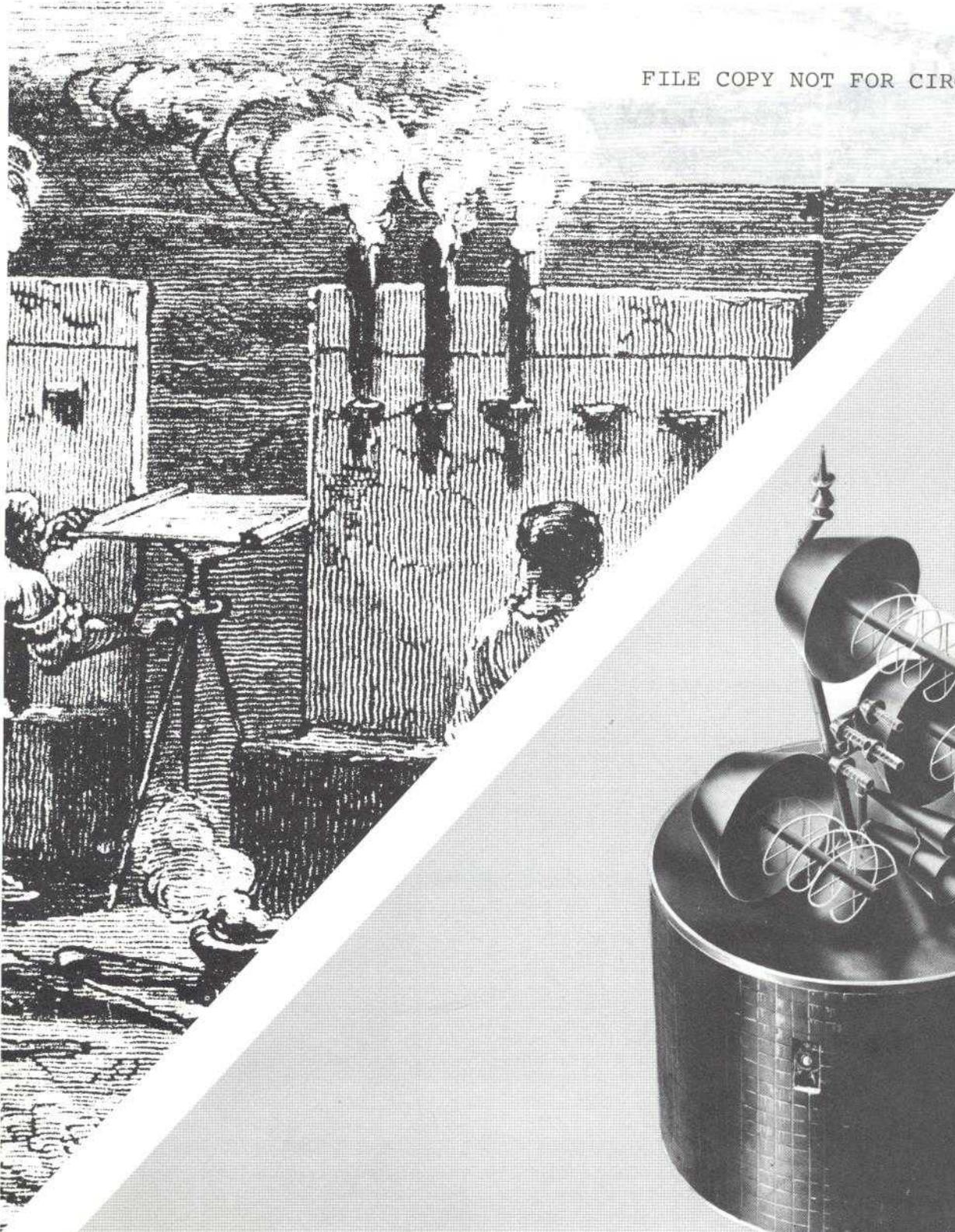


COMSAT NEWS

May-June 1973

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From Roman torches to COMSAT's latest satellite to be used in the Navy-Maritime program. For related articles see pages 5 and 15.

May-June 1973 — 8th Year, No 3

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**Matthew Gordon, Assistant Vice
President for Public Information**
James H. Kilcoyne, Jr., Editor



Mr. McConnell

The Chairman's statement to shareholders

■ *Following are excerpts from the statement of Joseph H. McConnell, Chairman of the Board of Directors, at the Annual Shareholders Meeting on May 15.*

This year marks the 10th anniversary of COMSAT's incorporation here in Washington, D. C.

"COMSAT AT 10" is appropriately the theme of this year's annual report, which I am sure most of you have read. If you go through the report, you can see how far we have come

in advancing world communications. These achievements have opened up an entirely new chapter in the history of world relationships. In fact, the words, "Live Via Satellite," identify, in a routine way, the remarkable change that has taken place.

Ten years ago, nobody really knew how COMSAT would develop.

The Communications Satellite Act of 1962 merely said that a new privately-owned corporation should be created to establish a global communications satellite system, in cooperation with other countries, as quickly as practical.

The Act gave COMSAT a responsibility, but it placed various constraints on the new enterprise; it made no funds available; and it did not define the nature of the cooperation with other countries. Thus, on being incorporated, COMSAT was confronted with a formidable legislative mandate, but COMSAT had to raise the capital, get the necessary staff, and decide how to proceed to fulfill its task.

To me, the pace of activity and accomplishment which followed are a lasting tribute to the small group, and the subsequent employees, who provided the leadership in transforming a mandate of the Congress into a global reality.

In April 1965, Early Bird, the world's first commercial communications satellite, was launched successfully and emplaced over the Atlantic Ocean. After intensive and highly successful communications testing, Early Bird was placed in commercial service in June. The initial decision to go with the synchronous satellite would now bring large benefits to all nations of the world.

Today, the fourth generation of successively advanced satellites—the INTELSAT IV series—comprises an expanded global satellite system. These satellites provide more than 260 communications pathways among earth station facilities in 49 countries.

Along these pathways flows a major portion of all international long distance communications—telephone, television, teletype, high speed data and facsimile. Almost 100 countries, territories and possessions are leasing satellite services on a full-time basis. High-quality telephone calls can be

made to more than 20 countries that cannot be reached by cable, the only other means of providing reliable transoceanic phone service. Over 900 million people on six continents could see an important event on TV as it happens, "Live Via Satellite."

COMSAT has, indeed, helped to change world communications, and this change has been accomplished by still other changes. New INTELSAT Agreements have been negotiated, and they entered into force on February 12. With FCC approval, we will soon be constructing satellites to be used for U.S. domestic communications. And we are making efforts to enter the maritime and aeronautical communications markets, as well.

Last December, the FCC authorized COMSAT to proceed with one domestic program and to have a one-third participation in another. The Commission directed COMSAT to form a subsidiary to implement the domestic satellite programs. Accordingly, we established COMSAT General Corporation, a wholly-owned subsidiary, which will be responsible for all new programs in which we may participate outside of the INTELSAT system.

In the other domestic program, COMSAT General, MCI Communications Corporation and Lockheed Aircraft Corporation each has a one-third interest in CML Satellite Corporation. CML is now analyzing market potentials and discussing requirements with customers preparatory to completing the multipurpose system design.

