

state & society

Bell Labs executives express concern over antitrust suit

In November 1974 the Justice Department filed a complaint against American Telephone and Telegraph, Western Electric and Bell Laboratories, alleging violation of the Sherman Antitrust Act. Bell Laboratories is one of the largest employers of physicists in the US. The suit, said to be the largest antitrust action ever filed, could result in the splitting up of the Bell System, which consists of AT&T (the parent company), Bell Laboratories, Western Electric and 23 operating telephone companies. The suit is expected to last at least ten years, and appeals could conceivably occupy another several years.

Although the Justice Department has not specifically said what it would like done with Bell Labs, there is considerable concern among Bell executives over the suit. Recently we visited Bell Labs to discuss the antitrust action, the organization of the Bell System and of Bell Laboratories in particular with N. Bruce Hannay, Bell Labs vice-president for research and patents, William L. Keefauver, head of the Bell Labs patent and legal organization, and Albert M. Clogston, who heads the physical research division at the Labs.

Antitrust suit. The Justice Department complaint, filed in the Federal

District Court in Washington, DC, alleges a variety of civil antitrust violations. The first alleged violation, for example, is that the Bell System has conspired to monopolize telecommunications services and submarkets. The complaint specifically requests that AT&T divest itself of Western Electric (its manufacturing arm) and that Western Electric divest itself of certain manufacturing and other assets to ensure competition in the manufacture and sale of telecommunications equipment. In addition, AT&T was requested to divest itself of its Long Lines department, which owns and operates the long-haul transmission facilities of the Bell System.

Antitrust officials were quoted in the *Wall Street Journal* (21 November 1974) as saying, "We really haven't arrived at a determination of how to handle Bell Labs," but the suit could mean that AT&T would have to shed itself of the Laboratories.

After the complaint was filed, government lawyers and AT&T lawyers exchanged interrogatories and requests for discovery (requests to produce certain documents from the other party's files). AT&T argued before Judge Joseph Waddy that the mere searching of

continued on page 70



HANNAY

Ramo and Baker head two White House advisory panels

Two advisory panels recently established by the President will study Federal policy for science and technology. Formation of the panels is part of the attempt by the Ford Administration to restore the position of White House science adviser.

The Advisory Group on Contributions of Technology to Economic Strength—headed by Simon Ramo, Board Vice-Chairman of TRW—is to investigate the improved utilization of technology in bolstering the national economy. The panel will discuss productivity increases and environmental and safety aspects of technological development, the proper role of government and the international economic impact of technological exchange.

National policy implications of scientific developments that may take place

in the next decade are the province of the Advisory Group on Anticipated Advances in Science and Technology, which Bell Laboratories president William O. Baker leads.

At a joint meeting of the two groups held in early December, 1975, National Academy of Sciences president Philip Handler and Courtland Perkins, president of the National Academy of Engineering, addressed the advisers; also, Emilio Daddario, director of the Office of Technology Assessment, described his organization's work. A long-range objective of both panels is to facilitate planning for the White House Office of Science and Technology Policy. Creation of the office has been unexpectedly delayed by Senators Edward Kennedy, John Tunney, and Frank Moss, whose White House science advisory

bill, S 32, differs in emphasis from the House-passed version (HR 10230) and was expected to be reported out on the Senate floor early in February.

Members of the economic panel, besides Ramo, are as follows: Ivan Bennett (NYU School of Medicine), C. Fred Bergsten (Brookings Institution), Lewis Branscomb (IBM), Arthur Bueche (General Electric), Joseph Charyk (Communications Satellite Corp), Edward David Jr. (Gould Inc), Carl Djerassi (Stanford University), Robert Gilpin (Princeton University), Patrick Haggerty (Texas Instruments), Charles Hitch (Resources for the Future), J. Herbert Holloman (MIT), Edwin Land (Polaroid Corp), Hans Mark (NASA), Norman Rasmussen (MIT), and Marina Whitman (University of Pittsburgh).

The panel on anticipated advances

also numbers 16, including Baker. The others are John Baldeschwieler (Cal Tech), Manson Benedict (MIT), Solomon Buchsbaum (Bell Labs), Melvin Calvin (University of California, Berkeley), Harry Eagle (Albert Einstein College of Medicine), Eugene Fubini (Arlington, Virginia), Murray Gell-Mann (Cal Tech), Arthur Kantrowitz (AVCO-Everett Research Lab), Donald Kennedy (Stanford University), Hans Mark (NASA), Frank Press (MIT), Frederick Seitz (Rockefeller University), Charles Slichter (University of Illinois), Edward Teller (Lawrence Livermore Lab), and Charles Townes (University of California, Berkeley).

