of social purposes. The bulk of this went for united appeals, the Red Cross, to educational institutions and purposes, and for hospitals and other health and welfare agencies. We also make in-kind contributions that are, perhaps, more important than our direct financial assistance. These include such things as responding to requests from the community for people with special expertise.

My own service with Governor Hughes's (former Governor Richard Hughes of New Jersey) special advisory commission on civil disorders is an example of this. Another example is the action of New Jersey Bell in lending the services of one of its people to the City of Newark to fill a short-term need for a fully qualified professional engineer — who was nowhere to be found in the city's government.

It's difficult to place a dollar value on these kinds of contributions. Our individual employees also give generously of their time in community voluntary activities. We have a policy in the Bell System that encourages this kind of involvement. But the point here is not what the Bell System is doing, but to define the rationale that helped to influence our decisions and to illustrate that we are not being influenced

*(continued on page 33)*

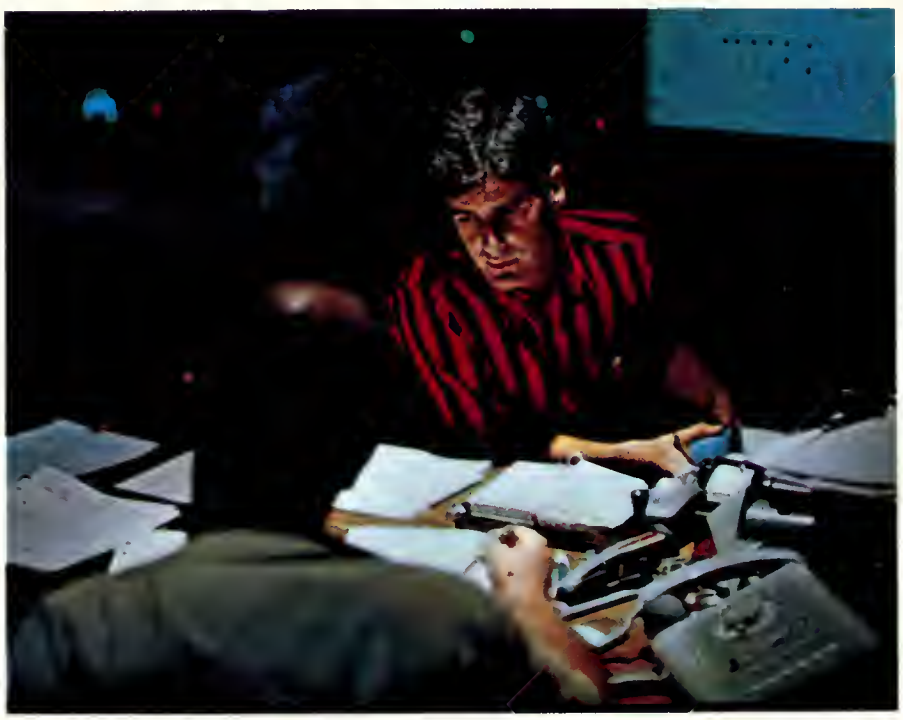
# THOSE SPECIAL PEOPLE

*"Our business has been singularly fortunate in the special kind of people it has been able to attract."*

*H. I. Romnes, AT&T Chairman of the Board.*

*We are more than a million people of all ages and colors and creeds. A devotion to excellence and a commitment to serve are shared among us all.*

1



3

4

1. James A. Cengia, Long Lines transmission, New York, N.Y.
2. Michael Hall, cable splicer's helper, Indianapolis, Ind.
3. Mark Gardner, member of technical staff, acoustics research, Bell Laboratories, Murray Hill, N.J.
4. Jo Ann Sacco, Marie Gujski, overseas operators, Pittsburgh, Pa.


TELEPHONE
TELEPHONE
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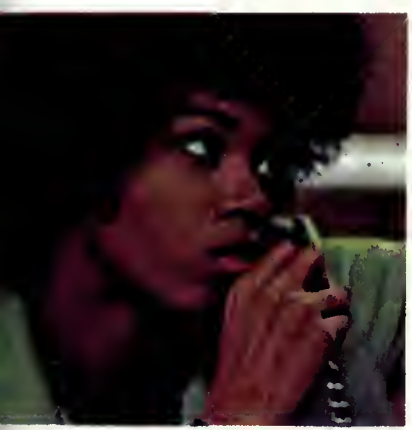

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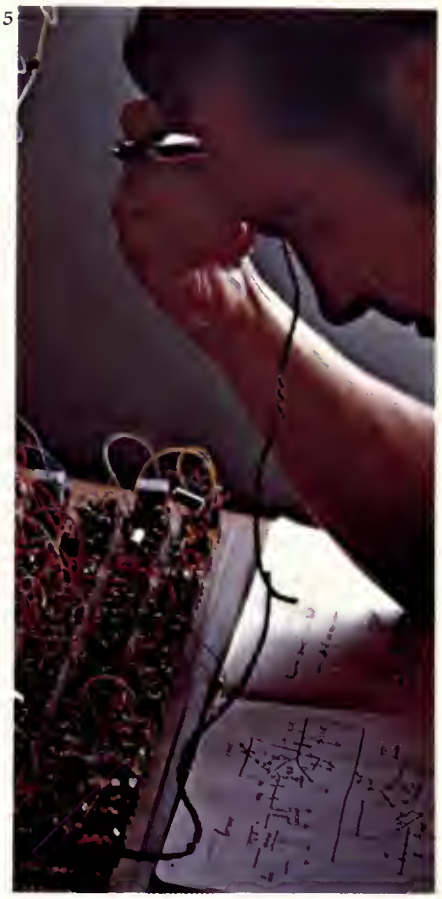
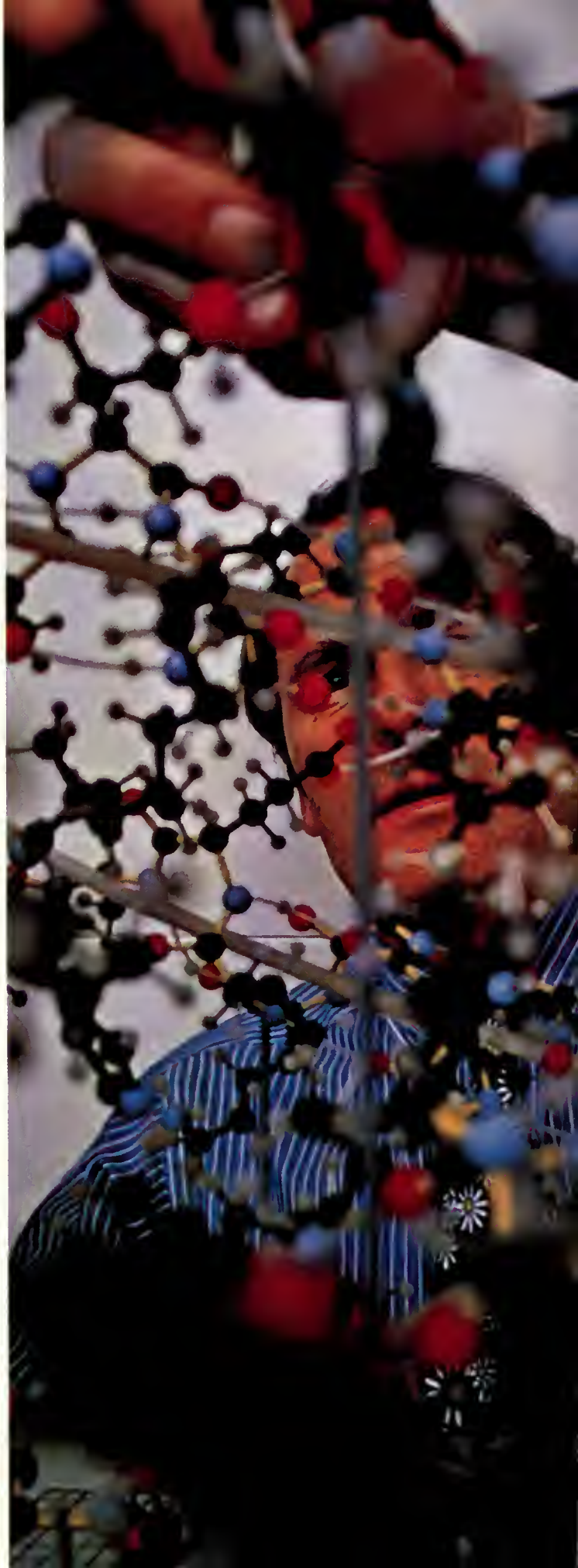


6


1. Phil Lozano, coin collector, New York, N.Y.
2. Shirley Ratliff, test center dispatch clerk, Baltimore, Md.
3. Ed Brennan, cable splicer, San Francisco, Cal.
4. William Powers, directory production manager, St. Louis, Mo.
5. John Kunish, electronics design engineer, Bell Laboratories, Holmdel, N.J.
6. Margaret Zbikowski, Long Lines operator, Pittsburgh, Pa.

*From our myriad backgrounds we bring with us many skills and many trades. The sum of those skills enables us to serve as we do.*



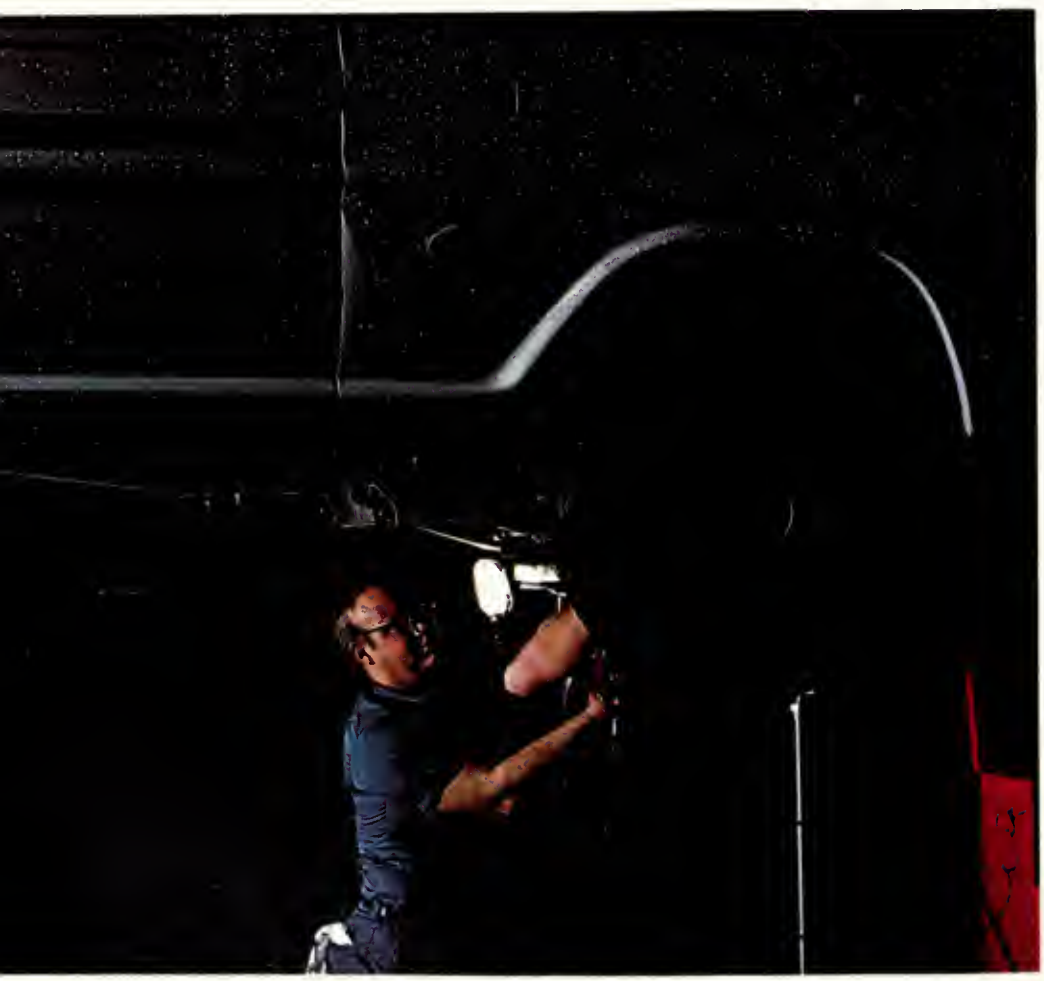
1. Robert Shulman, biophysicist, Bell Laboratories, Murray Hill, N.J.
2. Robert Paglusch, metals molder, Western Electric, Chicago, Ill.
3. Jackie Jean, bench hand, Western Electric, North Andover, Mass.
4. Carl Face, cable splicer, Monterey, Cal.

2

3

4

1. Tim Cowan, auto mechanic, Jacksonville, Fla.
2. Geraldine Shreckengosh, coin telephone counting clerk, Jacksonville, Fla.
3. Judith Ann Hedlund, business office supervisor, Philadelphia, Pa.
4. Henry Birdsall, purchased products engineer, Western Electric, Millinocket, Me.
5. Charles Wilson, computer operator, Phoenix, Ariz.



2

3

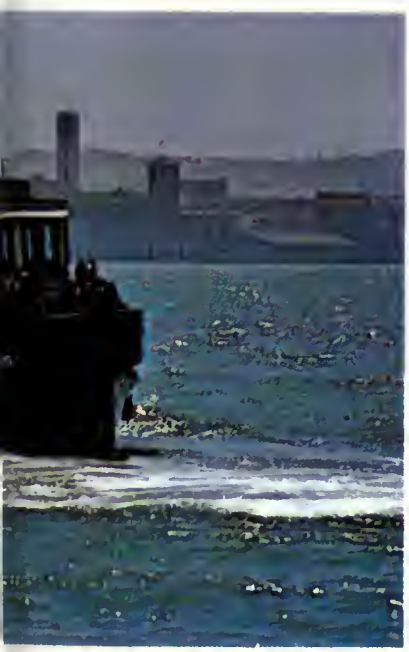
*Those Special People serve wherever and whenever the need exists.*

David Pollard, Thomas Jones,
transmission engineers, Long Lines,
San Francisco, Cal.


3

4

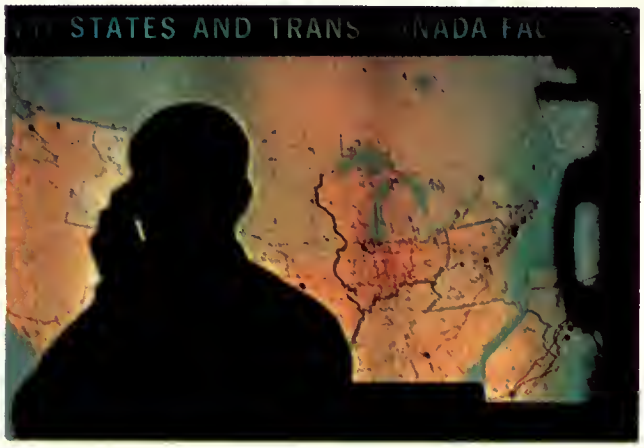
1. Michael Boldman, lineman, outside plant; trenching for underground cable, Arizona.
2. Lee G. Boyles, Kenneth R. Olson, Jr., linemen, Cook, Minn.
3. Jack Ward, plant supervisor, with pilot of cable patrol plane, Napa, Cal.
4. Ben Schmidt, cable splicer, on Telco barge, San Francisco, Cal.