The efforts of the Corporation during the past year have led to a number of other important developments in both international and specialized communications. However, as I said at the outset, no one could really foresee 10 years ago how great a contribution COMSAT would make to world communications. It has truly been remarkable, and no one should lose sight of this.

As we enter the next 10 years, we cannot foretell precisely what the future will bring. But, if it matches the past; if obstacles are not placed in our way to achieve what we can achieve; then, despite risks and uncertainties, the second 10 years can also be something special.



Dr. Charyk

The President's statement to shareholders

■ Following are excerpts from the statement of Dr. Joseph V. Charyk, President of COMSAT, at the Annual Shareholders Meeting on May 15.

Our progress can be measured, to a large extent, by looking at the growth of our business and the way we have developed the potentials of satellite communications.

At the end of 1965, the year that little Early Bird entered commercial service, we were leasing 66 voice-grade half circuits on a full-time basis. Today we are leasing 3,146.

During 1965, we had a total of 47 hours of TV transmission by satellite. During 1972, this had risen to a total of 1,666 hours of TV transmit-receive time.

In 1965, there was only one satellite pathway between the United States and Europe. Early Bird could connect only two satellite earth stations at a time. Today, with the multipoint communications capability of the present satellites, there are more than 260 satellite pathways connecting 80 antennas at 65 station sites in 49 countries.

The INTELSAT IV satellites represent a hundred-fold increase in communications capability over Early Bird at a far lower investment per unit of capability.

It is noteworthy that the new Board of Governors of INTELSAT at its first meeting in March, approved a \$72 million contract with the Hughes Aircraft Company for three advanced satellites to be ready for use in the global system beginning in mid-1975.

The new satellites will have almost double the communications capability of the present INTELSAT IV satellites. They will be a derivation of these satellites, but with 20 transponders, that is, individual radio repeaters, as compared with 12 for the current IVs.

Earlier this year COMSAT signed a contract with the U.S. Navy, pending FCC approval, to provide two-ocean satellite services for the Atlantic and Pacific fleets by September 1, 1974.

On April 12, the Commission authorized us to proceed with the construction of the satellites, but required that all carriers presently providing maritime service be permitted to invest and participate in the entire system under certain conditions.

On May 4, we, therefore, informed the Commission that we are willing to proceed with the Navy-Maritime program while matters of ownership and management are being resolved, but stressed that continuity of management is essential from the inception of the program.

Our research and development efforts also continue to show other tangible results.

Immediately following our last annual meeting, we conducted two months of communications via satellite between an eight-foot antenna aboard the Cunard Line's *Queen*

Elizabeth 2, at sea, and a 15-foot antenna at the COMSAT Laboratories. Through these tests, we demonstrated the feasibility of providing reliable, high-quality telephone, data and facsimile communications between ships at sea and shore terminals which will improve shipping management and passenger services when maritime satellite communications services become available.

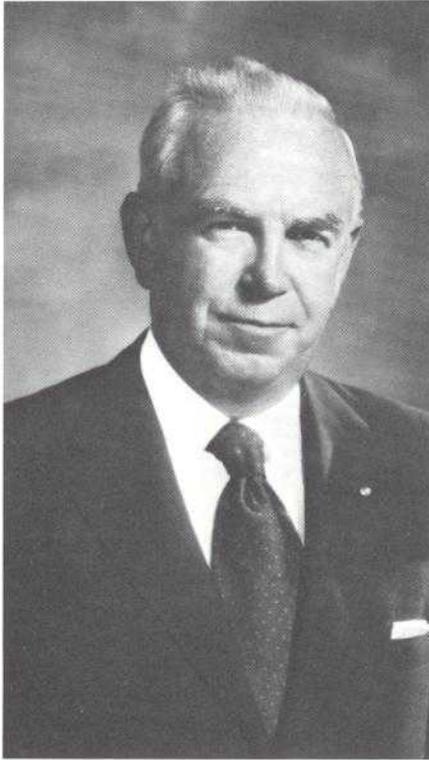
The small eight-foot antenna was subsequently placed aboard the *S. S. Hope* which is now anchored in the Port of Maceio, Brazil. Connected via satellite with another small antenna at COMSAT Laboratories, the *S. S. Hope* experiments demonstrate reliable transmission of medical data to and from a remote location, making it possible for medical teams in the field to have rapid access to the resources of the National Medical Library at the National Institutes of Health in Bethesda, Md. In addition to telephone communications, information is being exchanged by telecopier, and a slow-scan TV camera.

Finally, in March, we unveiled our new digital television system at the annual meeting of the National Association of Broadcasters in Washington, D. C. This system makes it possible to provide high quality audio and video signals through a small receiving station located in an urban area.

Such a combination of advanced technologies, digital transmission combined with small stations, promises substantial communications benefits as satellite services continue to develop.

In a very short time, COMSAT has made remarkable progress in advancing communications satellite technology, and in changing world communications. This has been accomplished under highly complicated circumstances.

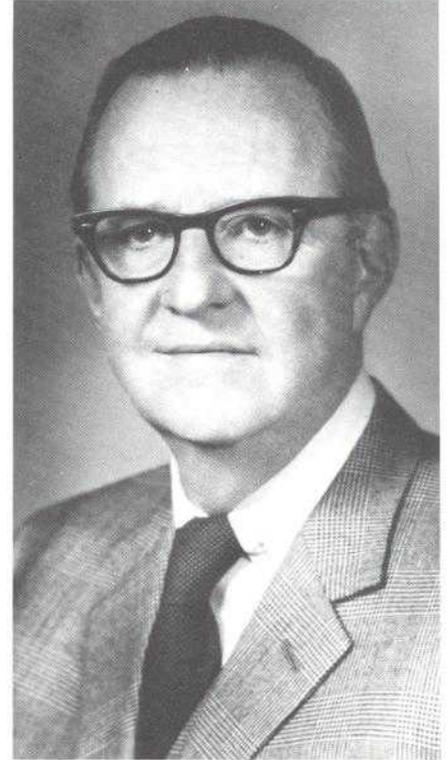
At the same time, we have also developed unique capabilities and resources which should be fully utilized in the public and national interest. If competition is the principle embodied in our national communications policy, then we must be given an equal opportunity to compete for new business. As the past 10 years have demonstrated, COMSAT can do the job.



John D. Harper



John B. M. Place



William L. Zimmer, III

Twelve directors elected by COMSAT shareholders

COMSAT shareholders elected 12 directors at their annual meeting on May 15, nine by Series I (public) shareholders and three by Series II (communications common carrier) shareholders.

The nine elected as Series I directors were:

- Philip W. Buchen
- Joseph V. Charyk
- Gordon Edwards
- William W. Hagerty
- George L. Killion
- Joseph H. McConnell
- John B. M. Place
- Bruce G. Sundlun
- Leo D. Welch

Mr. Place, Chairman of the Board, President and Chief Executive Officer of the Anaconda Company is the only new Series I director and he succeeds James McCormack who retired as a director.

The three elected as Series II directors were:

- John D. Harper
- Rudolph A. Peterson
- William L. Zimmer, III

The three Series II directors succeed the three representatives of American Telephone and Telegraph Company(AT&T) on the COMSAT board.