—FCB

Bell Labs

continued from page 69

the documents requested (7 billion pieces of paper) from the Bell System would cost \$300 million. AT&T also complained that the Federal government was not retaining documents in all the agencies in which AT&T asked for discovery. The judge ordered the government to comply with that request and suspended all further proceedings until he had been briefed on three questions of law.

One question concerned the effect on the new action of the 1956 Consent Decree that terminated the 1949 antitrust action against the Bell System. The main thrust of that action was to split Western Electric off. But the Consent Decree instead required AT&T to divest itself only of all business activities that were not regulated.

The second question was whether or not the suit should have been brought in the New Jersey court that settled the 1949 suit. The third was whether or not the antitrust action is barred in whole or in part by the regulatory activities of Federal and state bodies.

After the briefing, Judge Waddy asked the Federal Communications Commission to file an *amicus* brief, which the FCC recently did. The FCC has itself been investigating the Bell System structure since 1968 in connection with the setting of long-distance rates. An FCC decision is expected early next year. In the FCC action there has been no suggestion that AT&T would be required to divest itself of Bell Labs. In addition there are some private antitrust suits against the Bell System.

It is the Bell System position that the interests of telephone customers are best served by a vertically integrated, regulated monopoly, and that the present industry structure was defined by the Communications Act of 1934 and confirmed by the Consent Decree of 1956. Also, since Bell activities are subject to "pervasive regulation" by



KEEFAUVER

both state and Federal regulatory agencies, the activities complained of by the government in this antitrust suit are more properly decided by these same regulatory agencies.

Keefauver told us that a major antitrust action typically takes six years before the trial. The trial itself takes one to three years and the decision another year. A total of ten years is a conservative estimate, he feels, if the suit is not settled earlier by a consent decree or a narrowing of the issues. He also says that regardless of the outcome, the probability of an appeal is reasonably high—this could easily take three or four more years.

In the Bell System, the parent company, AT&T, has an operating unit (Long Lines), a manufacturing unit (Western Electric) and a research and development unit (Bell Laboratories). Ownership of Bell Labs is shared, 50-50 in terms of stock, between AT&T and Western Electric. The Bell System also owns, either wholly (about three-quarters of them) or in part, many local telephone companies, each of which pays a small percentage of its revenues—called "license contract revenues"—about half of which pay for the general functions of AT&T. The other half is paid to Bell Laboratories for research

Bell Laboratories Income in 1975

Source	Millions of dollars	%
AT&T	223.5	34.1
Western Electric	320.2	48.8
Operating companies	62.5	9.5
Government	49.5	7.5
Other	0.8	0.1
Total	656.5	100.0

and development.

Western Electric, one of the largest manufacturing companies in the US with sales of about \$7 billion per year, is restricted by the 1956 Consent Decree to sell only equipment of a type normally provided to the operating companies of the Bell System. However, the telephone companies are not restricted and buy general supplies and communications equipment from other manufacturers.

In 1975 Bell Labs had a total budget of \$656.5 million. (For comparison, the NSF budget for FY 1976 is \$710 million.) The sources of income for Bell Labs are shown in the table. AT&T supports all research and fundamental development. (All physics research at the Labs is supported by AT&T.) Western Electric support, on the other hand, goes for specific development and design.

Bell Labs is organized into seven technical areas, each of which is headed by a vice-president; one area is government work, three are systems development (divided into transmission, switching and customer products), one is business-information systems, one is devices and components (such as integrated circuits, charge-coupled devices, magnetic bubbles, lasers), and last, but not least to physicists, is research. It is this latter area that is headed by Hannay.

"Why is basic research funded by the operating companies rather than Western Electric?" we inquired. It would be very difficult to decide how to allocate expenses of basic research programs to the costs of manufacture of particular pieces of equipment or systems, Hannay replied, and "it could end up in an endless problem when deciding how to charge the operating companies for the equipment." AT&T's approach contrasts with that of many other large companies that have a central R&D laboratory and then separate divisions doing development work. The cost of the central R&D is then spread over the whole operation.

The Laboratories has almost 16 000 employees. Of these over 2000 have PhD's and 3300 have master's degrees. There are 726 physicists—481 with PhD's (2.5% of US physics PhD's) and 142 with master's degrees.

Bell Labs funds a wide spectrum of research, but unlike a university, the research may be relevant to the Lab's broad communications mission. The size of the effort is roughly proportional to its eventual expected interest to the Bell System, Hannay explains, but "we're generous in our interpretation about what might be relevant." Thus, in addition to such obvious fields as physics and chemistry, there is research in biophysics, psychology and econ-

continued on page 72

Bell Labs

continued from page 70

ics. There is even research in astrophysics, both because of possible application to long-distance communication and because of its intellectual interest among physicists.