*Our job spans many environments. It takes us beneath city streets and along country lanes. We work in boats and planes, on horseback and on snowshoes, in trucks and on tractors.*

1

2

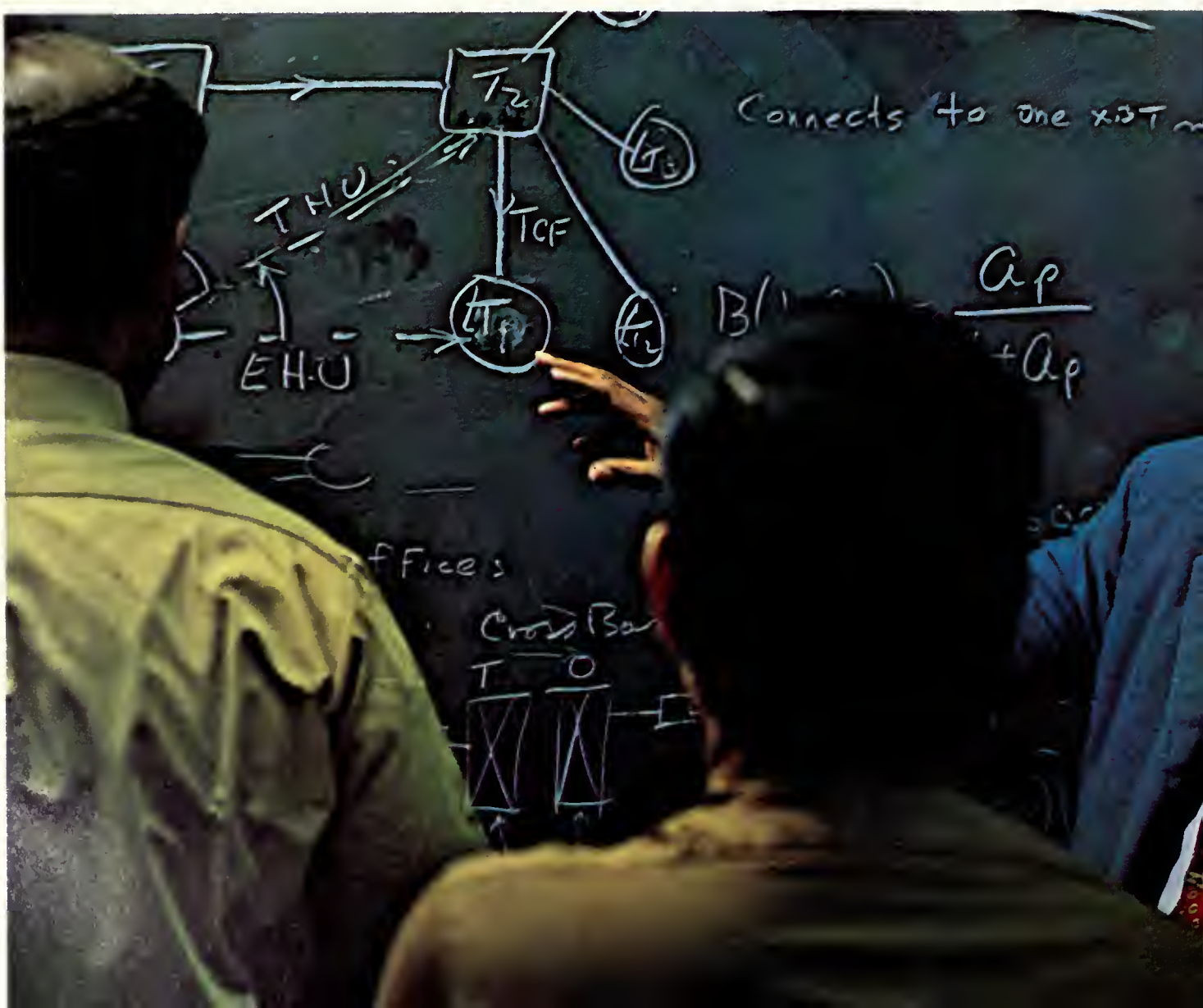



1. Richard Altizio, installer,
   San Francisco, Cal.
2. Staff supervisor, Long Lines network
   management center, New York, N.Y.

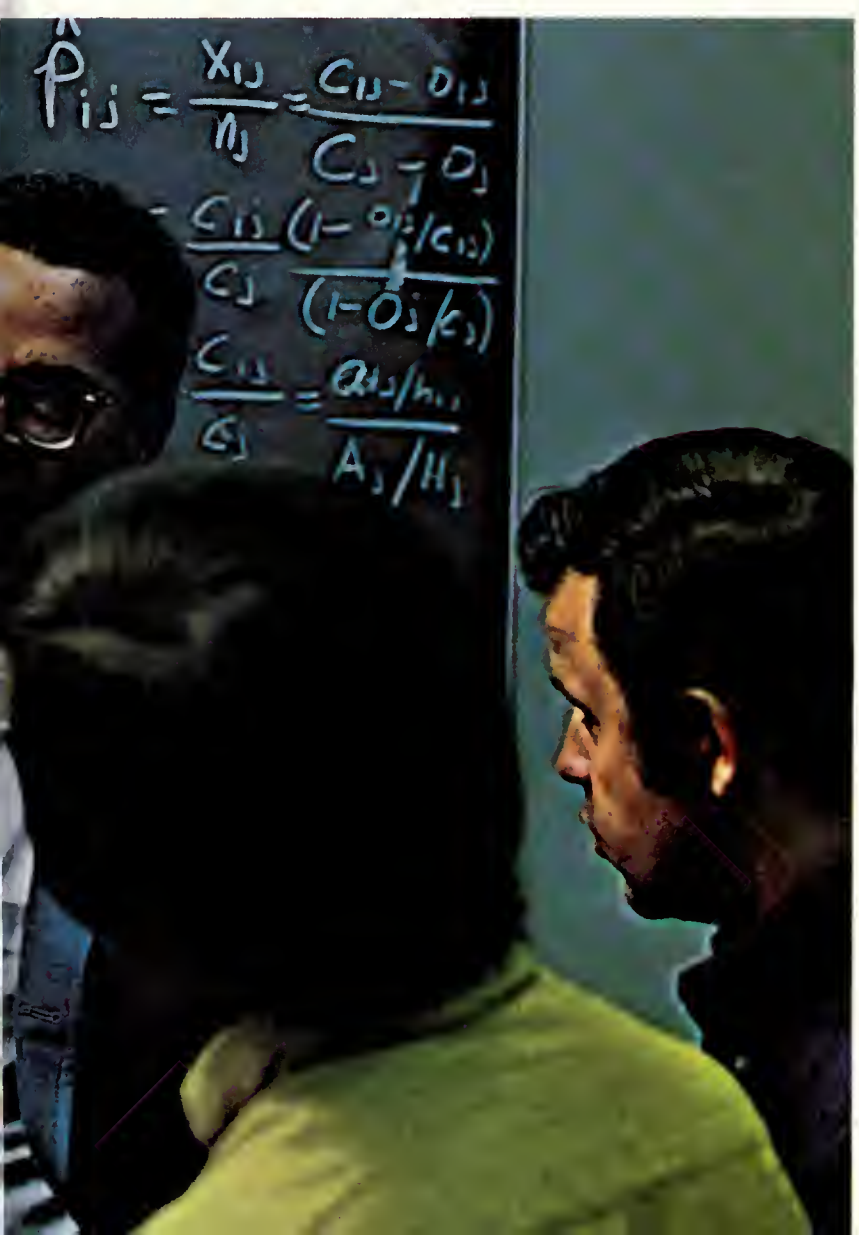
*...And we walk a lot.*

*We call ourselves a system, which means we are a team—a team of people who design and manufacture and operate the big, growing, changing machine we call the switched network. By working together to common standards we make that machine encompass a whole nation's communications, yet be sensitive to the command of a child's finger.*

2



1. Helen Chiffriller, chief overseas operator, New York, N.Y.
2. Victor Ransom, systems engineer, Bell Laboratories, Holmdel, N.J.
3. Dr. Charles Aliosio, materials engineer, Bell Laboratories; Edwin Shieh, development engineer, Western Electric, Indianapolis, Ind.
4. Dale Wormeck, service representative, Philadelphia, Pa.



3

4

*In our pursuit of excellence, growth and change are of the essence. The learning never ends.*

2

1. Carl Dorr, instructor, Management Training Center, Lisle, Ill.
2., 3. Plant school trainees, Phoenix, Ariz.

1

*How well we meet each special need is a measure of how well we serve.*

1

2

3

1. Jack Eslick, commercial manager, Mayport, Fla.
2. John Harshman, central office repairman, adjusting closed circuit ETV amplifier, Williamsport, Md.
3. Mrs. Veronda Murphy, teller, Jacksonville, Fla.
4. Mary Fahey, service adviser, instructing state trooper in use of LEAPS network; Boston, Mass.

4

*We never forget that we are neighbors. Community service, like communications service, is our way of life.*

1

2

1. James J. Morrison, commercial personnel supervisor, showing blind woman how to use the "talking book machine," Oklahoma City, Okla.
2. Gene Tatman, chief transmissionman, working in black to black program, San Francisco, Cal.
3. Katherine Titsworth, editorial assistant, volunteer in Telephone Pioneer remedial reading program, San Francisco, Cal.

1

1. Sylvia McClendon, service representative, Jacksonville, Fla.
2. Doug Swaby, installer-repairman, Indianapolis, Ind.

2

*Everything we do leads finally to this one basic act—helping the individual customer. For, what is service but one human helping another?*

(continued from page 8)
blindly by the immutable forces of the marketplace.

The American economy today is a curious mixture of public and private activity. And this mix has evolved as a pragmatic way of getting things done. Whatever else it is, the economy is not purely private, and it never has conformed identically to the classic, elegant, generalized model of a free enterprise, free market system that is used by some critics of corporate social involvement. Whatever else the modern market is, it is not free.

The decision-making mechanism in our economy, far from being the invisible forces of the marketplace, really is a combination of market forces plus government and private manipulation and initiative. In short, the economy, as it exists in the minds of many who defend the maximization of profits, is no more than a classic abstraction. For corporate leaders faced with such social issues as crime and vandalism, pollution, racial discrimination, declining labor markets, high costs, consumerism and rising demands for service, this abstraction offers no realistic solutions. For the management of a major corporation today to "stick to its knitting" — to pursue profits to the exclusion of the public interest — is to isolate the operations of the company from life itself.

## Business beyond its depth

This does not mean we can ignore the need for profits. It is absolutely fundamental that a corporation be healthy and successful financially in order to discharge its social responsibilities. And it does not mean there are no limits on how far corporations can go in fulfilling a socially responsible role. There is, for example, much to think about in the counseling of those who warn of the danger of business pre-empting or seeking to pre-empt the political process in which we all participate.

In saying this, I'm not suggesting that I am so much concerned about business threatening to supersede that political process. Rather, I see a greater threat to business, in that the general conception of what corporations can actually and properly accomplish may become inflated. This could result in public pressures for corporations to respond to so many problems that they become diverted from their essential role, which ultimately *is* economic, into areas where they have little competence. I believe this danger, while not immediate, is implicit in the corporate accountability movement. This movement, which should not be confused with corporate *responsibility*, seeks to *pressure* corporations on social issues. In connection with this movement, companies have been pressured on issues ranging from pollution, discrimination against blacks and women, and safety, all the way to economic sanctions against South Africa and ending the war in Southeast Asia.

## Change through lawful means

The rationale guiding this movement is a belief in the pre-eminent power and influence of the American corporation. Ralph Nader best exemplifies the thinking of people who support this approach to social reform. Nader has described the large corporation as a "kind of private government."

He states that, collectively, large corporations "constitute the most powerful, consistent and coordinated power grid that shapes the actions of men in public and private sectors."

What we have today, in effect, are not only government pressures, but pressures from private individuals and groups, many of them working skillfully within lawful channels, like the courts and shareowner meetings, in an attempt to move the corporation toward *their* concept of social responsibility. I believe there are both positive and negative elements in these movements. On the positive side, movements such as Nader's, for the most part, are seeking institutional change through lawful, proper means. And this suggests that social protest may be becoming more so-

phisticated, and that there is emerging at last an effective alternative to violent confrontation. The danger, as I indicated earlier, is that the accountability movement, through pressure, may push the corporation into areas where it does not belong. This could weaken not only the corporation's ability to achieve its essential mission, but the viability of our political institutions as well.

We know something about these pressures. The Bell System has been petitioned to take positions and to use its resources to influence the outcome on just about every imaginable issue. And let me assure you these are not simple issues to deal with.

Most of us have both public and private views on all the major issues. And sometimes we feel compelled to adopt views as officials of publicly-owned corporations that cannot be reconciled easily with our views as private citizens.

We have had to come to grips with this problem in connection with the war in Southeast Asia. Last year we received a number of letters seeking an expression either for or against extension of the Vietnam war into Cambodia. Our response made two main points:

The corporation essentially is an economic rather than a political institution.

## The right action — for whom?

There is an honest question as to whether a business organization — even if it were inclined to express strictly political viewpoints — is a fit vehicle for the achievement of political objectives.

I think what we are saying here is that, because of the size and economic influence of some of our large corporations, people tend to ascribe wisdom to them in areas well beyond the relatively narrow spectrum of their competence. People also tend to see very complex political issues in very simplistic terms. The right action to take may be very evident to *them*. But I daresay that even if we had the power as a corporation to take actions that would influence the outcome on major political issues, we scarcely have the wisdom or the experienced judgment to decide *which* action is the right action to take. And it is the public tendency to ascribe a kind of omniscience and power to corporate leaders, and then to demand that they exercise this presumed power and wisdom, that creates great risks.

## Consider the shareowner

Looking at the other side, I would say that a risk equal to the risk of corporations overextending themselves is the risk that their full potential for making a contribution to the solution of social problems will go unrealized. It is one thing to have a socially aware management in the sense that it recognizes the impact social problems have upon the success and prosperity of corporations. It is still another thing to convince shareowners of the wisdom of the corporation's undertaking actions to deal with social problems.

One of the constraints acting against a wider corporate involvement with social problems is the fact that it is almost impossible for the corporation to assure its shareowners that they will benefit directly from contributions it makes for such purposes as education, or health and welfare, or to improve conditions in the nation's ghettos. Because it is difficult to convince their shareholders of the benefits that flow from social involvements, many firms don't contribute anything to environmental improvement. Others contribute far less than would be the case if they could indicate to their shareholders a more immediate or direct return. The result is that from 1936 to 1969 the per cent of net corporate income going for philanthropic purposes has increased very little. It has gone from less than one half of one per cent to only slightly more than one per cent in that time. This despite the fact that the deductibility of corporate contributions for tax purposes, established back in 1935, has been sustained by several court rulings.

At the present time, most direct corporate financial

contributions are going to education and to hospitals, and to other health and welfare agencies. Such activities seem to be the easiest to rationalize. This is because companies can argue that the availability of good schools, hospitals and other necessary community institutions helps industry to attract good employees to the community.

I say it is easier for companies to argue this. But even in these areas where the need for and the desirability of corporate support is so well established, shareholders don't always buy the argument. What many shareholders fail to realize, and what we try to explain, is that the present level of our contributions has virtually no impact on dividends. Total Bell System contributions amount to approximately three-tenths of one per cent of Bell System income. If we were to transfer to dividends the total amount of our contributions, it would amount to about one-third of a cent per quarter.

## Industry benefits in the long run

Given the "tend to business, stay honest and pay dividends" attitude of most shareowners, I suppose it is no surprise that many companies find it difficult to contribute to an inner city street academy, for example, or to establish training or remedial programs for the hard core or to support housing policies or improvements in transportation that will make it possible for inner city residents to get to where the jobs are. In the long run all industries benefit from efforts to improve social conditions. They benefit in lower taxes, in better markets and in more stable communities. The problem is that these are long-range benefits, and they are not always easily quantified. This means that obtaining corporate support for many necessary programs of social improvement will continue to be difficult. It will remain difficult until the public, and particularly the shareholder public, can be made to understand that social problems, if left unsolved, do as much damage to balance sheets as unsolved production and sales problems.

Another way of looking at it is to state simply that we in the corporate world must do a better job of justifying to the public what it is we're trying to do. We must find ways to convince the public of the necessity of the things we feel we must do in order to promote conditions that sustain the highest, most durable levels of both corporate and human endeavor. To accomplish this objective we are constantly studying the interrelationship between the operational problems that affect our ability to provide service, and the problems of the environment.

## Government must direct

As more corporations examine their operations in terms of environmental considerations, and as they communicate what they learn to the public, I feel confident that better understanding will result. No business, no group of businesses, acting alone, can do the job that has to be done in our cities and communities. If the job is to be done, it must be a cooperative effort. All segments of American society must be involved. But the leadership and direction must come from government.

My service with Governor Hughes's special commission studying civil disorders demonstrated to me very clearly that the failure of government was a pervasive factor in the deterioration of life in the City of Newark. When we, as citizens, allow government to falter in its obligations to any segment of the community, when government fails to provide constructive leadership, the quality of life in the entire community suffers. And government won't provide the necessary leadership in the areas I've been discussing unless it has from the public a political mandate for a different set of social priorities. If this is forthcoming — both the mandate and the leadership — then I believe more corporations will come forth with the kind of energies, talents and resources that will help bring us closer to the solution of our most pressing social problems. ▢

# Side-by-Side

## A representative of the 1,800 other telephone companies looks at the industry in an interview.

**by Robert F. Hanson**

Probably in no other industry in the United States today can one find more comprehensive teamwork than that employed by the Bell and Independent portions of the telephone industry. Few people realize that there are 1,792 Independent (nonBell) telephone companies in the 48 contiguous states or that 20 years ago there were more than 5,000—and that Independent telephone companies provide all of the local service to customers in Alaska and Hawaii.