Prior to the annual meeting, AT&T had advised the Corporation that, in view of its plan to sell its COMSAT shares, it would nominate and vote for three persons designated by the Series I and the Presidentially-appointed directors of the Corporation. Messrs. Harper, Peterson, and Zimmer were so designated and subsequently elected on May 15.

Mr. Harper is Chairman of the Board of Directors, Chairman of the Executive Committee, and Chief Executive Officer of the Aluminum Company of America.

Mr. Peterson has been a Presidentially-appointed director since May 1970 and also served as a Series I director from February 1969 until he became a Presidentially-appointed director.

Mr. Zimmer is President and Chief Operating Officer and a director of A. H. Robins Company, the pharmaceutical manufacturer.

Under the Communications Satellite Act, three directors are appointed by the President of the United States with the advice and consent of the Senate. Presently serving are Frederic G. Donner, whose three-year term expires in 1974, and George Meany, who has asked to be replaced.

At this time, President Nixon's choice to replace Mr. Meany, Frank E. Fitzsimmons, General President of the International Brotherhood of Teamsters, has not been confirmed by the Senate.

The President has not nominated a replacement for Mr. Peterson.



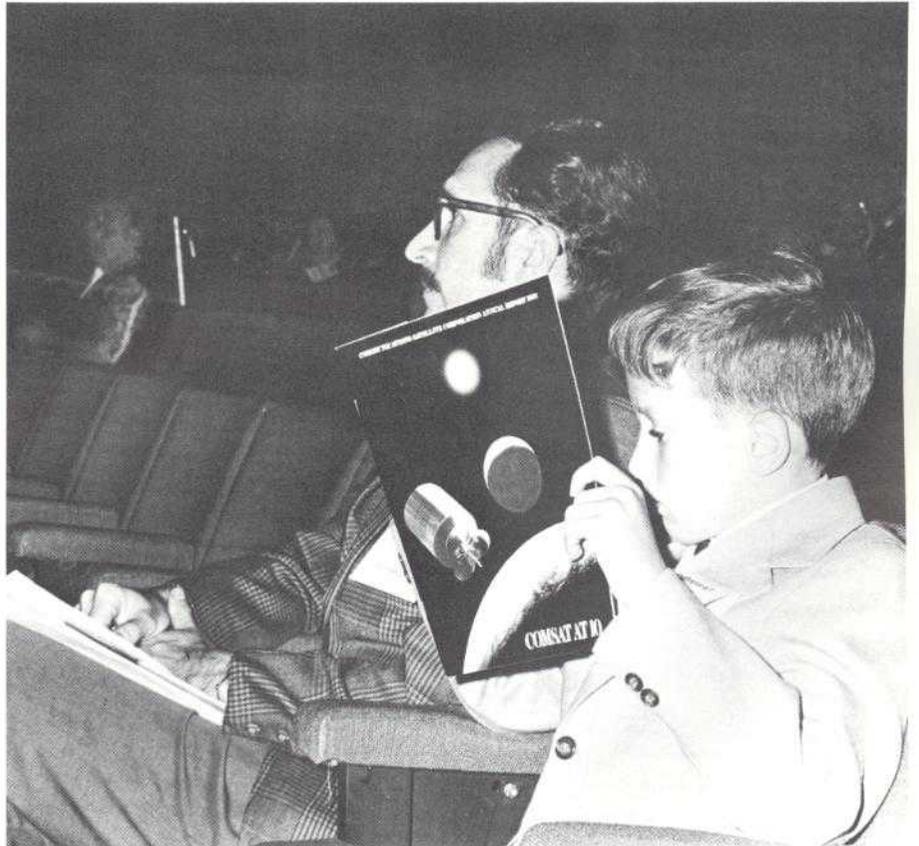
AP's Vern Haugland files his story on the annual meeting.

Tenth annual meeting

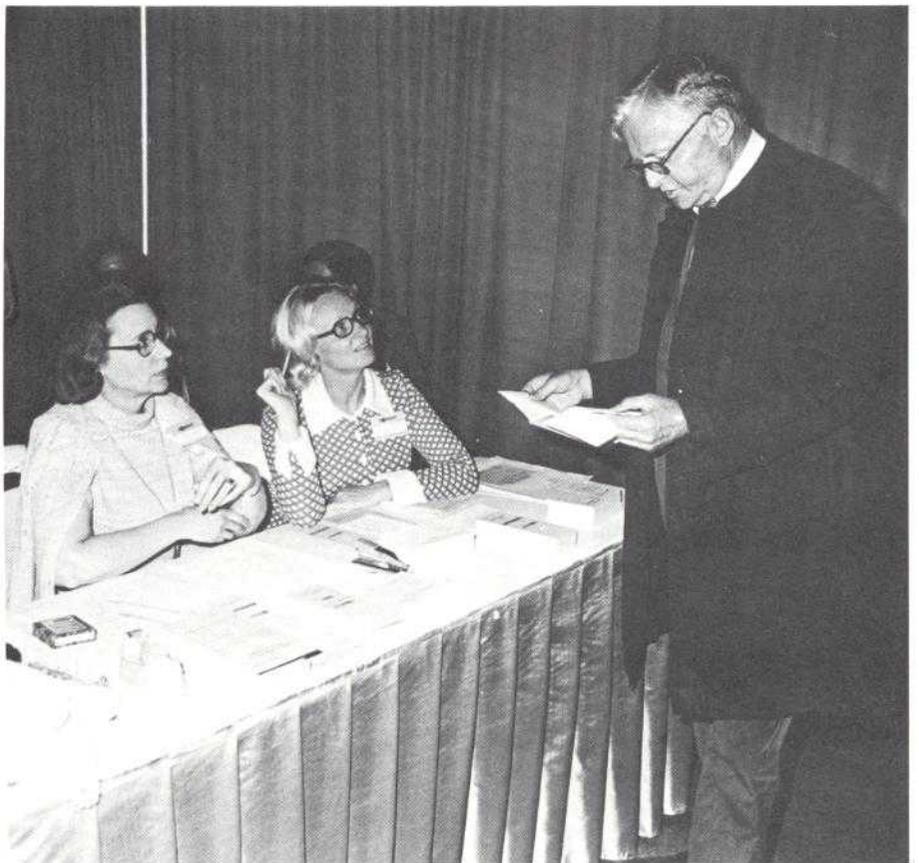
Approximately 80 COMSAT shareholders and their guests attended the Tenth Annual Shareholders Meeting on May 15 in The American Theater, L'Enfant Plaza. Shown here are some scenes of the meeting including shareholders and employees on duty for the meeting.



Shirley Oliver pins on a shareholder badge.



A young shareholder catches up on his reading.



Marion Timmons (left) and Barbara Swaylik assist a shareholder.

COMSAT awards spacecraft contract for Navy-Maritime satellite system

COMSAT has awarded a \$40-million contract to Hughes Aircraft Company for three satellites for Navy-Maritime service.

The contract covers the procurement of three multifrequency satellites, each with a five-year design lifetime. Two are to be placed in geostationary orbits, one over the Atlantic and one over the Pacific, as part of a specialized maritime satellite system. The third is for an on-the-ground spare. The system is scheduled to start service by the fall of 1974.

The contract follows the March 2 announcement by the Navy of a \$27,912,000 award to COMSAT for lease of a portion of the capacity of two in-orbit satellites for fleet communications for a two-year period. The Navy retains options for additional capacity, and to extend service for a third year.