Clogston notes that the Labs has drawn the line at experimental high-energy physics, even though much of the best intellectual effort over the past several years has gone into high energy. Nevertheless several Bell Labs theorists are doing high-energy theory—for example, John Klauder, who is doing axiomatic field theory, and Bertrand Halperin, who along with others at the Labs, is using renormalization-group theory, which has had considerable impact on statistical mechanics.

What would divestiture mean? The Bell System is integrated, both horizontally and vertically. It is horizontal in the sense that all the local operating companies, such as New York Telephone, Bell of Pennsylvania, and so on, are linked together. It is vertical because the ultimate service to the customer, the manufacturing, and the R&D are all linked together. Divestiture of Bell Labs, Western Electric and Long Lines would specifically destroy the vertical integration. Hannay argues that it is the vertical integration that makes the Bell System superior to telephone systems in other countries, most of which are operated by their respective governments and generally do not have manufacturing as part of the system.

The Bell System has just put into regular operation a No. 4 ESS (Electronic Switching System), a centralized machine that is at the top of a hierarchy of smaller switching systems. This system cost Western Electric over \$400 million, of which \$150 million is attributed to development costs. Hannay points out that a company with a smaller R&D commitment would never have handled the development of such a system. In the United Kingdom, for example, when the British Post Office decided to build a switching system much smaller than the No. 4 ESS, it had to assemble a combination of five companies to work with it, he said.

An important feature of vertical integration is the interaction among people, Keefauver told us. "This money just doesn't come through the door in sealed envelopes;" there are many interactions between Bell Labs people, those at Western Electric, those at AT&T and those in the operating companies. At the Laboratories people in basic and applied research and those in exploratory development know each other and talk over their problems. If the Bell System is split up, Keefauver observes, one will have to worry about proprietary information, premature leaks, and so forth.



CLOGSTON

"It would make jobs for lawyers and interfere with scientists and engineers."

Bell Labs president, William O. Baker, in testimony before the US Senate Subcommittee on Antitrust and Monopoly in the summer of 1974, said that "disintegration of the Bell System will destroy Bell Laboratories . . . The notion that Bell Laboratories could endure and function away from AT&T, Western Electric and the operating integrated Bell System would be laughable were it not so sinister and so ominous."

—GBL

R&D growth rate revives, Battelle believes

Expenditures for research and development in the United States in 1976 will reach almost \$38.2 billion, 5.8 percent more than in 1975, estimates Battelle Columbus Laboratories. Only half of the increase, it is forecast, will be due to inflation.

Most of the anticipated hike in research and development spending is expected to come from Federal and industrial funding increases. With almost 53 percent of the total expenditures in this area, the Federal government will increase its support for research and development by 11.4 percent (in other words, to \$20.2 billion, up \$2.1 billion from 1975), according to Battelle. A similar rise, 11.1 percent over last year, is expected in industrial funding, which accounts for 43.5 percent of the total. Support for research and development efforts from academic institutions and nonprofit groups makes up another 3.4 percent of total funding.

The increase is said to reflect concern over energy problems and a more positive attitude in Congress toward military research and development pro-

grams. Beginning in 1968, a decline in Federal funding began, but the growth rate for research and development, Battelle notes, in current dollars appears to have returned to the pre-1968 rates.

Rasool takes up new post at NASA

S. Ichtiaque Rasool, special assistant to the deputy associate administrator of NASA, has been appointed deputy associate administrator for space science (science). He will serve as chief adviser to Noel W. Hinners, the associate administrator for space science, in establishing the goals and objectives of the space science program.

Rasool joined NASA in 1965. He was senior research scientist at the Goddard Institute for Space Studies until 1971, and deputy director for planetary programs in the Office of Space Science from 1971-1974.

in brief

The papers of Ernest O. Lawrence, founder and first director of the University of California Radiation Laboratory, have been arranged for access by scholars interested in the history of physics. For information contact Arthur L. Norberg, The Bancroft Library, University of California, Berkeley, Cal. 94720.

The European Organization for Nuclear Research (CERN) and the USSR have extended a collaboration that allows physicists from CERN's 12 member states and their Soviet colleagues to perform joint experiments at CERN's laboratories and at sites within the USSR.

The Dutch Society of Sciences will publish the correspondence of H. A. Lorentz and is interested in obtaining copies of his letters with permission to publish them. Persons or institutions who have custody of such letters should write to Hollandsche Maatschappij der Wetenschappen (Lorentz Committee), Spaarne 17, Haarlem, Netherlands.

Copies of AIP Pub. No. R-268, *Nuclear Physics Manpower*, may be obtained from Beverly F. Porter, Director, Manpower Statistics Division, AIP, 335 E. 45th St., New York, N.Y.

The following appointments have been made at the Nuclear Regulatory Commission: Robert B. Minogue as director of the office of standards development, Robert E. Heineman as director and Frank Schroeder as deputy director of the division of technical review and Saul Levine as deputy director of the office of nuclear regulatory research.