Independents serve nearly 11,000 exchanges, while the Bell System serves about 7,000, including most of the large cities. The big three among the Independents are General Telephone and Electronics Corp., United Utilities, Inc., and Continental Telephone Corp. These three groups are made up of more than 125 separate operating companies. The General System serves approximately half the 19.7 million Independent telephones. It is significant to note that each of some 1,000 Independent companies serves fewer than 1,500 telephones. About 850 Independents serve only one exchange, or local calling area.

Competition in the usual sense of the word does not exist among the Independents and Bell, in that a telephone company operates in an area that it, alone, is authorized to serve. Bell System companies, under a long-standing practice, do not purchase or consolidate with Independent companies except in certain special cases, and then only with approval of the Federal Communications Commission (F.C.C.) and local regulatory bodies. The decrease in the number of Independent telephone companies in recent years is attributable mainly to mergers and acquisitions by Independent holding companies.

The Bell System, on a day-to-day basis, coordinates its operations with those of the Independents, mainly

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*Mr. Hanson is the Bell-Independent Relations Director at AT&T. A graduate of Cornell University, he joined the Long Lines Department in 1946. After having served in various assignments in Kansas City, Omaha, St. Louis and New York City, he assumed his present responsibilities in 1968.*

through its own operating companies. In addition, AT&T people work closely with Independent telephone company groups, such as the United States Independent Telephone Association (U.S.I.T.A.), the National Telephone Cooperative Association and the telephone branch of the Rural Electrification Administration in coordinating a flow of information and development of new or changed procedures at a national level. A number of state and regional telephone associations coordinate among themselves and with the Bell operating companies on matters concerning expansion and improvement of service.

U.S.I.T.A. has a number of standing functional committees that deal with all phases of telecommunications operations. Some of the more active committees and subcommittees include those with names like Accounting, Commercial, Engineering, Government Communications, Plant and Traffic. One that exemplifies the teamwork nature of Bell-Independent relations is an engineering subcommittee responsible for keeping track of developments requiring technical coordination in order for Bell and Independent companies' equipment to interface satisfactorily.

Another major area of cooperation between the Independents and Bell involves toll revenue sharing, or "settlements," as the process is usually identified. The Independents interconnect with the Bell System long distance network for most of their toll calls, and their settlement share of the industry's toll revenues was $1.1 billion in 1970. Bell's share was $7.9 billion.

Basic to the determination of how revenues from toll business should be divided are considerations related to the application by all telephone companies of uniform interstate or intrastate toll rates, so that calls of the same distance are priced the same, regardless of which company furnishes the local service on each end. In turn, there is a requirement to determine the toll costs of each company participating in such long distance business, since it is not unusual for three different companies to play a part on a single call. As an example, a long distance call from St. Petersburg, Fla., (General Telephone Company) to Rochester, N.Y., (another Independent) is carried over Bell facilities between points in Florida and New York.

Over past years, Bell and the Independents have had some areas of disagreement regarding methods of determining, for settlement purposes, those costs of the Independent companies' operations that relate to toll business. Today, agreement exists on use, for this purpose, of procedures contained in the *Separations Manual* prepared by the National Association of Regulatory Utility Commissioners and the F.C.C.

Other problems receiving continuous Bell-Inde-

pendent attention involve network improvements, meeting of customer service expectations, private line and data services, and competition resulting from F.C.C. decisions in the Carterfone and Microwave Communications, Inc., (M.C.I.) cases. And we continue to work together on the details of processes attendant to equitable sharing of toll revenues.

There's no better way to get a feeling for the Independents' view of their involvement in this industry's interests, problems and outlook than to hear from one of their representatives. James S. Day, President of the Tidewater Telephone Company in Warsaw, Va., is the current president of U.S.I.T.A. His company connects with the nationwide telephone network through the Chesapeake and Potomac Telephone Company of Virginia, the Bell System operating company of his state.

"Bud" Day is an amiable, six-foot Virginian who began his telephone career with a small Independent company the day after he was graduated from high school in 1932. He joined the Tidewater Company as chief engineer in January 1955 and became its president in 1962. "I love the telephone business," he says, "and I've traveled all over the country for U.S.I.T.A., talking before groups of telephone people, and I've found they're pretty much alike in that they're dedicated to serving their customers, and they like what they're doing."

## Primary problem is service

Day believes the primary problem facing the telephone industry today is service. "We've got to improve it and regain the public's confidence in us where we've lost it," he says. "We have a new generation of homemakers whose first meaningful toys were play telephones, and the real telephone was one of the first things they learned to use. And now they're using the service in a way that we couldn't have expected a few years ago. We — and by that I mean the whole telephone industry — have got to give them the service they want, because our public acceptance is based on the service we provide."

Day is optimistic: "I think we can do it and will do it. But I don't think we're going to overcome the public opinion that has developed within the last several years until we go completely to one-party service and no-delay D.D.D. service and still keep our rates within an area where we don't get this adverse feedback from Mr. John Q. Public. And with this tremendous growth we're all familiar with, we're going to have to come up with the money and take care of our shareowners, who are going to have to provide at least half of it. We've got a big job cut out for us."

The key to meeting the service problem, Day believes, is in taking advantage of improved technology "as it comes down the pike" and in providing better tools, motivation and training for our people.

## Greatest asset: people

"We have a real people problem — we're going to need twice as many of them." Day believes the greatest single asset of the telephone industry is its people. "I think we've done a lousy job of convincing the F.C.C. and other regulators of what kind of people we are. We're dedicated to service, and we work day and night and in storms to provide that service, and we're not out to gouge the public with unnecessarily high rates. All we want and need is a fair return on our investment. It was very refreshing to me to hear the chairman of one state commission say to me privately that if we as an industry would tell the people we serve as much as we tell the regulators, we'd have an easier job in dealing with our customers. I think it's important to have a coordinated effort to tell our industry's story better to the public."

Day points out we've been fighting inflation since after World War II, "but it's accelerated in the past few years. We had no rate increases in those early years of inflation. In fact we had rate reductions, in interstate rates mostly, and in the regular service when we did a good job, we increased services rather

than reduced rates. Base rate areas ballooned out, and we more or less got ourselves in a hole. I don't think the public recognizes that, and I'll have to assume my share of the responsibility for it."

Independent company relations with Bell have never been better, Day says. He credits the Bell Laboratories with most of the technological improvements in the telephone industry. "Without them, we wouldn't be here," he says. "Now don't get me wrong. I wouldn't like to work for Bell. For one thing, I wouldn't like to live in a large city. And I like to see the results of what I do, which I feel is easier to do in a small company. I fight Bell toe to toe when I think they deserve it, but I think they're doing a great job of working with the Independents—not just in providing improved technology but in providing technical advice. We can pick up a telephone and talk directly with a Bell representative. Following disasters such as a hurricane or tornado, Bell has moved its own people and equipment in to help us restore service. We've been up there on the 26th floor of 195 Broadway and met with Mr. Romnes and Mr. deButts and other officers, and we're very impressed with them. And we have reason to think they were impressed with what they saw sitting across the table. Bell gets some ideas from us, just as we get ideas from them. And, of course, we're smaller than Bell, and we feel we can often move faster than they can."

## Fewer mergers, acquisitions

Day expects the trend of mergers and acquisitions of Independents to decrease from its rate of the past 20 years. "There aren't many 'mom and pop' telephone companies left, and most Independent companies today are able to raise money and make a profit — and that's been the main issue in these acquisitions. I'm not one of those people who think we're going to end up with just a few bigs and no littles in the Independent industry, and, shucks, we're doing a better job of working among ourselves and with the Bell System. We have a dialogue going back and forth at all levels — even at the top level of our industry. I don't think it would be good to have one big telephone system in the country, but I don't think that there is any justification in fragmenting the large companies that exist, including the Bell System."

Regarding debt ratio, Day believes his own company should remain in the range of 50 or 60 per cent. "But I don't think we can afford a debt ratio down in the forties to qualify for triple-A bond ratings. It just isn't in the picture. To go above 60 per cent would lead to our losing control of what we do. And this is the general feeling among many of the independents, although some of the holding companies have debt ratios above 70 per cent."

## More one-party service

Serving rural areas, as most Independents do, has its problems, just as does serving metropolitan areas. Day admits one main problem is that of getting telephone plant out to a customer who is miles away from the nearest central office or cable end. "But we're mainly concentrating on improving our multiparty service from eight-party lines to five or less. And, of course, ideally we want to provide one-party service for anyone who wants it. We can't right now, but we're banking on new station carrier equipment to enable us to transmit more calls over our existing plant. Of course, we all know that when a call goes between an Independent and Bell, and something goes wrong, the originating company gets the gaff, no matter who's at fault — Bell or the Independent.

Day feels strongly that the telephone company should assist the community it serves in lending creative and administrative expertise toward helping to solve sociological problems. "Of course, many of us from small towns don't fully understand big city ghetto problems. But where there are problems in the communities we serve, I believe we should help where we can. I know the Rochester (New York) telephone company has spent a great deal of effort to encourage its young people to stay in Rochester

and work and serve the community instead of leaving for a larger city."

Computers are entering the picture in independent company operations, and again Bell comptrollers or accounting people are developing systems to permit data such as billing information to be easily and quickly exchanged between the independents and Bell companies. "In fact, says Day, "I don't believe there's any area of improvement that's filtered down into the small Independent telephone systems where the connecting Bell companies didn't get into the picture somewhere."

## "They've got to have that telephone"

The need to improve forecasting of future telephone needs is one problem that disturbs Day, who says: "I don't have the answer to it. I don't know how to do it. You can rest assured that every generation from now on that reaches adulthood is going to be the same type as those who have reached adulthood for the last five years or so. They were raised with a telephone in their hand. I would think that a kid who hasn't had the use of a telephone hasn't had a normal childhood. And it may even create some personality problems, because they've got to have that telephone. And this is going to keep on from now on. We're going to have to find better tools, but we're also going to have to find ways to respond quicker when we've found out that we have underestimated our telephone needs. It just takes us too doggone long to get things done. I remember in the early thirties we could conceive of an entire plant, including central office and everything, and six months later, it was produced. It was there, working. Now, it takes us 14 months to get a small addition to a community dial office. When these housing developments blossom over a few months, we're going to have to find ways to serve them. And I think we can."

In some respects, the Independents are ahead of Bell, believes Day. "I think that many of our people are better motivated and that our per-man production is often higher. I feel we *have* to do a better job here, because we often have more invested than Bell does for similar items of plant. And, as I said, we feel we can move faster. We don't have as many steps to go through as Bell to get approval of a project."

## "We can successfully compete"

On competition with carriers such as M.C.I., Day says: "I think that if the regulatory people permit us to operate under the same ground rules, we can successfully compete with the likes of M.C.I. and Datran, and we can give the customer better service. The secret is, how can you do this and maintain the integrity of the message network with the average pricing concept that is in the picture? This has to be done, I believe. But at the same time, we're going to have to be permitted to compete with these people on point-to-point pricing. I'm not too worried about customer-provided terminal equipment, because the people who are going to buy that apparatus are going to find that the maintenance is just too expensive for them. They're going to find that we can do a better job for them and will do a better job for them. And I feel the same about customer-provided P.A.B.X. systems (non-telephone company PBX's). We're just better equipped. The F.C.C. has injected competition into the picture, but I think that competition, just for competition's sake, isn't the answer."

A good telephone man or woman, Day believes, "must have above average intelligence, must like working with people, must be motivated to serve others and needs a desire to keep learning."

"We must do a better job of educating the public, the regulators and the President's Office of Telecommunications Policy about our challenges and how we can meet them," Bud Day believes. "The telephone industry has been hit with some mighty tough problems during the past several years. We in the industry need to get our brains together and see what we can do to plan how best to use our people and technology to meet whatever lies ahead." □

**The Spirit of the Cobbler**
*(continued from inside front cover)*

though, that works not for but against a company's progress. When a man feels he's not thoroughly necessary, even if he's paid as if he were, he won't give his job everything he's got. He may spend more time at lunch than at work; a practice as costly to employer as to employee.

**Incentive to perform**

It may be merely enlightened self-interest, but small-business people *do* feel indispensable. They do because they *are*. Being a small business — whether day nursery, drugstore, doctor or furniture maker — if the boss fails to show up for work, or if he shows up and fails to do his best, the day is likely to pass without profit. Too many such performances by the boss and his small staff will directly and rapidly ruin the business and have a detrimental impact upon the lives of those responsible. There exists a strong incentive to perform, because the reward, or lack of it, is clear and quickly felt. There is an inclination among some people in big organizations, on the other hand, to feel that whether or not one performs to his fullest reach, the paycheck or the promotion will arrive on schedule. It is a human flaw of very large organizations — and perhaps an insurmountable one, considering the numbers of people and the complex subjective values involved — that such visible examples do exist.

A return to cottage industry is not the answer. It is doubtful that there is a single executive, educator or other reader of BTM who would trade technology and most of what it has wrought, including air-conditioned offices and knowledge work, for the chance to squat in a fly-infested alley in some lethargic land and scratch out an existence by selling bean sprouts to one's neighbors. Nor are there many among us who would swap the modern medical specialist, even if he *doesn't* make house calls, for a prescription of herbs and sheep blood when attacked by coronary thrombosis or appendicitis or even mumps. Those who do sometimes pine for the more relaxed economic performance and resultant life-style of other cultures are often students fresh from a trip abroad. They are students who have traveled at discount rates achieved through skilled mass-marketing techniques, on jet aircraft sprung from technology's rib, with money given by parents who had it to give because of jobs in the industrialized society that the students bemoan and that the visited societies seek eagerly to emulate.

The answer is not to return to cottage industry, but to introduce the assurance of personal indispensability, individual by individual, into large-scale organized human efforts. This must be a prime goal of managers, sociologists and behavioral scientists as governments and corporations continue to grow in the 1970's. While there have always been and always will be some who are grateful for the easy ride possible in big bureaus and big businesses, especially if it's well paid, most people need, want and do find indispensability in their work. A sampling of such people is illustrated in the center section of this magazine.

These people, both manual and knowledge workers, are special, and they know it. They are not exceptions to the Bell System rule; they are the rule itself. Like the successful small-business man, they feel indispensable simply because they are. They are as necessary to the performance of their job, and to the quality conduct of this company's service mission, as the Mountainview cobbler is to the production, selling and repair of boots and shoes.

Personal indispensability is one of the great things we have going for us, individually and organizationally, in the Bell Telephone System. The people pictured, and the million more they represent, bring the spirit of the cobbler to the marketplace of big business and to the rewarding occupation of communications service. Such a blend — cottage and corporate — is the best of both working worlds. It is the way this singular business has always worked, it is the way this business works now, and it is the way this business, big as it is, will work and serve in the exhilarating days ahead. ▢

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November/December 1971

# BELL

telephone magazine

# Improving the Art

*"Veracity does not consist in saying, but in the intention of communicating truth."—Coleridge*

A boy who is almost five years old was told recently by a more worldly peer that if he dug deep enough into the sand at the beach he would hear Chinese people talking. The boy found the idea so fascinating that he began to dig and, sure enough, after he'd scooped out about a foot or so of sand he stuck his head into the hole and heard Chinese.

One of the secrets of successful communication is to have something worthwhile to communicate. Whether good news or bad, serious news or funny, it should be worthwhile in the view of the communicated to as well as in the view of the communicator. It should offer an incentive: like hearing Chinese people talking beneath the sand, when you're almost five.

Another element in effective communication involves following through on what you say you are going to do. That aspect of the art of communication is the main thrust of an article by AT&T's vice chairman in the opening pages of this issue. An example of successful communication employing both techniques — interest and follow-through — is New York Telephone's current service recovery and simultaneous campaign to inform the public and its employees that "We're coming back." The art of communication is working in that case because, first, the company has a subject — improved service — dear to the hearts and pocketbooks of its public, and, second, the company is not just talking, it is doing. It is following through.

It is an uncomfortable irony that today, when the *technology* of communication borders on the miraculous — thanks largely to the early and continuing accomplishments of this business — the *art* of communication so often seems to border on the forgotten. It is an irony that has become increasingly troublesome, wasteful, inefficient and expensive to large organizations. And it is an irony that is not being ignored.