Separate capacity will be available in the system for service to the maritime industry to provide new and improved voice and data communications to ships at sea.

COMSAT will, at a future date, substitute COMSAT General Corporation as the party to the contract with Hughes.

Under a recent Order by the Federal Communications Commission (FCC), COMSAT was granted a waiver

to proceed with contractual arrangements for procurement of the necessary spacecraft. The Order also required COMSAT to afford other carriers authorized by the Commission an opportunity to participate with COMSAT as joint owners of the system.

Each of the satellites will weigh about 1,450 pounds before liftoff, have a diameter of about seven feet and an overall height of about 12 feet, and be launched by Delta 2914 launch vehicles.

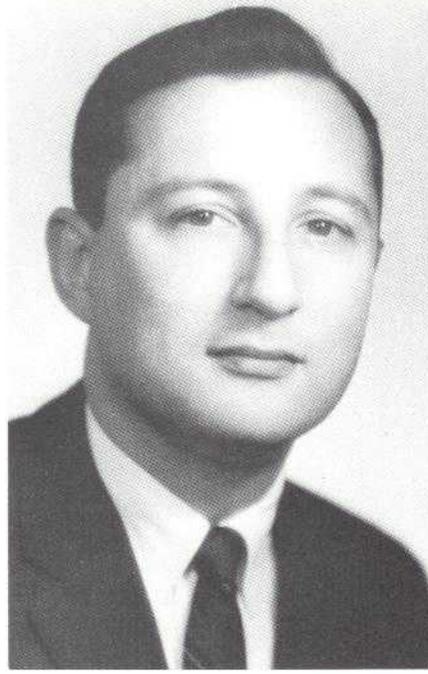
The contract does not cover launch vehicle costs or related ground facilities. Two earth stations will be built as part of the system, one at Southbury, Connecticut, and one near Santa Paula, California. Each station is to be equipped with 42-foot diameter antennas to perform tracking, telemetry, and command (TT&C) duties, and to serve as U.S. communications stations for the commercial maritime service.

The satellite design permits the Navy to utilize frequencies allocated for government use to meet its requirements for channels between the satellites and Navy-provided ship and shore terminals.

In addition, the satellites will be capable of providing a variety of high-quality communication services on commercial frequencies to the maritime industry, including voice, teletype, facsimile and high-speed data.



Mr. English



Mr. Briskman

New organizational elements announced by COMSAT General

In a recent statement, COMSAT President Joseph V. Charyk and COMSAT General President John A. Johnson jointly announced the initial organizational arrangements for the new subsidiary.

As was previously announced, Joseph H. O'Connor and John L.

Martin, Jr., were elected Vice Presidents of COMSAT General and Jerome W. Breslow was elected Secretary. In addition, the Board of Directors of COMSAT General elected William D. English as Vice President and General Counsel.

Other major elements of the orga-

nization will be headed by Robert D. Briskman, Director, Domestic System Program; John A. Keyes, Director, Commercial Development; Edward J. Martin, Director, Mobile Systems Programs; and Donald R. Owen, Director, Technical Services.

The new subsidiary will assume the domestic satellites system contract with AT&T, as well as becoming the applicant before the FCC; the satellite system contract with the U.S. Navy, and the applicant for the Navy-Maritime system at the FCC; and all contracts for the performance of technical advisory services in foreign countries.

COMSAT will also transfer to COMSAT General all of its interest in NICATELSAT, and will assign to COMSAT General the contract with NICATELSAT for management services.

As the result of a previous transfer from COMSAT, one-third of the shares of common stock of the CML Satellite Corporation are currently held by COMSAT General. In this regard, COMSAT General will maintain continuing liaison with CML.

In addition, COMSAT General will be responsible for the commercial exploitation of new processes and equipment developed by COMSAT Laboratories through licensing, joint venture and other commercial arrangements with the exception of all contracts with the Government and commercial entities for in-house research, development and fabrication of equipment.



Mr. Keyes



Mr. Owen



Mr. Martin

FCC publishes amended rules on interference

By HANS J. WEISS

As of May 7, 1973, the Federal Communications Commission (FCC) amended its Rules and Regulations regarding the siting and protection against interference of satellite communications earth stations where they share frequency bands with stations of terrestrial services. To quote Damon Runyon: "there's a story goes with it."

Ten years ago the International Telecommunication Union (ITU) hurriedly convened a conference known as the 1963 Extraordinary Administrative Radio Conference on Space Telecommunications (EARC) in Geneva whose objective was to establish international rights and regulatory provisions for services in the new field of space communications among the then existing terrestrial services.

More from necessity than desire, the conference made the historic decision of allowing the space services to use, with equal rights, frequency bands already in use by terrestrial services. To harness the obvious problem of potential interference between stations in space and terrestrial services, two kinds of regulatory provisions were adopted:

- to protect space and terrestrial stations against interference from each other, the emission characteristics of both were restricted, obliging each to operate in awareness of the interference environment established by the bounds imposed upon the other; and
- to protect earth and terrestrial stations against interference from each other, criteria of maximum permissible interference for each were established, obliging a potential interferer to ascertain, by predictive calculations, that his emissions would not exceed the criteria at the potentially interfered-with station, on a case-by-case basis.

■ *Mr. Weiss is Director, Systems Engineering, COMSAT Laboratories.*

It was the latter provision which caused wrinkled brows; the task of calculating interference between a proposed earth station site and possibly thousands of terrestrial stations appeared to be forbidding.

So the concept of "coordination distance" came into being. It is predicated on the realization that certain characteristics of a proposed earth station and its site are known beforehand, and that the characteristics of real terrestrial stations are sufficiently similar to allow their replacement, in calculations, by a "hypothetical reference terrestrial station."

With these station characteristics and suitable generalized information on radio wave attenuation as function of distance, one could determine a maximum distance beyond which interference between an earth station and the hypothetical reference terrestrial station would always meet the interference criteria; this distance was called the coordination distance.

The coordination distances determined for all directions around an earth station define a caution area or the coordination area. Therefore, interference calculations need only be made for terrestrial stations located within the confines of the coordination area of an earth station.

The original procedures for the determination of coordination distance, adopted in 1963 at the EARC, and also in 1965 by the FCC in this country, soon became inadequate; in part because of inherent shortcomings, but mainly because they were written for moving satellites and confined to frequencies between 1 and 10 GHz.

In view of these and other inadequacies in the 1963 provisions, and in the light of developing space communications technology and implementation, and with an increasing interest in frequency bands above 10 GHz, the need for another ITU space conference became soon evident, and the World Administrative Radio Conference on Space Telecommunications (WARC-ST) was called for 1971.

COMSAT, active and influential in ITU matters from the beginning, set to work in a concerted effort within the International Radio Consultative Committee (CCIR), one of the tech-

nical advisory bodies of the ITU. After several years of preparatory, often frustrating, work on the part of COMSAT, the United States incorporated most of COMSAT's proposals in the official position at the WARC-ST. The Final Acts of that conference, now part of the International Radio Regulations, reflect the success of COMSAT's efforts.

To underline further the importance of COMSAT's role in pioneering and implementing technical regulatory provisions in the field of satellite communications, the FCC has now adopted, nearly unchanged, the international provisions of the WARC-ST in its domestic Rules and Regulations.