Growing organizations, reeling from the impact of worsening personal communication up and down the lines and increasingly poor rapport with their publics, are pouring considerable time, energy and money into efforts to revive the *art* and put it on a par with the *technology*. In the U.S. State Department, for example, a massive reform and reorganization movement has been in progress to upgrade the performance of that vital government unit. A principal aim of that effort, according to a Department official, is to achieve more "openness" throughout the organization — "a higher priority for expanding and improving our contact and communication in both directions with all segments of the American public."

### Amazement and admiration

The situation, and the prodigious efforts under way to solve it, are no less impressive in large business organizations, including the Bell System. For evidence of this company's mounting concern, one need not look past the pages of this magazine. In the March/April issue, for example, AT&T's publications director questioned the success of the System's pioneering, continuing attempts at employee information over the years. He wondered if the professional communicators who comprise this biggest of all big businesses — and the biggest and best of all communications businesses to boot — really know how to communicate *with each other*. The evidence, he said, is that they do not.

A number of letters arrived in the editorial offices about that article. Most were from nonBell businessmen and educators who expressed both amazement and admiration that this company would admit to such a fallibility. Some requested reprints for circulation among their own managements and faculties. In the issue you are reading, there are further stories about communication problems and progress, including the one by the vice chairman, in which he chides business, including this business, for not telling its "fine story" more convincingly to the public. He urges business to tell it better. Like John Milton, the vice chairman obviously feels that "Good, the more communicated, more abundant grows."

### "A square deal"

The intensity of a communicator's desire to put his message across is yet a third contributor to the art of communication among colleagues or with the public. Some of the most memorable communications artwork over the years, at least in this country, has come out of Presidential campaign and election speeches, where the impetus to communicate is fierce indeed — the prize for the best job of communication being the Presidency itself.

For instance, a would-be assassin shot at Teddy Roosevelt during a campaign speech in Milwaukee in 1912. "I will make this speech or die," said T. R., and kept right on talking. The bullet had struck his spectacle case, and the candidate finished his remarks, only slightly rattled. It was in that campaign that Roosevelt said, "The principles for which we stand are the prin-

*(continued on inside back cover)*

# 50,000 Phones for AT&T's New Neighbor

## World Trade Center Tops Out

A "city" with the phone capacity of Galveston, Tex., or Poughkeepsie, N.Y., is opening for business on a 16-acre site in lower Manhattan. A sign designating the address of the North Tower in the building complex reads: "This Is One World Trade Center." And that it is, whether one considers the address or the magnitude of the project. The South Tower, Two World Trade Center, like its twin, is 110 stories — 1,350 feet tall. The complex also will include a U.S. Customs House, Northeast and Southeast Tower Plaza buildings, each nine stories high,

a 17-story hotel and below-ground parking for 2,000 cars. Fifty thousand people will work at the center, which is expected to attract 80,000 business visitors every weekday. Together, the twin towers will have 204 elevators. Each express elevator will be capable of carrying 55 people at a speed of 1,700 feet per minute.

The $575 million World Trade Center will offer nine million square feet

of rentable space. When completed, it will have required 200,000 tons of Japanese steel, 600,000 square feet of tempered, heat-reflective glass and 5,000 construction workers on the site at one time. It will take a 49,000-ton system of air conditioning to cool the place.

The center will have 50,000 telephones and will consume 600 megawatt hours of electrical power daily. New York Telephone and Western Electric, among 167 sub-contractors working on the project, have a total of more than 100 people installing telecommunications equipment and coordinating plans with the general contractor, Tishman Realty and Construction Corp., and the center's owner, the Port of New York Authority. When completed, the complex will require more than 200 full-time New York Telephone employees to serve it. Six Electronic Switching System (ESS) offices will be installed in the South Tower. They will serve the complex as well as future downtown growth. New York Telephone will occupy five floors in the South Tower — more than 150,000 square feet — for central office and administrative space. The company will invest more than $65 million in telecommunications equipment to provide service at the center. Some 200,000 miles of telephone conductors are piped into the complex — enough to reach eight times around the world.

The center is scheduled for completion in late 1973. More than 100 customers now occupy lower floors of the North Tower, which was topped out last December. Tenants and visitors alike will be afforded views of New York City's harbor, Staten Island and the Verrazano-Narrows Bridge to the South; the Hudson River immediately below; New Jersey to the West; Brooklyn and Queens across the East River on Long Island, and all of Manhattan Island, including that renowned second tallest building in the world — the Empire State.

Some time in the future the Empire State Building will drop to third in height and the World Trade Center to second with completion of Chicago's Sears-Roebuck Building. ☐

# A Time for Straight Talk

by John D. de Butts

Americans are bombarded daily with reports that their water is polluted by industrial wastes, their air is befouled by the outpourings of auto exhausts and factory chimneys, and even their food is contaminated by dangerous chemical additives. They experience repeated transportation breakdowns, power failures, blackouts — and, I regret to say, even some localized problems with telephone service. Their ears are assailed by triphammers and the roar of jet aircraft. And, to top it all off, their incomes are eroded by inflation, their livelihoods threatened by the specter of unemployment.

As a result, and not surprisingly, a great many Americans are today convinced, and a great many more suspect, that the neglect or indifference or outright irresponsibility of businessmen is the source and cause of the deteriorating circumstances in which they find themselves. Judging by the newspapers, and by what we see and hear on TV and radio, either businessmen are unpersuasive and inarticulate, or there is something sadly wrong with our system of free enterprise. The *image* of business is not what it used to be. There is scarcely a problem confronting the nation that is not laid at the doorstep of business: pollution, unemployment, inflation, the international monetary crisis, discrimination and a host of other maladies, I suspect, as yet unborn.

Criticism of our operations and activities comes from employees, young people, intellectuals, politicians, consumer advocates, customers, shareowners — just about every source imaginable. Some of the criticism is justified. Much of it is not. Some of it is honest, sincere, reasonable. A sizeable proportion is vindictive or irrational.

That many of the charges currently being leveled against business are unfounded provides small comfort. In the long run, the success and survival of private enterprise in this country is likely to depend not only on its objective performance but on the ways that performance is *perceived* by the American public.

Is it any wonder that the reputation of business and businessmen is at a low ebb? The blame has to be placed somewhere. And business is a very large and seemingly logical target for those who have not the time, training or inclination to look for root causes.

The truth is that a whole combination of factors has helped to produce the problems and perplexities facing our nation today. Ill-advised or ill-conceived policies of local, state and national government have contributed their healthy share. The upward thrust of science and technology, with their potentialities for both good and evil, has played a part. The seemingly insatiable hunger of our affluent society for more and more products and services has strained our resources. And businessmen have their foibles and have made their mistakes, as well.

The problem for business is one of convincing its employees, its shareowners, its customers and the public at large that the nation's ailments — insofar as they have been blamed on business — have not been

**that many of the charges currently being leveled against business are unfounded provides small comfort**

properly diagnosed; that they won't be cured, moreover, until they are viewed as problems of our entire society, and that our entire society shares in responsibility for their solution. *That*, essentially, is a problem of communication.

Somehow — without for a moment suggesting that we are not partly culpable, without attempting to pass the buck — we must make it clear that business recognizes that improvements in the quality of life are necessary, business has the resources and the commitment required to do its share in bringing about those improvements, and it will commit its resources fully if it has public understanding and support. Too often, the public and its representatives in government insist on immediate and large-scale improvements without acknowledging that ultimately it is the consumer that must pay the fair price.

The question, of course, is how to get that story effectively told. At AT&T and throughout the Bell System we have learned the importance of listening closely to what people are saying about us and responding candidly and promptly. Some examples:

The Bell System has experienced some difficulty of late in maintaining traditional standards of service in a few large urban centers, especially New York. People have been quick to express their displeasure — in the press, on radio and TV, by mail. Some of the criticism has been justified, and we've admitted it. From the start, we stated publicly and often that our estimates of telephone growth had been too conservative, that we had fallen behind on construction, maintenance and repair, that we were going to spare no effort to make things right again. More important, we moved quickly to put our money and our manpower where our mouth is by accelerating installation of equipment and shifting hundreds of skilled people into the areas where service had faltered.

But, for some, that indication of good faith and commitment apparently was not enough. For example, a former New York congressman urged residents of New York to protest our alleged indifference to the public interest by withholding a portion of payment on their phone bills. In a subsequent radio broadcast he went well beyond the matter of our service performance, questioning the structure of the New York Telephone Company Board of Directors, the ownership of the Company, its manner of stock distribution, its request for a rate increase, and the distribution of dividends. He didn't miss much.

Our response was immediate, candid and open. The very next day, William Ellinghaus, New York Telephone's president, appeared on the same radio program, answering these allegations point-by-point and, I believe, conclusively. Who "won" that round, I don't know. But we had placed the facts before the public and stood ready to back them up with whatever documentation anyone might want. I'm pretty sure we won ground with those who listened to both

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## ...the premise that good public relations is good service. It is what we are, not just what we say we are

sides open-mindedly. Certainly one of the things we had going for us was a considerable reservoir of goodwill — a reputation for honesty and community-mindedness, a reputation built on the premise that *good public relations is good service.* It is *what we are, not just what we say we are.*

In the midst of the debate over our service performance, an FCC commissioner took the occasion to question, quite comprehensively, not only our dedication to the public interest, but our ability to manage the business wisely and capably. He challenged our decisions on use of debt versus equity financing. He criticized us for what he described as a failure to promote usage of our service, for our policies on interconnection of nonBell equipment to our network. He called for divestiture from the Bell System of the Western Electric Company. He accused us of opposing educational television, and he charged that our employee stock plan had diluted the value of AT&T stock held by nonemployee shareowners. As if that were not enough, the commissioner spoke deprecatingly of our role in the development of the transistor — one of the great technological developments of modern times — and charged that we had failed to safeguard communications privacy.

Our response was swift and to the point. Not only did we issue a specific rebuttal to each of his allegations, we also petitioned the commissioner, pointing out his apparent bias and asking that he disqualify himself from further participation in matters involving the Bell System. Unfortunately, the commissioner declined to honor our request.

The press response to our position was generally good. His criticism of our decisions and activities did not appear to command substantial public support, and for that we are grateful. We think our prompt and reasoned reply to him was largely responsible.

One of the hazards involved in presenting a large target — and the Bell System is the largest outside of government — was brought home to us recently, when the Equal Employment Opportunity Commission charged the Bell System with discrimination. That one caught us by surprise, because we have taken what I consider justifiable pride in our efforts to make equal job opportunity a reality in our business.

The day after the charges were filed, we held a press conference at which we pointed out that, far from being laggards in hiring and promoting representatives of minority groups, we are among the leaders in American industry. At the same time, we readily admitted that not all that needs to be done has been done, and we expressed our confidence in the thousands of managers throughout the Bell System who — often in the face of adverse circumstances — have worked earnestly to expand opportunities for minorities in our business. Judging by much of the editorial comment I've seen, our response at least earned us the benefit of the doubt.

My purpose in citing these examples is simply to suggest that in this era of protest, this era of growing cynicism with respect to the aims and goals of the business establishment, nothing less than swift, accurate and honest disclosure of facts, of truth, will effectively rebut the arguments of those who insist that private enterprise is becoming less and less responsive to public needs and the public will. At least that's the conclusion at which we in the Bell System have arrived. And we think it applies to everyone with whom business is, or should be, attempting to communicate: employees, shareowners, customers.

Let me emphasize, however, that while the examples I have cited were all of the *reactive* sort, I do not mean to suggest that we can win public support and understanding simply by answering charges. Swift response to criticism when it occurs is important. But even more important is what we communicate day in and day out, partly by what we say about ourselves *and in larger part by our actions.*

The growing sophistication and speed of communications and the accompanying need for a quick, factual response to criticism is something of which we need to be more mindful, but not necessarily apprehensive. I would go so far as to say that the discipline thus imposed may, in time, prove beneficial. Given the proper conditions, it could cause to emerge a new breed of corporate leadership, one that is highly sensitive to what's going on in our communities and throughout the nation, one that is articulate, that has the courage of its convictions, that knows how to communicate persuasively. I believe that the emergence of this kind of leadership, where it is lacking, can be hastened and encouraged by the development within our companies of an environment that is totally supportive of effective communication. By this I mean that when businessmen tell the public and employees and shareowners that we *are* sensitive to human needs and concerns, that our policies and actions are guided by integrity and by concern for the public welfare, the proof will be in the pudding.

I believe there are a number of things managers can do to create the supportive environment to which I have referred.

First, we can place a higher *value* on communicating with one another and our publics.

Second, we can *personalize* our interchange of information with our employees, customers and shareowners, taking care to assure that they are accorded the dignity and respect they deserve.

And third, we can work at *building human concern* into the very structure of our companies.

Point one: If we really value communication — if we believe it is as important as we like to say it is — then logically one would expect to see our businesses run by people who are good communicators. Which suggests that the ability to listen well and communicate effectively should be built more strongly into our rewards system.

It doesn't make sense to me to take a man who has done a poor job of communicating in a lower management position, where he is in charge of only a few people or has limited contact with the public, and move him up to the point where he is the principal spokesman for a whole unit or an entire company. *Effective communications ability should be the number-one criterion for advancement.*

Point two: What happens to communications when a company grows bigger? I can only respond that this depends on what was happening when the company was smaller. If communications already are bad, and a company starts to grow, they can only become worse — unless some fundamental changes occur.

One thing we've tried to do in AT&T and in other Bell System companies is to personalize our communications. In the case of AT&T employees, we have instituted, in addition to an extensive publications effort, a program we call Answer Back. Employees submit questions on any business or job-oriented subject and receive a reply from an appropriate officer or executive. If the subject is one of broad interest, the question and the answer are published in our

employee newspaper. We also conduct *skip-level* meetings between lower and higher managers and discussion meetings for craft employees to provide adequate opportunity for face-to-face communication.

We've moved toward wider use of closed-circuit television for employee news shows and for presentations to special company audiences. The Associated Companies of the Bell System receive programs from AT&T, and most of them can originate their own programs. An essential ingredient in this and other forms of communication is the active, interested participation of top management.

We also make an effort to personalize our communications with shareowners. Most readers of this magazine already know that we have the largest shareowner body in the world — more than three million on record — and I can assure you they are alert and responsive to what we do. We receive from these people as many as 1,200 letters each day on all kinds of matters relating to their holdings. But we also receive from 4,000 to 5,000 letters a year on subjects relating directly to business policy, practice and performance. And every letter gets a reply.

But we feel it is important to go beyond written communications. And so each year telephone company managers visit thousands of shareowners in their homes to give them an opportunity to ask questions about the business and to hear any comments or suggestions they might wish to make. Last year visits were made to more than 37,000 shareowners in all parts of the United States. Through these visits we obtain a better feel for shareowner sentiments on a range of issues. But more important, perhaps, it is our way of demonstrating that we care about them as individuals. This is particularly important today when corporations are apt to be regarded as cold and mechanistic.

Point three: We are committed to providing work for our people that is as satisfying as we can make it, and we're attempting to do this through something we call the Work Itself concept (see Jan/Feb 1971 *Bell Magazine*). It's an effort to build as much responsibility into a given job as the employee can handle, the objective being to overcome routine and enlarge the employee's sense of accomplishment.

In addition, we established in 1969 a Human Affairs organization at AT&T, embracing three departments: the Personnel Department, the Information (or Public Relations) Department, and the Department of Environmental Affairs. Our purpose was to place these *people-oriented* departments on an equal footing with those concerned with operations and finance. Hence, the new organization is headed by an executive vice president, Robert D. Lilley, who is also a member of our Board of Directors.

These examples illustrate what I mean by working to create an environment that is totally supportive of effective communications. And what I've been saying is that the most important part of that supportive environment is people. In the long run we can't communicate effectively with customers and the public generally — in fact we can't even function effectively — unless we have the respect and support of employees and shareowners. We won't get that respect and support unless we listen carefully to their viewpoints and opinions and then speak out frankly on matters that concern them. And you obviously can't communicate with honesty — you can't tell it straight — unless you live right, unless you conduct your business in a manner that leaves nothing to hide.

This belief was reaffirmed for me at the 1970 annual

# American business has a fine story to tell, but it hasn't been telling it very well or very persuasively

meeting of AT&T shareowners, at which we were subjected to a corporate accountability campaign of the type directed at many large companies recently.