Looking to the future, we find room for improvement of the present provisions, and there is little doubt that COMSAT will remain instrumental in bringing these improvements about.

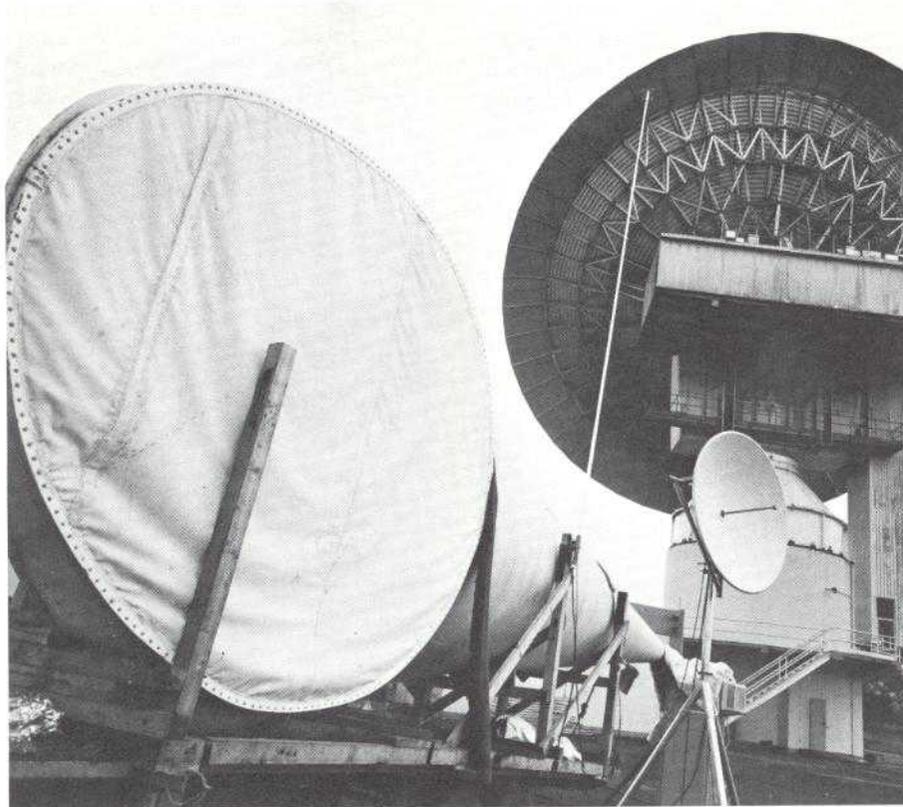
Briskman appears before House committee

Robert D. Briskman, Director, Domestic System Program, COMSAT General, recently testified before the Subcommittee on Science, Research, and Development of the House of Representatives on pending legislation for metric conversion.

In his capacity as Chairman, Committee on Standards, Institute of Electrical and Electronics Engineers (IEEE), Mr. Briskman has been active in the preparation of an industry-wide conversion program.

Mr. Briskman accompanied Dr. Donald Marlowe of the American Society of Mechanical Engineers who was the chief spokesman for the major engineering societies of the United States.

The proposed coordinated national plan calls for an orderly conversion to the use of metric units, with an independent Presidential Commission to be responsible for developing and directing the conversion program. Dr. Marlowe urged "the substitution of metric be accomplished in such a way that it becomes the predominant, but not the exclusive, measurement language within a target date of 10 years after the establishment of the conversion committee."



The collocated antenna in position to the rear of Cayey's 98-foot dish.

Cayey tests show controlled interference offers added frequency spectrum capacity

BY HANS DODEL

Today, with the increasing congestion of the radio frequency spectrum, it is more and more difficult to accommodate additional traffic in the available frequency bands. As a result, the spectrum utilization department has been seeking new ways to use this limited spectrum more efficiently.

A case in point is the concept of frequency sharing, i.e., the use of the same frequencies for both terrestrial and satellite communication systems on a controlled interference basis.

Microwave engineers long ago learned to reuse radio frequencies in terrestrial links, but until recently it was believed that terrestrial links must be frequency-separated from space links because:

■ *Mr. Dodel is a member of the spectrum utilization department, Systems Engineering, COMSAT Laboratories.*

(1) the earth station transmit power is 1,000 times that of the terrestrial station, and liable to interfere with a terrestrial network, and

(2) the earth station receive power is less than one thousandth of that of the terrestrial station, thus the earth station is liable to be interfered with by the terrestrial station.

Therefore, it was thought that the frequency of the terrestrial link (the link between the earth station and a local switching center) and the space link (the link between the earth station and a satellite) could not both be accommodated in the same frequency bands without causing mutual interference between the earth station and the collocated (situated at the same site) station of the terrestrial link.

However, a theoretical study by Hans Weiss indicated that the interference between such collocated terminals in the same frequency band might, after all, be acceptable. To

prove this contention, he asked me to conduct a corroborative field experiment.

My first task was to locate a COMSAT earth station with terrain suitable to allow the installation of a microwave test link of adequate length to verify Mr. Weiss' conclusions. Most stations, as it turned out, were either tucked away in valleys (as Etam is) or hidden in woods (as Andover is). Only one location, Cayey, provided the terrain suitable for our work.

After obtaining special authorization from the Federal Communications Commission (FCC) to temporarily operate in Puerto Rico, a complete 4- & 6-GHz radio relay link was built at the COMSAT Labs by Hans Kruisbrink and Don Lee who put together the microwave equipment, and by Clarence Crane's group who constructed the horn antenna mounting. This unit was shipped to Puerto Rico and set up in January of this year in the Cayey Mountains close to the Cayey Earth Station, by Jack Ehrmann and myself.

We wanted to locate this two-way link in the worst possible position with respect to the earth station. If Mr. Weiss' conclusions were correct and interference could be successfully controlled under our test conditions, we really had something.

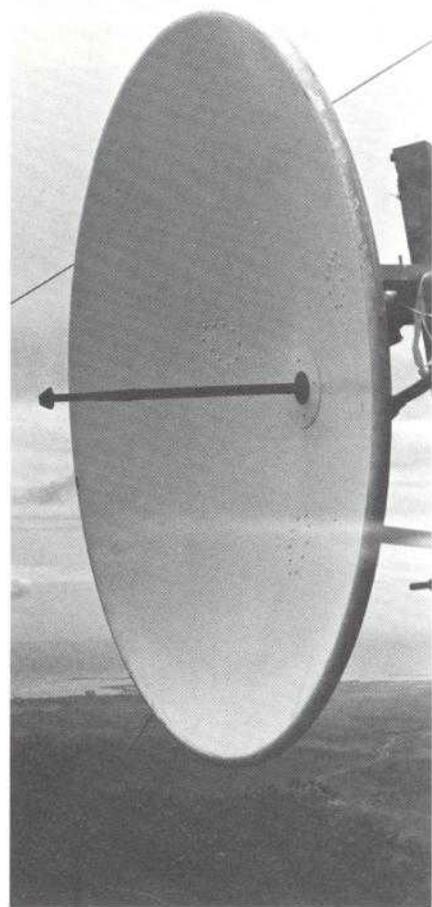
Our first test was to conduct field strength measurements to locate the spot in the rear of Cayey's 98-foot dish antenna where the electromagnetic field "leaking" towards the back of the earth station would be at its greatest. We found maximum leakage to be at the point where the backward projected focal axis of the antenna intersected with the ground. At that point the "coupling" or interaction between an antenna transmitting in any direction, and the earth station antenna was at a maximum (at the same time the "isolation" or independence between the two antennas was at a minimum).