When you are confronted before your shareowners at an annual meeting with newspaper and television coverage; with demonstrations raging outside in the streets; with specific, pointed questions about your activities in connection with military undertakings and with respect to your policies on equal employment opportunities; when your stewardship is being questioned by people who challenge your policies on charitable contributions; when you're accused of tapping people's wires — when charges like these are being made publicly, there are two choices: You can close the meeting and scurry away with your tail between your legs, or you can do what I've been suggesting — stand up and answer the charges.

At our meeting, anyone who wished to was allowed to speak, within reason. Every question, every challenge was answered — as honestly and thoughtfully as we could. That meeting may rank among the finest moments in the history of our company. I believe we emerged from it stronger — both in the eyes of the public and in the eyes of our own people.

I believe one of the reasons we emerged successfully from that challenge was that we were prepared. But the most important reason, I believe, was that we had nothing to hide. We had conducted our business above board, and with integrity, and we knew this. Where we had fallen short — for example, on service — we were honest and forthright about it. And therefore our Board Chairman, H. I. Romnes, could stand before that meeting and account for our actions in a response that was plausible, factual and verifiable.

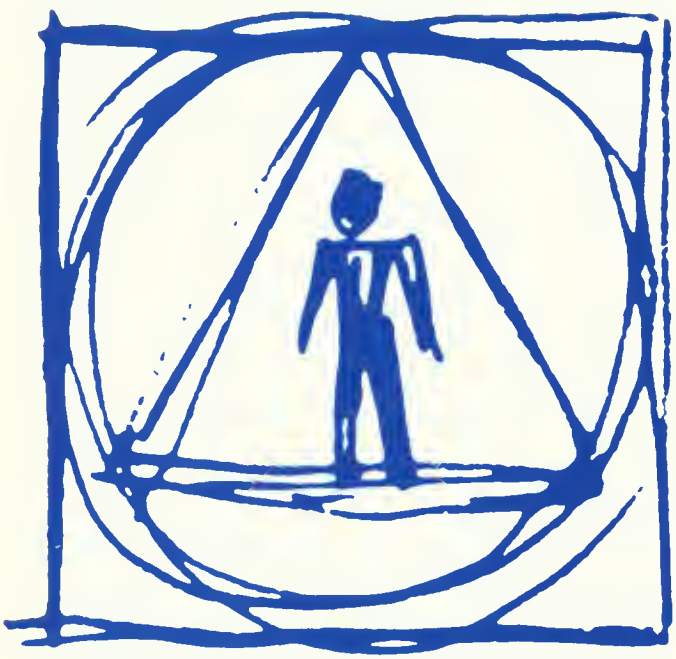
But good as that response was, it might not have been necessary if all business — ours included — had been doing an effective job of listening to what the public was saying, and telling our own story straight and well over the years. Too many businessmen, I suspect, have coasted along blissfully in the belief that the public either has not been very interested in our policies and practices or has not had the capacity to properly understand them. This concept of the uninformed masses, doubtful to begin with, has long since died. Not only are people better informed, but there are articulate, informed spokesmen for virtually every constituency you can identify in our nation today. The corporate community must be prepared to talk with these spokesmen, believably and persuasively. We must listen to them carefully, assess their points of view, seek to discern trends in public opinion and speak out positively and intelligently.

American business has a fine story to tell, but it hasn't been telling it very well or very persuasively. To cite an example from the telephone business, our research and manufacturing arms, Bell Laboratories and Western Electric, have contributed mightily to the strength of the American economy and the well-being of the American people in ways that go far beyond the provision of phone service. Hundreds of thousands of people are today employed in industries created, in whole or in part, by Bell Labs' inventions, such as the transistor. Thousands of others benefit from Western Electric's multibillion-dollar purchases from suppliers and the advice and counsel it offers to small businesses. But this story has not been adequately told. We must do a better job.

All business must do a better job of informing the public of the *concern* and the impressive *contribution* it has made *and is making* to the quality of life. □

# Symbolically Speaking

**by Robert A. Feinstein**
*Editorial Director, New Jersey Bell*



Man, since his earliest beginnings, has resourcefully grappled with the problem of making himself understood. Spoken and written languages are a testimonial to this overwhelming desire. And the development of high-speed transportation, the telephone, telegraph, radio, television and computers bears witness to the astounding human ingenuity concentrated on solving the mechanical problems of communicating quickly across vast distances.

These developments have succeeded in bridging time and distance but, oddly enough, have done little to improve human understanding. We have evolved methods of exchanging messages, but we have not advanced appreciably in our ability to understand them — particularly if they are expressed in a tongue other than our own.

That the world is full of misunderstanding should surprise no one. Populated by more than 3.5 billion individuals speaking 2,800 different languages and representing at least as many different cultural backgrounds, it should scarcely seem surprising that our planet is a natural breeding ground for human error and misunderstanding.

The need, then, is for a universal idiom. This need has not gone unrecognized, and many attempts, none of them particularly successful, have been made to develop and promote a *lingua franca*. Whatever became of Interlingua, Europan, Lingvo Kosmopolita, Romanol and Esperanto? No doubt they still are in use among tight-knit groups of linguists, scholars and scientists, but their impact on the world at large has been small. They did not catch on because like other languages they have vocabulary and syntax that must be laboriously learned. All that these artificial international languages have done to date is to provide mankind another tongue in which to be inarticulate and illiterate. Obviously, what is needed is some sort of device that can be easily recognized and understood by all men, regardless and independent of whatever language they may speak.

Henry Dreyfuss, the internationally recognized industrial designer and long-time consultant to the Bell System, has some definite ideas on the subject:

"Symbols are as old as civilization, and their use predates even the earliest written language. From the most primitive cave drawings to the most sophisticated computer, man has employed symbols to represent his ideas. I believe we have come full circle from the primitive use of symbols to highly complex languages and back again. Symbols afford an excellent opportunity to promote worldwide understanding through visual communication. They have proved their worth in the past and promise to do so in new applications in the future. They are a necessary and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important supplement to all language, everywhere."

Dreyfuss does not pretend to be the first person to reach this conclusion. He is quick to point out that every field of knowledge from agriculture to zoology has a system of symbols all its own. Mathematical formulas, electronic diagrams and music can be read in any language — if the reader is grounded in the symbols of those particular disciplines. And symbols have long been used as traffic controls (arrows), warnings against hazards (skull and crossbones) and handling instructions (arrows again, indicating side up).

There are many good reasons for the broad acceptance and use of symbols, according to Dreyfuss. He enters three basic claims for the efficacy of symbols as means of visual communication:

1. They pass all language barriers.
2. They add to safety. In a panic or emergency the meaning of a symbol is grasped far faster than words.
3. They are convenient. Symbols can be placed on small controls (buttons, knobs or levers) where written instructions would be so small as to be illegible.

## A symbol language barrier

But as widely accepted as symbols are, their use is not without drawbacks. Symbols, like languages, are developed to match the specific requirements and experience of the groups adopting them. There is little consistency in their application. You might say there is a symbol language barrier.

"Many disciplines share common terminology," says Dreyfuss, "but when this terminology is translated into symbols, a different graphic representation is often adopted by each. This creates a great deal of confusion and actually defeats the purpose for which symbols are basically intended. Still more confusion is generated when new groups, lacking knowledge of or coordination with existing systems, compound the problem by designing yet another set of symbols."

On a very elementary level, the symbols designed for use at international sports events such as the Olympics illustrate the problems of duplicated effort and lack of standardization. Those from recent Olympiads, graphically handsome, are similar but different. They reflect the cultures in which they were created. A person who easily understood the sign language of the Mexico City games might not have fared so well at Tokyo. Even so, it is well known and often demonstrated that symbols are a very effective means of communication when applied under controlled conditions — as in the U.N. traffic signs used in most European nations.

## Used and understood anywhere

The challenge, then, is to apply the controls that will enable man to standardize existing symbols and apply them to all fields of knowledge, so they may be used and understood anywhere in the world. Dreyfuss has been working to meet that challenge for several years. He, his wife — known professionally as Doris Marks — and the bright young people who staff his South Pasadena, Calif., office are now putting the finishing touches on his "Symbol Sourcebook." The book is the culmination of a symbol harvest that began at least 20 years ago during his world travels.

For many years, he admits, his collecting was casual and his method of filing, random. During this period he and his firm designed about 100 symbols for industrial clients including Singer, Polaroid and the Bell System. But it was not until about six years ago, when asked by John Deere to develop a set of symbols for use on farm equipment and industrial machinery, that he began collecting in earnest and decided to do the sourcebook.

Deere, too, saw obvious potential economic and safety advantages in a common set of graphics which could be understood in all the nations in which they sell their implements. The existing symbols collected as background research for that project, plus those previously gathered, provided the nucleus for the "Symbol Sourcebook."

Dreyfuss's once casual collection of symbols now numbers more than 25,000 and continues to grow.

All have been neatly filed and cross-indexed according to meaning, shape and discipline. A careful record has been kept of the origin and source of each.

## UNESCO distributes questionnaires

The symbols have been sorted into three graphic categories — representational, abstract and arbitrary.

Representational symbols, says Dreyfuss, give a fairly realistic image of the object being symbolized. For example, a rabbit to indicate "fast" and a tortoise to represent "slow," or outline drawings of figures in trousers and skirts to indicate men's and women's restrooms. Their effectiveness depends on prior knowledge and experience and is susceptible to changes in form of the original object. Dreyfuss points out, for example, that in certain parts of the world traditional garb for men is skirts — trousers are worn by women.

Abstract symbols, Dreyfuss explains, are generally the result of the process of evolution at work on a realistic image. The original symbol becomes less and less realistic until the original reference has been totally obscured. An example would be formalized wavy lines to represent water. While harder to learn, abstract symbols are hardier, since time and change do not automatically make them obsolete. And no man has a learning advantage over any other because the symbol is foreign to all.

The third class of symbols is arbitrary. These are symbols with no pictographic precedent. They are developed for memorability and uniqueness and then are assigned a definition, for example, a triangle to denote caution. Their use requires extensive education and familiarization.

To aid Dreyfuss's effort, thousands of questionnaires were distributed to individuals, organizations and institutions throughout the world, describing the project and asking help in collecting symbols. Some of the forms were distributed by the United Nations Educational, Scientific and Cultural Organization (UNESCO) which is, itself, working on standardizing symbols. Others were distributed by McGraw-Hill Inc., who will publish the sourcebook in January 1972, and other national and international groups.

"Contributions to the collection have come from just about everywhere — Africa, Russia, and Poland, for example — but we have nothing yet from Red China," Dreyfuss explains. "We've looked in books in libraries all over the world, and we've consulted with experts on symbols ranging from tarot cards to the sciences."

The excellent response to the questionnaire, Dreyfuss theorizes, is the result of great international concern generated by the flow of workers, goods and tourists across national borders.

One major source of material was the International Organization for Standards (IOS), a 55-nation body with headquarters in Geneva. The group, which creates technical standards, supported the idea of Dreyfuss's project and gave him its cooperation and access to its files.

## Other groups are active

Others are working on similar projects, usually in more narrowly defined fields. The American National Standards Institute (ANSI) has published standards for a few fields. The Society of Automotive Engineers, which Dreyfuss serves as an adviser, is developing a standardized system of symbols for automotive controls. And, in 1969, the International Committee for Travel Signs and Symbols completed an extensive survey covering symbols applicable to travelers and tourists. Some standardization in airport signs has been achieved at major international terminals through the efforts of the Air Transport Association.

A few other groups, such as Glyphs, Inc., and the International Council of Graphic Design Associations' Commission of International Signs and Symbols, like Dreyfuss, are concerned with the over-all problems of communication through symbols. They, too, have comprehensive files and keep abreast of symbol development and applications, and they too, lack power

to establish or enforce standards. The difference between their efforts and Dreyfuss's is that Dreyfuss is about to put the fruit of his labors in print, where all can sample them.

Authoritative professionals in various disciplines have selected for representation basic symbols that they consider essential to a layman's understanding in their areas of expertise. The final selection produced a total of about 6,000 symbols, many of which appear more than once, according to Dreyfuss.

Selection of symbols to be included in the book was on the basis of current usage. Some of those chosen are actually ancient symbols that continue in contemporary use. Dreyfuss emphasizes that no judgments were made about the effectiveness of the symbols in his book. "We simply want to show that they *exist,* reckoning that anyone attempting to design a new symbol should have this information as a point of reference."

## The case of the cracked goblet

But how does one judge a symbol? By applying six design criteria determined by Dreyfuss to be necessary to "good" symbols. Well-designed symbols, he says, can be recognized by their bold lines and shapes, their legibility at reduced size and under poor light, their self-contained or nondirectional shapes, their effective use of black and white (using color only as a supplement), their freedom from extraneous detail, and the ease with which they can be reproduced.

Dreyfuss concedes that symbols meeting all these criteria will not necessarily communicate as expected because they are still subject to interpretation within an individual's frame of reference.

One of the stories he tells to illustrate this point is about the cracked goblet stenciled on a case of fine glassware being shipped to Turkey. When the crate arrived in Constantinople the symbol was interpreted by a dock worker as meaning "broken glass" instead of "fragile." It was handled accordingly and the misinterpreted symbol became a self-fulfilling prophecy.

This story illustrates the need for testing of symbols before their wide adoption. The task of testing and coordinating symbols is even more formidable, perhaps, than that of cataloging them. That chore will be left to others, says Dreyfuss. "My goal at present is to compile the results of our research in a single reference available to everyone, particularly those involved with the development, application and standardization of graphic symbols."

## A path to human understanding

The book's contents will be organized in several broad categories. One part will contain basic symbols that have applications in many disciplines (up, down, start, stop, left, right, on, off, etc.). There will be sections indexed by discipline and alphabet. The symbology of color will be dealt with separately. And there will be a section in which symbols are indexed by graphic form.

The only writing in the book will be a preface by Buckminster Fuller; two-page articles by Charles K. Bliss, an Australian who invented a symbol language that can be written by combining hundreds of standardized forms, and by Mrs. Otto Neurath, widow of the man who developed pictographs, diagrams representing statistical data by pictorial forms varied in color, size or number to indicate change; an introduction by Dreyfuss; brief instruction on how to use each section, and a table of contents in 18 languages.

"What we are producing is basically a picture book. We believe that if we can lead the reader to the discipline, he should be able to find the symbol he needs with no trouble. After all, it will be in context," says Dreyfuss.

The Dreyfuss project cannot provide all the answers to the problem of bringing a sense of system to the design of symbols and their use in communicating. No one expects that. It is, however, a long and necessary step down the path to human understanding through signs without words. Who can tell where that path eventually will lead? □

# 60 years of human service to the community

## Telephone Pioneers of America

The people who built the telephone system from its tiny beginnings were pioneers in the traditional sense of being trailblazers. They had no written practices covering all aspects of operations as they do today. As the telephone spread across the land, those early shapers of a new civilized medium borrowed from the older principles of telegraphy. When the techniques of that simpler art didn't suffice, they improvised. By 1910, a generation of communications trailblazers had grown up with Dr. Bell's invention.

On November 2, 1911, an organization called the Telephone Pioneers of America was founded — appropriately, in Boston, the telephone's birthplace. Membership was reserved for employees with 21 years of service in the business. Their major goals were to perpetuate the ideals and traditions of the industry, and to promote the fellowship that was a natural concomitant of their working together.

The principle of service to others underlay the organization's activities almost from its inception. Originally limited mainly to contacts with members in times of sickness or bereavement, and to honoring such career events as service anniversaries and retirements, the Pioneer program later on was projected into other areas of living. Today, 60 years after founding, the Telephone Pioneers have a membership both active and retired approaching 350,000. Pioneers in the organization's 81 chapters across the country are dedicated to community services too numerous to name completely: working in braille with the blind; making talking books for the blind; hearing and vision screening of children; tutoring of children; child care centers; hospital work ranging from bandage-making to entertaining Vietnam veterans; helping in school programs for children in ghettos; helping to rehabilitate drug addicts and prisoners on parole; safe driving training; and other such diverse activities as combating environmental pollution and aiding in eyebank and bloodbank work.

Out of the Telephone Pioneers' total membership, a little more than 212,000 are active, on the payroll. Of the Bell System's more than 1 million employees, over half are less than 30 years old; about 800,000 are too young in service to be Pioneers. Yet in these younger telephone people is a great potential reserve of talent, spirit and willingness to help in the many communities where Pioneers alone have not enough hands to do all they would. There is evidence of such infusion of new blood in Pioneer efforts, where telephone people who will not qualify as Pioneers for many years yet have joined forces to help sustain a tradition of human service to the community.