Ernie Wilkinson joined us for a few days, and was instrumental in locating this "hot spot". At this location, some 60 feet to the rear of the large antenna, we put up our two antennas for the terrestrial link, the first to transmit to a simulated local switching center, the second to receive

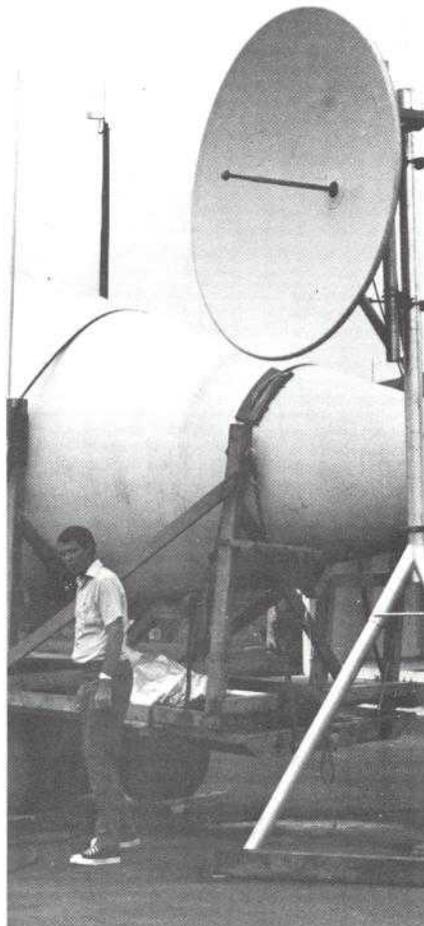
from the center. This center with its two counterpart antennas was erected on top of the Las Tetas Mountain 12 kilometers southeast of Cayey.

After this link was operational in both directions, we calibrated our terrestrial link and a satellite link in Transponder 5 of the Atlantic INTELSAT IV spacecraft at exactly the same frequency. Then, Dr. Ben Pontano arrived and conducted a complete series of carrier-to-interference noise measurements for us. Towards the end of these tests, George Robertson and Hans Weiss also joined us (so that by this time our test team almost outnumbered the station personnel) in time to share our happiness as the test results verified the conclusions made in his original paper.

Noise-power ratio tests were followed by more specific tests of the most critical element in the whole setup, the terrestrial transmit antenna at the earth station, a 10-foot horn reflector antenna. Measurements of the "coupling factor" between it and



The remote terrestrial antenna located on Las Tetas Mountain.



Hans Dodel stands beside the collocated antennas.

the earth station were carefully taken for future analysis.

When all tests were concluded in March, Jack, the last man to leave Cayey, supervised the breakdown and the return shipment of the test equipment. Jack worked like a dog for three months and I would like to especially thank him for all his efforts. Thanks go also to Lee Jondahl and his staff who bent over backwards to help us. Many times they literally read our minds before we knew them ourselves.

Since my return, all our field tests have been completely evaluated, and the results indicate that frequency sharing on a controlled interference basis is realistic.

We hope this fact will be more widely recognized and that system planning in the future will benefit by more efficient usage of the radio frequency spectrum through sharing.

Dividend declared, net income up

COMSAT recently reported net income for the first quarter of 1973 of \$7,066,000, or 71 cents per share, as compared to \$6,496,000 or 65 cents per share for the first quarter of 1972.

Operating revenues for the first quarter amounted to \$27,102,000, as compared to \$25,240,000 for the first quarter of last year. At March 31, 1973, COMSAT was leasing full time to its customers the equivalent of 2,991 half circuits, as compared to 2,537 being leased at March 31, 1972, and 2,971 at December 31, 1972.

Operating expenses for the first quarter totaled \$21,425,000, as compared to \$20,234,000 for the first quarter of last year.

Net operating income amounted to \$5,677,000, or 57 cents per share, as compared to \$5,006,000, or 50 cents per share, for the first quarter of last year.

Total other income, after provision for income taxes, amounted to \$1,389,000, compared to \$1,490,000 for the first quarter of last year.

At its monthly meeting held April 20, 1973, the Board declared a quarterly dividend of 14 cents per share, payable on June 11, 1973, to shareholders of record as of the close of business on May 11, 1973.

Earth station count

Eleven new antennas became operational during the latter part of 1972. They are Abidjan, Ivory Coast; Barbados, Barbados; Deh Mandro, Pakistan; Emeq Ha-ela, Israel; Goonhilly, United Kingdom (No. 3); Lake Cowichan, Canada; Lessive, Belgium; Managua, Nicaragua; Quito, Ecuador; Peking, People's Republic of China; and Thermopylae, Greece (No. 2).

One new antenna has become operational so far during 1973. It is Raisting, Germany (No. 3).

The count of operational facilities as of mid-May was:

- 80 antennas
- 65 earth stations
- 49 countries operating stations.

Data transmission demonstrated at ICA in Boston

High-speed data transmission at the rate of 9,600 bits per second was demonstrated via satellite at the 1973 International Communications Association Exposition (ICA) held last month in Boston.

Using a voice-grade satellite circuit, data transmissions were sent from a terminal in the COMSAT exhibit booth to the Andover Earth Station by landlines, looped through an INTEL-SAT IV satellite and returned to the exhibit booth in Boston where the data message was printed out on a 965-line printer. Each participating delegate was presented with a souvenir message which welcomed him to the conference and explained how the satellite circuit worked.

In addition to the exhibits, there were numerous panel discussions during the Conference, including one dealing with U.S. domestic satellite services. Companies represented on this panel were American Satellite Corporation, CML Satellite Corporation, GT&E Satellite Corporation, RCA Global Communications, Inc., and Western Union Company.

The International Communications Association is a non-profit organization made up of companies who spend at least \$1 million a year on communications services. Member companies include IBM, ALCOA, Xerox, Mobil Oil and General Motors Corporation.

This year's exposition attracted nearly 500 ICA company representatives and over 100 exhibitors. COMSAT was represented by staff members from the Domestic and Aeronautical, Information, Marketing, and U.S. Systems Management offices.



ICA delegates watch as a data message is sent to them via satellite.



Each delegate received a data message as a souvenir.



Mr. Battle

Battle becomes president of Mid-east group

Lucius D. Battle resigned as COMSAT Vice President-Corporate Affairs to become President of the Middle East Institute on June 1.

Founded 27 years ago, the Institute is a private, non-profit organization which through lectures, seminars, conferences, and publications seeks to promote understanding of the Middle East by interested Americans.

Prior to joining COMSAT in 1968, Mr. Battle had twice served as Assistant Secretary of State. In 1962, President Kennedy appointed him Assistant Secretary for Educational and Cultural Affairs, a position he held until 1964. President Johnson appointed him Assistant Secretary for Near Eastern and South Asian Affairs in 1967 and he remained in that office until he joined COMSAT. He also was U.S. Ambassador to the United Arab Republic during his years in public service.

COMSAT Labs staff participated in lecture series

Drexel University of Philadelphia, Pennsylvania, recently completed a "COMSAT Laboratories" lecture series held on the university campus during the spring academic quarter.

The 10-lecture series, coordinated by Dr. E. S. Rittner, Director, Applied Sciences Division, COMSAT Labs, and Drexel's Professor Thomas J. Matcovich, Chairman, Electrophysics Advanced Study Group, featured COMSAT Labs personnel speaking on a variety of technical subjects. Included were discussions on microwave devices, circuit fabrication technology, and satellite reliability.

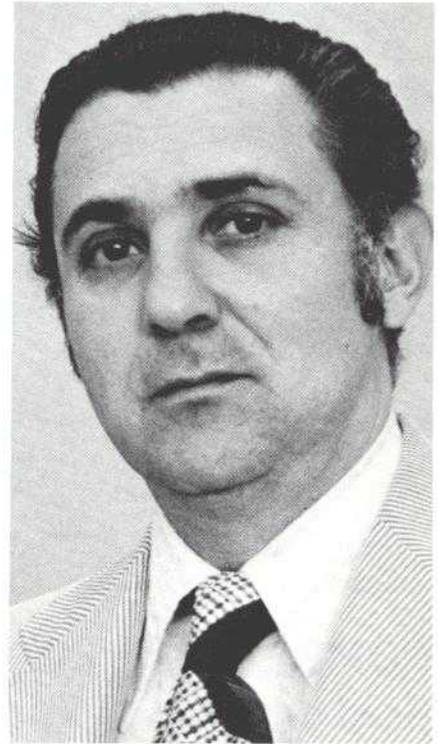
Professor Matcovich advised Dr. Rittner that the lectures were supplemented with an hour-per-week discussion supervised by members of the Drexel faculty and that this combination was offered for graduate course credit.

Dr. William W. Hagerty, president of the university, has been a member of COMSAT's Board of Directors since August 1965.

COMSAT General benefits

All COMSAT fringe benefits, including group insurance, thrift and savings, and retirement, are available to COMSAT General Corporation employees on the same basis as to regular COMSAT employees, according to David S. Nye, Director of Personnel.

There will be no break in the continuity of coverage and participation for employees transferred to COMSAT General, Mr. Nye said. Further, all COMSAT personnel policies and procedures and conditions of employment, without exception, apply to COMSAT General employees.



Mr. Mahran

Mahran appointed ass't vice president

Joseph L. Mahran was recently appointed Assistant Vice President and Comptroller. He has been Comptroller for COMSAT since he joined the Corporation in September 1969.

Prior to joining COMSAT, Mr. Mahran was Assistant Treasurer for American Electric Power Company, the largest privately owned electric utility system in the United States.

A certified public accountant, Mr. Mahran received a B.S. in Accounting from the New York University School of Commerce, Accounts and Finance in 1953, and earned an MBA, With Distinction, in Corporate Finance from the New York University Graduate School of Business Administration in 1963.

Mr. Mahran, his wife, Rhoda, and four children live in Bethesda, Md.



COMSAT's first home was at Tregaron in northwest Washington, D. C.

COMSAT's early days at Tregaron: hard work amid splendor

By MAJA J. GECK

Now that a decade has passed and COMSAT is well established, some of today's employees may be interested in having a glimpse of the early days of the Corporation as I remember them.

COMSAT's cradle stood in Tregaron, a beautiful mansion situated on a hill in parklike surroundings in northwest Washington, D. C. I, for one, had never expected to find an infant corporation in such unbusinesslike natural beauty—but there it was! It seemed strange to find desks in the huge salon, and a private office in what undoubtedly was at one time a conservatory where lovely plants must have blossomed. The dining room had been converted into a board room and the office of COMSAT's first chair-

■ *Miss Geck is a former COMSAT executive secretary who recently retired.*

man, Leo D. Welch, opened upon a beautiful terrace with rambling roses.

A lovely, winding, broad staircase led to the upper floor where COMSAT President Joseph V. Charyk had his office in what used to be the master bedroom. Of course, it had a huge bathroom connected with it, equipped—quite in style—with marble and gold faucets. The Office of Public Information was operated by Matthew Gordon in a dressing room with adjoining sauna bath. It was small, true, but it was enough for a start in those very early days. In another bedroom was the office of John A. Johnson, then Vice President-International. It, too, had a connecting bathroom equipped with silver faucets. On the upper floor there were also a number of guest rooms and some small rooms for the help—all turned into offices.

I especially remember the beautiful

view of the sloping lawn and trees behind the house and the climbing vines with which the house was covered. These vines—due to their encroaching nature—extended their tendrils right through a crack where the window had not been closed too tightly. They grew and grew and began climbing up the inside walls of one of the rooms.

I can remember that there was great excitement on a beautiful sunny morning when a rabbit dared to visit the office of the then Corporate Secretary, David J. Melamed. I believe a squirrel visited General Counsel Allen E. Throop's office to satisfy its curiosity.

I even had a visitor of my own when I was ensconced in one of the small maid's rooms. There was an air-conditioner in the window, and one day I heard strange noises there. Upon investigation, I found that a raccoon was embedded between the air-conditioner and the wall. I don't know how it ever found its way up and how it disappeared. It stayed there the whole day, but the next day it was gone.

We "girls" often had our lunch on the terrace. Sometimes I took a stroll in the park along lovely pathways among rhododendrons and various clusters of bushes. It was only natural that someone soon thought of a picnic, so one gorgeous afternoon the parents brought their children for hot dogs, Cokes and pony rides. This was the first of many COMSAT family picnics.

I have left the kitchen for the last because we used it quite differently than its original occupants did. There was a tremendous iron range, large enough to cook for 30 or more people. In this former Kingdom of Cook, now stood our first duplicating machine. It was constantly in use, and those who complain about today's Xerox machines not functioning should have been there to appreciate what progress has been made since that antique. Of course, it often broke down when it was most needed, but Paul Thompson, our indefatigable jack-of-all-trades, never lost his cool and always came through with a timely repair. The kitchen was a grand place to relax for a minute—for we



Project SOC returns for a third year

COMSAT's participation in Project SOC, an on-the-job training program, aimed at preparing individuals for clerical careers is again in full swing. In the photo above, a group of trainees and their future supervisors become involved in a "self-awareness" communications lab.

PHOTO BY J. T. McKENNA

were working hard—and have a Coke or a chat. The cook's storage room next to the kitchen later became our first Personnel office.

I mentioned earlier that the dining room was converted into the board room. There was a large oval table in the center of the room which did double duty. There were few suitable eating places in the vicinity. We often had lunch and dinner brought in when it was necessary, as the board meetings often lasted until late at night. There was always excitement when the board met because it usually

meant that new steps forward had been taken.

As the Corporation grew and the staff increased, the time came to move to larger quarters. We all regretted it, but we had to submit to the dictates of progress as we relocated to an office building in downtown Washington.

Undoubtedly there are many more incidents worthy of remembrance, but these are some of the ones I do recall. I shall never forget the early months—COMSAT in the cradle—when we were like a family watching the child grow.