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# 60 years of human service to the community

# The Bell System and Satellites

## Expanding the Network

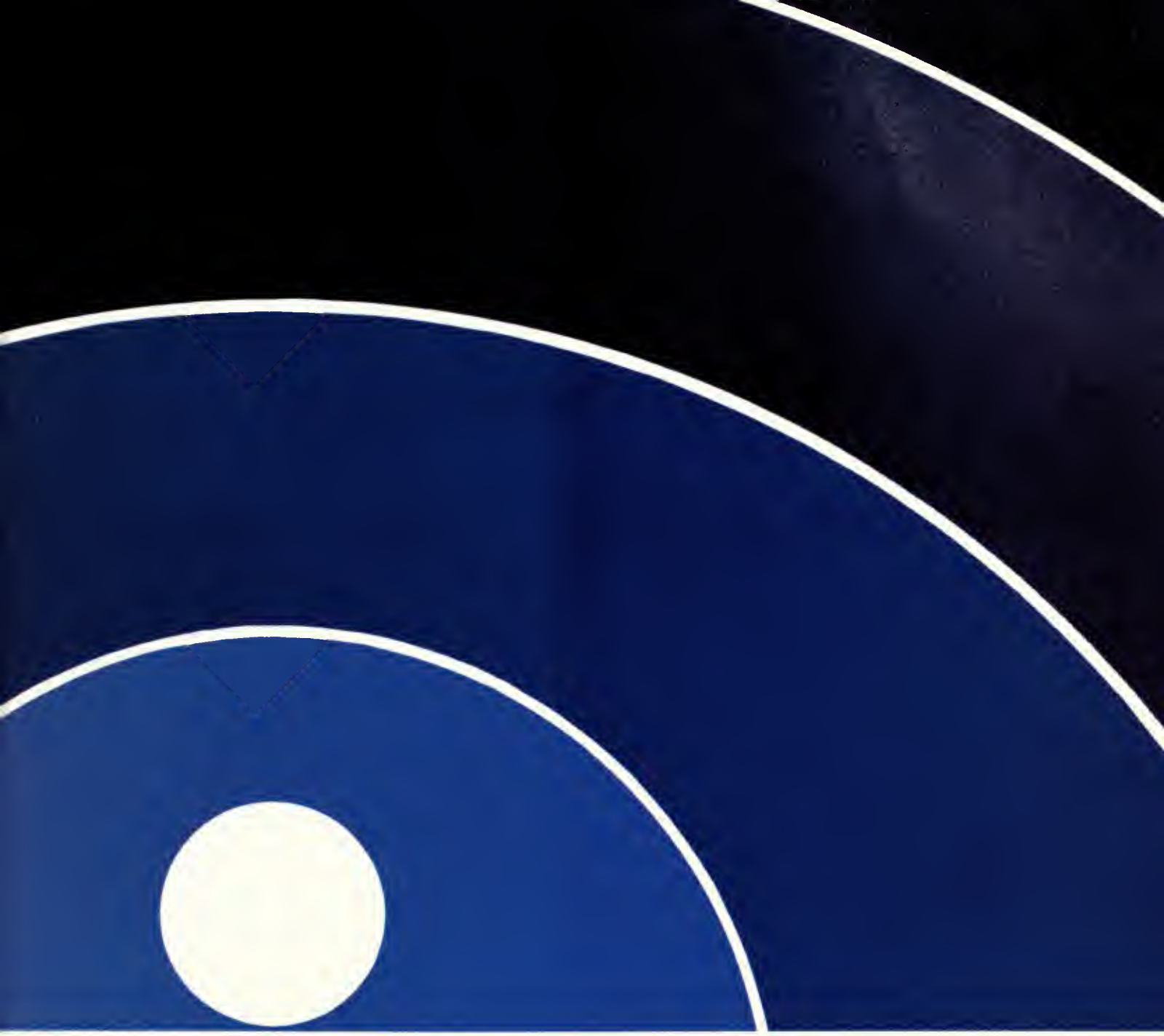
Mention satellite communications to an average American, and visions of great events carried live on television immediately come to mind. Coverage of major news and sports stories transmitted by satellite are now so commonplace that they are virtually taken for granted. These feats of communication are technologically spectacular, granted, but really are no more than one function of an increasingly important transmission medium.

The influence of satellites in long distance communications has not been restricted to the transmission of television signals. They have also played an important part in the tremendous improvement in telephone communications over vast distances which began in 1956 when the first trans-Atlantic telephone cable went into operation.

Before 1956, when high-frequency radio circuits were the medium for international communications a transoceanic call was an iffy thing, subject to variations in transmission because of such things as solar disturbances and the need for many frequency changes. Today, however, with a number of modern submarine cables in service as well as a number of communications satellites orbiting overhead, that very same average American can pick up his telephone, reach an overseas operator — or, in some cases, dial direct — and talk to a party in France, Chile or Japan with every expectancy of good service and high transmission quality. No more long waits and sporadic conversation amid static. The submarine cables and satellite circuits in use today are equal in quality in most respects to those used on calls within the continental United States. Additional cables and satellites of improved types and designs will be used to provide for the future growth of international telephone service.

The Bell System interest in satellite communications is due in great part to the vision of Dr. John R. Pierce, recently retired Director of Research at Bell Telephone Laboratories. In early 1954, three years before the Soviet Union launched the first Sputnik, Pierce spoke before the Institute of Radio Engineers at Princeton and made the first concrete proposals for a system of unmanned satellites whose functions would be to provide communications links in a world-wide network.

Technological advances in electronics at Bell Labs — the invention of the transistor, the maser, the solar battery — made the hardware necessary for a communications satellite and its associated earth stations available near the end of the decade. Also essential



to the project was, of course, the advent of sophisticated rocketry capable of placing a satellite into orbit. That, too, became available as the 1960's began.

Part of Dr. Pierce's dream of communications in space was fulfilled with the successful launch of Echo in August 1960. Although Echo was a passive, balloon-type vehicle that simply bounced signals back to earth from pioneering earth facilities like the Bell Labs installation at Crawford Hill, N.J., it did serve, however, as the prod that moved the whole communications industry, Bell System included, to look to the sky for extra transmission facilities.

Two years later, with launching of the Bell System's first Telstar® and the construction of the advanced earth station at Andover, Me., the age of the communication satellite began in earnest. Telstar, an active satellite, operated on transistors and solar cells and was the first satellite to relay a conversation across

the Atlantic. Officials at AT&T spoke for 22 minutes with officers of the Poste Téléphone-Télégraphe, France's government-owned telephone entity. The two parties were connected by ground stations or relay points in Andover and Pleumeur Bodou, France. The talk ended as the streaking satellite, orbiting faster than the earth's rotation, sped out of range of both earth stations.

Commercial satellite service began in June of 1965 after the launching of Early Bird by the Communications Satellite Corporation (Comsat), a publicly owned company formed by act of Congress in September of 1962. Early Bird differed from its Telstar predecessors in that its orbit around the earth was geostationary, or synchronous with the earth's rotation. This feature eliminated the need for many medium orbit satellites to assure continuous transmission and opened the door for full-scale use of space for communications.

Early Bird is the property of the International Telecommunications Satellite consortium (Intelsat), of which Comsat presently serves as manager. While fully used, the satellite had at best limited capacity, being able to handle only 240 simultaneous voice circuits or one TV channel.

## A reliable workhorse

Though small in size, Early Bird was a reliable work horse, assisting ocean cables in carrying the burden of trans-Atlantic telephone traffic for more than 18 months until the Intelsat II series made its appearance in early 1967. The first Intelsat II missed orbit and was lost in space, but the second, now inoperable, went into service over the Pacific and the third over the Atlantic. Intelsat IV, recently launched, is the biggest satellite in service, with capacity to handle an average of 5,000 simultaneous telephone conversations.

The satellites, themselves, of course, are only one element in the service chain stretching across the oceans; the other main ingredient is the earth stations with their complex transmitting, receiving and tracking equipment.

In the early years of satellite communications, it appeared that space communications would be a luxury reserved for the developed, affluent nations that could afford elaborate and expensive earth stations. But the mushrooming number of smaller nations that have joined Intelsat in recent years indicates that modern, global communications are a necessity for all nations, regardless of size or wealth. As of now, 80 nations are members of Intelsat, sharing in the global communications network. Earth stations now are located in 35 countries.

## Standby satellite

Perhaps the most significant development in space communication, as it enters its second decade, is not so much the enormous growth in international space traffic, but its potential use in the domestic field.

Recognizing that satellite communication across the oceans had become a permanent, viable transmission method, the F.C.C. opened up the field to companies in the United States to submit applications for construction of domestic satellite systems. The Bell System, which had prepared a far-reaching proposal in 1966, responded again in October of 1970 by filing an application in association with Comsat to build a domestic system that would go into operation 30 months after approval by the F.C.C. The application was withdrawn in favor of a more elaborate proposal in March of 1971.

The AT&T-Comsat proposal is basically this:

Under terms of the agreement, Comsat would acquire three satellites, place them in a suitable orbit and make them available to AT&T on a contractual basis. Comsat also would provide monitoring, telemetry and other satellite control services. The company also would acquire and maintain a fourth standby satellite, which could be placed in orbit in about three months should one of the working satellites suddenly "go dark."

AT&T, on the other hand, would be responsible for the terrestrial portion of the system, building and

operating five earth stations and integrating them into the nationwide network. The location and configuration of the AT&T earth stations is specifically designed to augment the Bell System nationwide long-distance telephone and private line service. Any domestic satellite system designed for other uses might not serve these special needs as effectively.

The AT&T-Comsat agreement leaves either party free to deal with other companies. Comsat could provide other satellites for other uses to other companies, while AT&T would be free to acquire other satellites from other suppliers. Indeed, Comsat has applied for its own general purpose satellite system.

The satellites are cylindrical, measuring 20 feet long by 9 feet in diameter and weighing about 3,000 pounds. Each would carry 24 transponders capable of carrying 10,800 two-way telephone conversations, 24 one-way television channels or 24 one-way digital streams, each with a capacity of 35 million data bits per second.

All three satellites would be placed in synchronous orbit 22,300 miles over the Equator (one at 94 degrees, the second at 104 degrees and the third at 119 degrees west longitude).

## Completely interchangeable

Although the satellites could be placed closer together, these locations were selected to keep the satellites far enough apart to avoid the occurrence of two satellites being affected simultaneously by solar disturbance. This condition occurs in spring and fall when the sun passes directly above a satellite as seen from a receiving earth station. Also, satellites of other companies could be placed between those of AT&T.

Each proposed satellite is identical to the others and is completely interchangeable. Although three would be in orbit, only two would be assigned full-time service loads, the third serving as a backup should trouble develop on either of the two others. It also would become active during peak traffic periods or during communications emergencies.

The earth stations would be located at Hawley, Pa.; Woodbury, Ga.; DeLuz, Calif.; Hanover, Ill., and Brazos, Tex. The stations at Hawley, DeLuz and Hanover would be equipped with three 100-foot antennas as well as transmitting and receiving equipment to allow communication with all three satellites. Initially, the two other earth stations would have two antennas for the simultaneous use of two satellites. All earth stations would be connected to the nationwide network by dual radio relay routes to insure the reliability of the satellite system.

## Analog and digital

When implemented, the satellite system would transmit in both the analog and digital modes. Analog mode would be used for normal telephone traffic. The digital mode would be used for data transmission and Picturephone® service.

The satellites would receive in the 4 gigahertz radio band and transmit in the 6 Ghz band as authorized by the F.C.C. But the AT&T vehicles also would carry beacons radiating at 20 and 30 Ghz for gathering needed information on expanded use of these frequencies. These higher frequencies authorized for satellite use by the recent World Administrative Radio Conference in Geneva, could very well provide the frequencies of the future, particularly as the lower bands become more crowded.

The estimated capital expenditures for the AT&T-Comsat system is approximately $240 million, Comsat's share being $145 million for the space segment of the project and AT&T's share about $97 million for the earth stations and connecting facilities.

As with any new and relatively large communications systems, this project would carry a cost penalty at the outset. The belief is, however, that with operating experience, the cost comparison between satellites and terrestrial plant would become much closer.

Technologically, there is a problem with the Bell System satellite system as there is with the systems proposed by Hughes Aircraft, Western Union, Comsat

independently, General Telephone and Electronics, RCA, Fairchild-Hiller and MCI-Lockheed.

Basically, the problem stems from the great distances involved. There is a 6/10 of a second time lag in transmission as the signal travels from earth to satellite and back — a round trip of almost 50,000 miles.

Specially designed *echo suppressors* can offset this effect, but it remains a fundamental problem of transmission by satellite.

## Best possible facility

The F.C.C. has all the applications under study but as yet has made no decision on just which companies will get rights in the domestic satellite field. A decision is expected by early 1972. The Bell System, of course, believes that its system is the best possible satellite facility at this time to serve the public at large but does not object to other systems being in use as the public interest requires.

That the AT&T system would increase the flexibility of the domestic communications network is obvious. It is an unalterable fact of the business that the network is subject to peaks and valleys in demands. The peaks shift across the country, crossing into new time zones as the day wears on. San Franciscans are making their first calls of the day at 9 a.m. their time while New Yorkers are going to lunch at noon. Thus, the domestic satellite system would add a new dimension in flexibility to the network, with its service capacity shifting across the time zones along with demand for service. Equally obvious is its value during periods of peak demand due to unforeseen events.

Another benefit of the system is the added reliability and diversity it will add to the nationwide network. Long-haul traffic is currently handled by cables and radio systems. Should one fail, the other is available. Satellites provide a third transmission alternative, one that is not subject to the same disturbances.

Several issues, which may have a bearing on the F.C.C. decision, are now under discussion in Washington as a result of a number of parties responding to the Commission's request for all pertinent data on a domestic satellite system.

One of those making comments, the Department of Justice, is concerned with maintaining a free competitive market in space communications, inclusive of regulated industries like ours. Support for the White House's *open sky policy* seems to be foremost in the thinking of the Justice Department. To this end the Bell System has no objection but rather believes that as many satellite systems as would benefit the public interest should be approved by the F.C.C.

The Justice Department has stated that for the cost of a domestic satellite system to be computed into the company's rate base, AT&T should demonstrate that the system itself is comparable in cost to the installation of similar terrestrial facilities.

Present estimates call for a revenue requirement of $65 million per year to make the system work effectively, compared to $60 million per year for comparable terrestrial facilities. Such a loss, less than 10 per cent, is acceptable because of the innovations involved in such a huge project. The argument can be boiled down to the fact that innovative systems are expensive at the outset, but once such systems are proved, economies in operation can be affected. Such is the case with AT&T's satellite system.

## Too much control?

The Justice Department states that AT&T's relationship with Comsat is, at the very least, suspect; that AT&T has too great an equitable interest in Comsat and thus exercises too much corporate control over it.

AT&T does own 2.9 million shares of Comsat, but this figure represents only 29 per cent of the total shares outstanding in Comsat. Also, AT&T has virtually no control over the corporate endeavors of Comsat. On occasions during development of the international satellite system, the two companies disagreed on many points. It is a matter of record that Comsat went its own way whenever it appeared to be in its best interests to do so.

Yet cooperation between Comsat and AT&T has been essential to implementing the Congressional intent when it created Comsat. It is evident that the present global system of satellites would not have been developed as rapidly or to such a great extent without the close cooperation — financially and technically — of the Bell System.

## No legal requirement

Justice further asserts that AT&T should not be permitted to acquire its satellites from Comsat unless Comsat proves to be the "least cost supplier." But the project is far too complex to be reduced to a simple "least cost" basis. Many other considerations should play equally important parts — for example, the supplier's ability to produce as promised, designs which have been space tested, and quality control.

AT&T plans to buy its satellites from the most experienced and most reputable supplier in the field. Additionally, there is no legal requirement for competitive bidding.

Thus, the Bell System does not want to be forced to buy a piece of hardware for its satellite system simply because it is the cheapest. If the cheapest hardware also should happen to be of acceptable quality, there would be no argument. Simple business economics would dictate that the less expensive piece of equipment should be bought.

Lastly, a number of consumer advocates, notably Ralph Nader, have attacked the AT&T-Comsat relationship by calling Comsat "a subsidiary of AT&T" and claiming that AT&T has deliberately slowed down the progress of Comsat and space communications to "protect its landlocked investment."

A careful examination of the facts completely dispels this theory. The number of communications channels in the global network has increased dramatically since Early Bird was launched in 1965. At that time, satellite communications were available only from North America to Western Europe. By the end of 1970, however, some 131 through-routes were in full use among 51 antennas and five satellites.

In addition, Comsat's annual revenues have increased from $19 million in 1967 to about $70 million in 1970. This is hardly the earnings record of a company whose progress has been slowed to protect the Bell System's "landlocked investment."

Looking to the future, it becomes clear that the decade of the 1970's will be an experimental one in the domestic satellite field. Should the AT&T system be approved, two satellites could be in operation by late 1974 and the whole system working sometime in 1975. It is safe to assume that any shift of traffic from land lines to satellite would be a gradual one. On the other hand, it is also safe to assume that there will never be a complete shift from land to satellites.

## 20,000 new circuits

At present AT&T Long Lines operates some 400,000 domestic telephone circuits. When in full operation, the domestic satellite system would add about 20,000 circuits to this enormous capacity.

As experience is gained with the initial system, however, and as improved and enlarged systems in higher frequency bands are developed, it is expected that satellites will play an increasing role in the Bell System's nationwide network. In the 1980's, satellites may be carrying a large share of the country's total long-haul telephone, Picturephone and data traffic. At this time, too, economies in operation would reduce the cost of satellite systems, but the continued development of terrestrial communications systems, such as coaxial cables, waveguides and others, will continue to give satellites strong competition.

It has been only 10 years since Telstar's brief moment in the international limelight. Those 10 years have produced a remarkable rate of progress and change, in terrestrial as well as satellite systems and the pace of the communications revolution is, if anything, accelerating.

What the next 10 years will bring almost staggers the imagination. —THOMAS J. FAY, ASSOCIATE EDITOR

# Illinois Management In Action

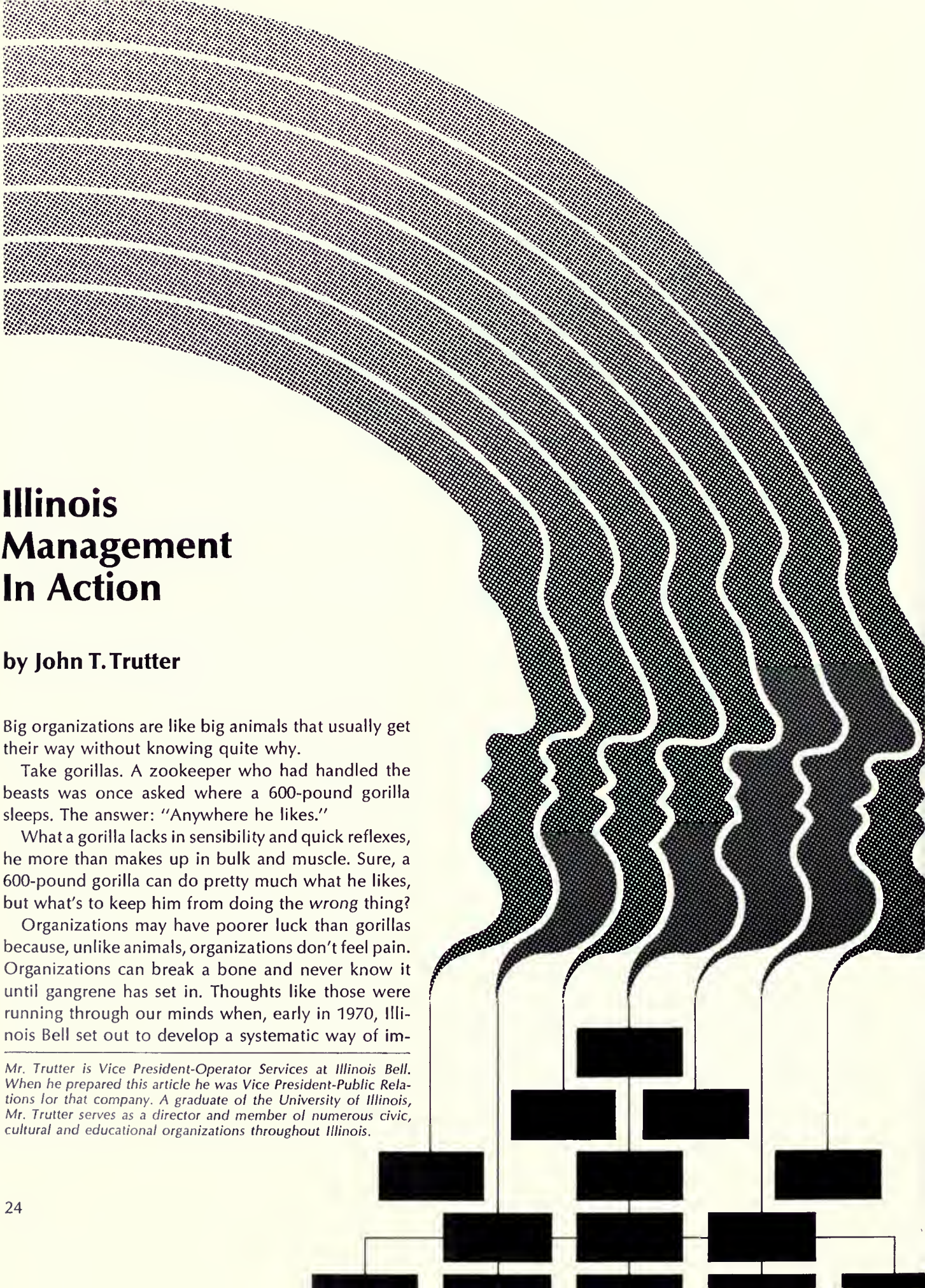
## by John T. Trutter

Big organizations are like big animals that usually get their way without knowing quite why.

Take gorillas. A zookeeper who had handled the beasts was once asked where a 600-pound gorilla sleeps. The answer: "Anywhere he likes."

What a gorilla lacks in sensibility and quick reflexes, he more than makes up in bulk and muscle. Sure, a 600-pound gorilla can do pretty much what he likes, but what's to keep him from doing the *wrong* thing?

Organizations may have poorer luck than gorillas because, unlike animals, organizations don't feel pain. Organizations can break a bone and never know it until gangrene has set in. Thoughts like those were running through our minds when, early in 1970, Illinois Bell set out to develop a systematic way of im-



*Mr. Trutter is Vice President-Operator Services at Illinois Bell. When he prepared this article he was Vice President-Public Relations for that company. A graduate of the University of Illinois, Mr. Trutter serves as a director and member of numerous civic, cultural and educational organizations throughout Illinois.*

proving sensitivity in our corporate nervous system.

In time we came to call it Management Action, and the plan has proved so successful it has nearly put itself out of business.

Management Action, as a concept, stemmed from the notion that every manager should be brought into the mainstream of the fact-finding and decision-making processes. First, it sought to root out the problems and challenges of managing the business. Standard survey techniques — with a few special twists — were used for this. Then it sought to involve management people at every level in the solutions to the problems that we uncovered.

"This is a sincere attempt to communicate," President Charles L. Brown wrote in a letter to management people. "I know that you will help."

Help they did. Managers jumped in enthusiastically, and to date we have completed more than 1,100 changes in organization, practices and physical working arrangements and tools. Another 900 suggestions are pending — some big, some small, but all calculated, in Mr. Brown's words, "to improve our relationships with each other and our service to customers."

The successes and the occasional failures of Management Action have taught us a great deal about the dynamics of management in the large corporation. We're learning our lessons.

As frequently happens in projects of this kind, the first step was the hardest. That first step was gathering some basic information about the problems and ideas of Illinois Bell management people.

Mr. Brown made it clear immediately that he wasn't interested in a purely attitudinal study, but that he wanted constructive suggestions for action. And he wanted them from every level of management.

"Traditional attitude surveys are hobbled from the outset with a tremendous handicap," Mr. Brown explains. "Once you've taken them, what next? Certainly a business can't be managed by a show of hands, but if the corporation isn't responsive to the opinions expressed, the people you've polled will feel rejected and bitter. Cynicism is almost inevitable."

The orientation of our study, we felt, had to be different. It had to be action-oriented rather than opinion-oriented. And, above all, it had to protect the anonymity of survey respondents. We couldn't see any other way to get candid, open participation.

Our search for the right research vehicle led us to Stanley Peterfreund Associates, Inc., a management consulting firm in Englewood Cliffs, N.J. The Peterfreund organization was no stranger to telephone management, having conducted a number of studies for Bell System companies over the years.

In designing the questionnaire, we took great pains to get not just opinions but action suggestions. The questionnaire itself was a massive, 24-page document which asked questions about numerous areas of concern — organizational structure, operating practices, reporting procedures, tools, wages and salaries and the relationship of education, training and ability to advancement opportunities. In each area, we asked management people to give us their assessment of our current posture, then tell us how policy should be changed and why. The questions were structured so that statistical summaries were possible, but there was ample room at every stage for verbatim comments, 22 opportunities in all.

To make the data more useful, we asked the respondents to tell us their jobs by district, but not their names. And to assure anonymity, we put the entire tabulation job in the hands of the Peterfreund organization in New Jersey. The questionnaires were sent there directly, tabulated, evaluated and brought back to Illinois in the form of 71 comprehensive summary reports, each dealing with one department or divisional unit. These reports discussed in detail the priorities for action. Also statistical summaries were provided showing district results for most units.

This questionnaire went out to all management people early in May, 1970. We allowed six weeks before closing the books. The response was gratifying — replies came in from 8,259 management men and women, more than 80 per cent of the total. In addition to tabular answers, these people provided us

with a staggering total of 133,000 verbatim comments, all of which were classified and summarized by the Peterfreund organization.

## The chance for action

Meanwhile, we were struggling with the problems posed by Mr. Brown's question: After you've taken the survey, what next?

We divided the job into two parts — results reporting and launching managers into action.

Reporting was relatively easy. We chose closed-circuit television. Stan Peterfreund flew to Chicago to video-tape his summary of questionnaire results. Mr. Brown and Robert P. Reuss, vice president-operations, and I sat down before the TV cameras to reflect on Peterfreund's report and to discuss the action which top management already was undertaking.

And there were some significant items to report, items which showed progress in the direction managers said they were seeking. These items — such as a comprehensive study of staff-line relationships and trials of organizations which cut across traditional departmental boundaries — demonstrated that top management would bear its part of the responsibility for change and action.

But most important, this report put managers at every level on notice that they would have a personal opportunity to take action on the problems they had identified. And it also proved wrong those management people who said the results would never see the light of day.

Thus the television program set into motion a structural plan of action which eventually would involve each of our 10,000-plus management people in direct, constructive confrontation with the problems and challenges of the business.

The Management Action Program, as we come to call it, started with a chain of discussion and planning meetings which worked down through the organizational pyramid. At every level, groups of managers paused to examine and analyze those comments and suggestions that they, themselves, had proposed.

As Mr. Brown had said in his television appearance:

"Action is a two-way street. You gave us priorities for change and many of them are within *your* scope of responsibility. It's not just the job of the Cabinet to act on these results . . . it's the job of every management man and woman to make a contribution to solving our problems."

Managers went to work quickly and productively. We provided some materials to help, but they provided the thinking, the creativity and the action. Reporting lines were established to keep track of progress at all organizational levels.

## Four aids for managers

There were four principal aids to managers. First was the results report itself. Peterfreund's unit summaries were discussed with managers within each reporting unit and detailed tabular reports were kept on hand for reference. Many managers requested — and received — further cross-runs of the data when these were needed to shed light on a specific problem area.

Next was an 18-page handbook which offered some help in interpreting the information and in organizing for action.

Finally, there were two action documents. The first was the Management Action Summary, a monthly report which managers used to report changes they had instituted within their own organizations. The second was the Management Action Recommendation, which any management person could use to suggest a change which lay beyond his own scope of authority. A formal channel was provided for moving these recommendations to the right level and department for action. Each manager was guaranteed feedback on the disposition of his recommendations, including the reasoning behind acceptance or rejection of the ideas he had submitted.

In most parts of the company, the early meetings were largely exploratory. Managers who had planned

a single meeting with their subordinates might find they needed two or three sessions just to discuss the findings in the Peterfreund report. In many cases, further fact-finding was done before actual problem-solving could get under way.

Then the reports and recommendations began to come in — first a few, then a steady stream.

The most gratifying result: about 75 per cent of the action has been initiated and carried out by first and second level management people. Most managers discovered they had the skills and authority to work for change themselves.

## A pattern of change emerges

Hardly any area of the business has been untouched by the effects of Management Action. Training, personnel practices, work techniques, communication up and down the lines of organization and across departmental lines — a pattern of change is emerging nearly everywhere as management people tackle new and shifting problems.

Structural change of the organization itself is a slower process, but that, too, is coming.

The success of the Management Action concept has been its ability to foster an atmosphere where managerial initiative can flourish. As people talked, thought and reasoned, they found the road to action a bit easier.

This is not to say that Management Action has been an unmixed blessing. It has been as subject to change as any area it was created to explore.

Last spring we began to notice some deterioration. Despite good intentions Management Action began to assume the characteristics of a "program." A program, as any middle manager can tell you, is something that will be gone in six months.

Perhaps it was inevitable that any formal structure — even one designed to foster free-wheeling management — should eventually endanger its own existence.

The signs were clear: Management people were beginning to chafe at the reporting requirements, simple as they were, saying "too much paper work." Those whose recommendations had been held up for lengthy consideration, usually for excellent reasons, were showing impatience. There was also evidence of a "numbers game," starting a competitive tendency to vie for supremacy in the production of reports, whatever they might or might not say.

Mr. Brown and the Management Action steering committee moved quickly. The decision was simply to complete formal parts of the program and concentrate on the basic managerial style.

Accordingly, we've stopped the Action Summary and the systematic tabulation and classification of results. The Management Action Recommendation is still available, but a letter or memo will serve just as well to get a recommendation moving up the line. These changes eliminated the potential for pressure aimed at generating suggestions for their own sake.

## The effort well repaid

The basic objective of the Management Action Program was to get managers to talk through their problems and to deal with them. The formal program was a very important first step in opening up the avenues of communications. The principles involved are becoming a part of our basic managerial style.

The progress of Managerial Action will be measured again. Right now, Illinois Bell is considering plans for another survey in 1972 to test how far we've come. Until then we'll continue to monitor our progress. And we're convinced our effort so far has been repaid many times over.

In his television report to management, Mr. Brown said: "I'd like you to remember that this isn't a one-time program but a continuing one. Potentially, Management Action is a valuable new tool for meeting our human and business goals."

That's still true, the major difference being that we in Illinois Bell have stopped talking about Management Action. Today the company is just talking about good management. □

John Pierce, Bell System Superstar, Leaves the Laboratories to Join His Alma Mater

# A Renaissance Man Retires

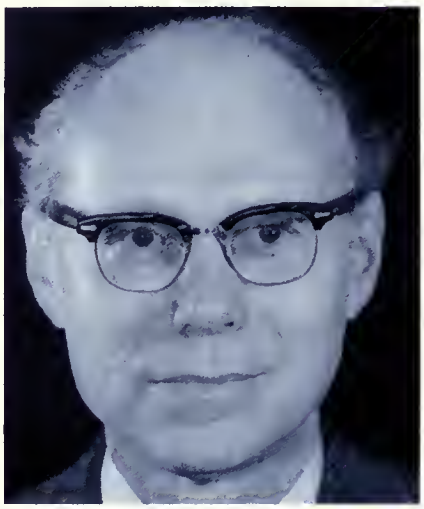
John Pierce has gone from inspiring colleagues at Bell Telephone Laboratories to inspiring students at California Institute of Technology—and with him has gone one of the Bell System's unique talents for original thought.

Dr. William O. Baker, Bell Labs vice president for research, says, "John Pierce has unwaveringly looked for the most challenging ideas that science and engineering could contain. And he could phrase those in forms which excited the best energies and enthusiasm of whole generations of collaborators."

Viewing those collaborators through his own window of recollection, Dr. Pierce says, "The one thing that has impressed me most about Bell Labs is the large number of very talented and very agreeable people who manage to work together cooperatively on problems. It is usual to have people working together cooperatively in the development field, but one sometimes thinks of research workers as prima donnas. There is less jealousy, less go-it-aloneness, in the research area of Bell Labs than in most other places.

"The mission of research," he emphasizes, "is to lay a groundwork for the future. The operating companies in the Bell System supply today's service. Western Electric manufactures things that will be used tomorrow. The development department of Bell Labs is developing the things that will be used the day after tomorrow. But out of research come the things we will see day after day after tomorrow. We don't see the output immediately — but, if you do not have research, the future just is not there."

Although standing always firmly in present time, Dr. John R. Pierce has also always contemplated the future with that creative admixture of imagination and realism that produces leaps in technology—such genuine innovations as communications satellites and



the helix waveguide someday to be used in the millimeter wave transmission system. Actually, Dr. Pierce considers his proposals for communications satellites to be the single most important contribution in the rich legacy of invention he has left during his 35 years with Bell Labs — a span of achievement which saw him granted no less than 98 patents.

"I suppose," Dr. Pierce reminisces, "that the thing of most importance was my calling attention to the fact, in 1954, that satellite communication could be achieved with rather simple unmanned satellites. Earlier than that, my British scientist-author friend Arthur Clarke had noted that manned space stations could be used for communications. But, if we'd had to wait for space stations, we wouldn't have satellite communication now.

"It was just in the air as far as I was concerned. I do not know whether I had read earlier things or not. I *had* read science fiction stories in which similar ideas were mentioned. But I actually did something about this when I was asked to talk at Princeton at the meeting of the Institute of Radio Engineers on some space topic. I thought this would be a good opportunity to make some calculations concerning communications satellites. I was astounded at how favorable things looked when I actually made the calculations.

"The passive balloon satellite Echo had been envisioned in that 1954 talk, which was published two years before Sputnik went up. I was very sure that something like that should be launched, but I had difficulty in getting anyone to launch anything so simple, although the very complicated things failed. Finally, with the cooperation of William Pickering at the Jet Propulsion Laboratory, we convinced NASA and Bell Labs people that Echo should be launched and that we should build a ground station. That was a great day in my life and in Rudi Kompfner's."

It is to his old friend and colleague Kompfner that Pierce gives credit for a key invention in communication satellite technology, the traveling wave tube. "But," adds Pierce, "he says that I discovered it. I realized its potential and did a lot of the analytical and experimental work that made it useful. This later tied in with satellites, because all communication satellites use traveling wave tubes as transmitters."

From his early days at Bell Laboratories, Pierce had specialized in the development of high-frequency electron tubes; some of the many patents granted him over the years included

*To learn the least amount of visual information a picture may contain and still be recognizable, Leon D. Harmon at Bell Labs made this computer version of John Pierce's portrait on the facing page. The picture is divided into about 300 squares, with each rendered in an even tone from one of 16 intensities of gray. To find Dr. Pierce's features, view this page from 15 feet or more and squint slightly.*

those for inventions in such fields as electron multipliers, electron guns and microwave tubes.

A native of Des Moines, Iowa, Pierce joined Bell Labs in 1936 after receiving the B.S., M.S. and Ph.D. degrees in electrical engineering from California Institute of Technology. Clearly combining administrative talent with his capacity for technical innovation, he progressed through several executive jobs, and, in 1965, assumed the position from which he has just retired: that of executive director of research in the communications sciences division.

Many tributes to his professional brilliance have come to him during his three and a half decades with Bell Laboratories. Seven colleges and universities, including Columbia and Yale, have awarded him honorary doctorates, and he is conspicuous on the rosters of many professional societies and committees.

## The most significant invention I didn't invent

Inevitably, John Pierce has been asked what he would like to have invented, that he did not. Candidly, he puts the transistor at the top of the list — "in any field that I know seriously about, clearly the most significant invention" — and mentions information theory, developed by his colleague Claude Shannon. Then he adds, with characteristically thoughtful humor, "Even more, I think I'd like to have invented the zipper, which must have been very profitable for someone."

In fact, Pierce devoted some study to the esoteric field which ultimately produced the transistor. He recalls working with two of its co-inventors in the late 1930's: "This was before the transistor times, but I remember that William Shockley was extremely energetic. He started a seminar in solid state physics before World War II, but the war interrupted it. He felt that solid state physics was the field in which great advances would be made. He taught various people, myself included, what he could. Walter Brattain was a member of that seminar also."

Pierce is serious in his assessment of the discovery that earned Bardeen, Brattain and Shockley the Nobel Prize in 1956. The transistor, he says, "has revolutionized so many things. It has put portable radios in the hands of not only people at beaches but people in backward countries. It has made the computer not a scientific monster but a practical device."

John Pierce, with his manifold original contributions to computer technology, is peculiarly qualified to comment on that ubiquitous handmaiden of science and business. "The computer," he affirms, "is a tool that people can use well or ill. Fortunately, we are getting a lot of small, cheap computers; people can regard them as more tailored to their individual use. "But," he adds, "there is a tremendous amount of human incompetence in using computers in business. The lack of familiarity of some businessmen with computers has been very bad.

"I think it is of the utmost importance that almost everyone in the schools be exposed to computers, to learn what they are and what they are not; to get away from this myth-making in which the businessman is told by an incompetent person that failures are the computer's fault."

Pierce has written and spoken a good deal about the future of communications, about the time when, perhaps, a businessman will communicate, rather than commute, to work. But, as with all of his extrapolations from present into future, the envisioned possibilities are rooted in reality. "The day when business will use computers and communications devices to conduct most of its daily work," he says, "is quite a way in the future. The reason lies in the cost of terminals and the cost of communication itself. It is not that cheap, and until it becomes cheaper, we won't be able to realize this. I think that traveling for pleasure and communicating to work is still an ideal toward which we should work, but we should not expect to get there tomorrow or the day after."

## The future: wireless phones, the laser, competition

Pierce's habitual caution in viewing the day after tomorrow is always leavened by his profound awareness of what is actually possible. He sees no reason, for instance, why the telephone itself eventually should not be liberated from its traditional umbilical cord attached to a wall. "I hope that the telephone will become wireless," he says. "I hope that it will become smaller and lighter and less conspicuous — and cheap, so people will have lots of them around the house, not just a few. It seems to me ridiculous that we have several electrical outlets in every room of a house, installed when the house is built, and yet just an occasional telephone jack. We have not made the telephone as universal and as portable as an electric lamp.

"Maybe what's needed are telephones that we can take around and plug in as casually as we do mixmasters or electric irons or TV sets. This is a matter that has to be explored, but unless we want to reach the goal we won't take the various approaches that might lead us there."

Enterprise in seeking and following such approaches is the essence of

technical progress and the generator of practical invention. Bell Laboratories has always sought better ways to carry communications traffic locally, between central office and home or business. One of the newest and most exciting, in Pierce's view, is optical transmission by laser light through glass fibers finer than a human hair. "We are far from realizing the potential of these," he says. "We do not have a uniform supply of fibers; we do not know how to cable them together, how to connect them; we do not know how to make cheap enough terminal equipment. But just imagine being able to pull thousands or tens of thousands of glass fibers through a duct that now contains only a few hundred copper wires. This would offer tremendous space savings in our metropolitan areas if it came through; now it is just a gleam of the future."

Gleams of the future often shine through much of Pierce's conversation. Contemplating Bell Labs itself 20 years hence, he foresees organizational changes to secure a still-growing Laboratories in a changing and competitive world.

"This seems plausible to me," he says, "in facing a very tough competitive situation where there are enterprising companies doing all sorts of things that are very important to the telephone business as a whole.

"Bell Laboratories gets bigger and better all the time, but continually it is a smaller fraction of the total related activity in communication and electronics. New uses of the communications network have grown into all sorts of forms. We are surrounded now not by telephone users who do not know or care what is in their terminals or telephones, but by a lot of very sophisticated customers who are on a level with us technologically."

The proliferation of technology that has made this country the most productive nation on earth has also created a kind of backlash, which Pierce describes as an "anti-technology feeling" and which he deplores. It stems, he believes, largely from ignorance. "People are frustrated by technology," he says, "because they do not understand it. It is a shame that people are not taught more about technology, taught how understandable it is, how it is man-made, how it can be controlled and directed by man. I think that the anti-technology feeling comes from past ignorance and some present frustrations that actually have very little to do with technology itself.

"There are, for example, problems of a social and a racial nature — a feeling of being lost in a world you do not understand, much as people understood the traditional old home town. The thing to do is not go back to the small town and its limited life; the thing to do is to understand the world we are in. The only way we can understand it is to learn something about technology, not to abandon it."

## Design the job for the people, not just the machine

Pierce's abiding belief in the importance and validity of technology is scarcely surprising in the light of his own devoted career. But that belief always relates the technical to its proper place in the human context, for John Pierce is an immensely humane man. He is more concerned about the intelligent application of technology and its effect upon ordinary people than he is about their understanding or simply tolerating it. Since he has been so instrumental in generating change, he knows that the means of doing things in the telephone business will change, and that the content of the telephone job will change.

"We are learning more all the time about training methods," he says, "about how to teach people to do things effectively; we are learning more about how to write instructions that will help people. Also, we are learning more about human engineering so we can build equipment that is easy to use, a pleasure to use. Together with these things there will be more automatic maintenance and testing. I think that in some ways it will be easier to do the job.

But it will also be more pleasant and rewarding, because some thought will have been given to the human being *as part of the job* rather than to just designing the physical equipment and then assuming that somehow the poor human being will be able to cope with it."

Education, too, is a peculiarly human process, and the problems of coping with its demands as well as its shortcomings have engaged Pierce's concern. He feels that students today have every right to be dissatisfied with some of their programs. "Not so much in science and engineering," he says, "but in other fields they have a right to expect that what they learn will be useful to them, will make life more enjoyable, will make them more effective in the world. I doubt if their education always does that. Even in science and engineering, it is only a very limited number of people who will pursue this creatively on the highest level. The others have a right to ask, and society has a right to ask, that they be trained to do things that are useful to society. Somehow, glamour has been associated with going to the moon. I do not see why glamour could not be associated with designing a better sewer system — but that requires a change of attitude."

With Dr. John Pierce himself now a member of the academic community,

installed as professor of engineering at Cal Tech, he will be seeing the problems of education from the inside, but with a vision enriched by his long and brilliant career in the business community. When he retired from Bell Labs September 1, he did not have definite courses or research planned, but he did have some specific objectives.

"What I hope to do is to learn more about Cal Tech and education as it now is, and to help the people there in relating this to the real problems of the world outside of the universities. I think that more cooperation is needed between business, particularly the research and development sector, and colleges and universities. I think it is unfortunate that research and development in this country have become so closely tied to military and aerospace activities, both in the government and in a very narrow segment of industry. I think it is important that ties be established between university education and research and the productive segment of American industry that provides us with the goods and services of life."

On the wider stage of human knowledge, Pierce believes devoutly in international cooperation in the sciences. There is, he says, in fact a lot of such interchange of information in science and technology. "But," he adds, "I think the only sort of international cooperation that really works is that between a scientist in one country, as a *scientist,* and a scientist in another country, as a *scientist.* If we try to make cooperation work through some third party, we get the trouble that is inevitable in indirect communication. The best cooperation is person-to-person, across national barriers."

Pierce has been known, over many years, in another capacity, practicing a craft that also bridges national barriers. As a writer of science fiction, he has been publishing stories since his college days. "I got involved in writing science fiction," he recalls, "because I read a lot of it when I was young. It was a great inspiration to me in the 1920's, especially after Hugo Gernsbach started publishing his magazine *Amazing Stories.* While I was an undergraduate, that magazine had a cover story contest, and I wrote a story that got second prize. After that I wrote other stories. Maybe I would have written other than science fiction, but at least I could get that published; I couldn't get the other stories published, and I am rather practical.

## Prophets, writers and scientists: views of future worlds

"The pseudonym J. J. Coupling, under which I wrote several stories, is actually a real term in science: it refers to a type of coupling that occurs in atomic physics. I borrowed it from the Institute for Useless Research, which was founded at MIT by James Fisk and William Shockley. I did not then know its significance; I wanted a pen name under which I could publish factual articles that were not of a company-private nature."

Under his own name, however, John Pierce has authored 13 books and hundreds of papers and articles on various scientific subjects. His influence has been felt in virtually every communications medium, even including recordings; some of his computer-music compositions appear on the Decca label as "Music from Mathematics" and "The Voice of the Computer."

It is a natural corollary to his concern for the human condition that Pierce, as scientist, writer and thinker should have rather special opinions on the future. Sometimes, he believes, a view of the future that a science fiction writer projects conflicts with that of a scientist. "For example, George Orwell and Ray Bradbury, in their stories, have had some rather dismal views of the future. A little farther back, H. G. Wells and Aldous Huxley saw man overwhelmed by machines.

"I think that what prophets of utopias and anti-utopias have lacked has been partly a foreknowledge of inherently unpredictable inventions. Partly, however, prophets of the past have underestimated both the individuality and the adaptability of man."

From the point of view of writing science fiction, Pierce does not believe that the future is foreseeable. "I think that the game of science fiction, if you wish, is not to predict the future, but to ask, 'What if?' It is to explore intellectual and moral ideas. The stories I have written I have never regarded as predictions of the future. Sometimes the future enters into them, but really they are little moral tales of one sort or another."

Pierce gives a modest nod to some of his other many talents and interests. "I also write poetry — much less well than I write science fiction — but I have published some poetry. I am also sort of a wood-butcher, rather than a cabinetmaker, but I have made furniture, gliders and sailboats. I occasionally take photographs for fun; I like to walk; in the past I have skied, and I have ridden horseback. But my main hobby is just living."

And John Pierce indulges that main hobby with the kind of evergreen enthusiasm that keeps some older men younger than their contemporaries. "No one knows exactly what we will do tomorrow," he says, with a direct, sharp-eyed gaze that looks into things rather than merely at them, "but it is sure to be better and more exciting than the things we have already accomplished."

—DON WOODFORD, MANAGING EDITOR

## Improving the Art

*(continued from inside front cover)*

ciples of fair play, and a square deal for every man and every woman in the U.S. A square deal politically, a square deal in matters social and industrious."

Twenty years later, Franklin D. Roosevelt offered his own brand of "deal" to the voters. Said FDR in the 1932 campaign, "I pledge you, I pledge myself, to a new deal for the American people." Then, at his inaugural in March 1933, he delivered what was to become the most famous of his many public statements. As in so many instances of speeches made immortal by history — Lincoln at Gettysburg; Churchill on the radio from London pleading, "Give us the tools, and we will finish the job" — in 1933 there was a great need, an insecurity, a deep despair in the land. The *interest* quotient — the first condition of good communication — was keen.

### Fear itself

"But, first of all, let me assert my firm belief that the only thing we have to fear is fear itself," said FDR. Then he said what needed to be done to make things better. Whether he did in fact follow through and make things better — the second condition of good communication — probably depends on one's politics, or on how well one's parents were eating at the time.

To some successful communicators, there are goals that surpass even that of being President — or King, as the case may be — and which help produce historic statements. Witness the Duke of Windsor's farewell remarks after renouncing the British throne on December 11, 1936: "I have found it impossible to carry on the heavy burden of responsibility and to discharge my duties as King as I would wish to do, without the help and support of the woman I love."

In citing such examples it is not suggested that the way for business to better communicate among its employees and with its various vital publics is to first work itself into such a bind that it teeters on bankruptcy, and then to spring an orator who can pull everything together with rhetoric.

### To improve the art

No, the thing that needs to be done to improve the art of communication, at least in this business, is precisely what *is* being done, as recorded in this issue — experimentation, innovation, high performance, a continuing quest for quality and credibility in everything the System does and says.

— In Illinois Bell the aim of a "management action program" is not unlike that at the State Department. It is to get managers to "talk through their problems and to deal with them." The company's president describes the program as "a sincere attempt to communicate."

— In Pasadena, Calif., Henry Dreyfuss and his staff collect and catalogue symbols from around the world in the belief that symbols, in their ability to bridge international communication gaps, may help bring the world together.

— In New York City, New York Telephone "will invest more than $70 million in telecommunications equipment to provide service" for the new World Trade Center. "Some 200,000 miles of telephone conductors will feed into the complex — enough to reach eight times around the world."

— And, underlying all of it, straight talk.

### Happen it must

If the art of communication is to be revitalized and rebuilt in large organizations to take its place alongside the technology of communication, those are some of the ways it will happen. And happen it must. For to communicate is indeed the beginning of understanding. If you are in this business, to communicate is also the way to higher morale, better jobs, adequate earnings and superior service. If you happen to be a four-year-old boy at the beach, to communicate is even the way to China. □

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