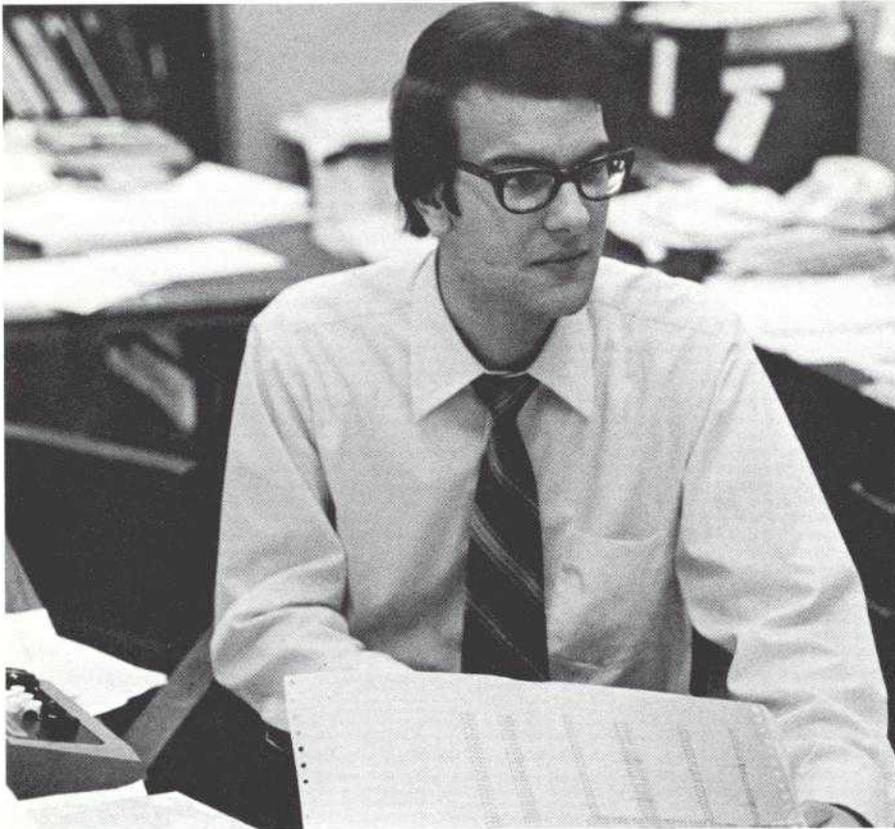


Mr. Bourne

Bourne appointed international counsel

Robert D. Bourne was recently appointed to the position of Counsel for International Matters, replacing William D. English, who was elected Vice President and General Counsel of COMSAT General.

Mr. Bourne, a member of the District of Columbia Bar, has been a COMSAT General Attorney for the past five years. He is a graduate of The George Washington University Law School.



Larry Burch reviews the latest revision of his computer program.

PHOTO BY J. T. McKENNA

COMSAT co-op student writes program used by FCC to avoid jamming

A COMSAT co-op student made a major contribution last year to a computer program now being used by the Federal Communications Commission (FCC) as an aid in settling disputes over the jamming of communications satellites.

Larry S. Burch, of Annandale, Va., a junior in electrical engineering at Virginia Polytechnic Institute, developed his computer program as a solution to the growing problem of accidental jamming.

Accidental jamming occurs when microwave earth station frequencies interfere with a frequency being used by a satellite. This problem was becoming a matter of great concern, according to Mr. Burch, and would have been compounded in the future as more and more satellites are launched and additional earth stations are constructed.

From the fact that a synchronous satellite remains in one place relative to the earth, Burch reasoned that an

antenna on the ground has only two directions or azimuths in which to move in order for its beam to intercept a satellite's transmission. Therefore, using an antenna's latitude, longitude, and given angle of elevation, his computer program determines the two directions of the antenna which would cause it to jam a satellite's transmission.

Burch, whose special area of interest is computer programming, said that at Virginia Tech he has learned the basics of programming and then has gotten his on-the-job experience here at COMSAT. He chose to combine campus study with practical work training in order to "make schooling a little more meaningful." He has alternated three-month quarters on the Virginia Tech campus in Blacksburg with his COMSAT employment. He has been a COMSAT employee for a total of four quarters or one year, and is again spending this spring quarter at COMSAT. Present plans call for him

to receive his degree in June 1975.

Working under the supervision of Hans Weiss, Director of Systems Engineering, COMSAT Labs, Larry represented COMSAT with his program at an industry-wide meeting of communications professionals called by the FCC last spring. He was one of the five corporate representatives chosen to derive a final answer to the jamming question. Incorporating Mr. Burch's original computer programming method, the committee's final report, published and edited by the Common Carrier Bureau of the FCC is entitled "Geostationary Orbit Avoidance Computer Program." The program is in use today.

The co-op program began at COMSAT in 1967 with a single student from Drexel University. Since then almost 100 students have taken advantage of this unique way of combining education and practical work experience.

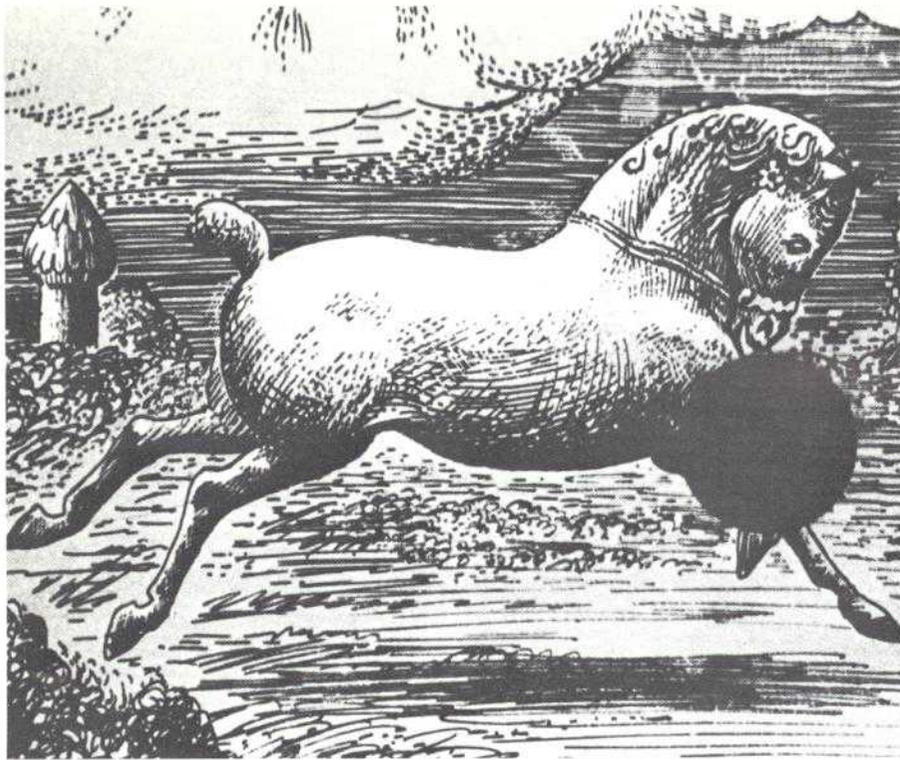


Miss Eaves

Staff attorney named

G. Lorraine Eaves recently joined the Office of General Counsel as a staff attorney in the Division of Regulatory Matters.

Miss Eaves holds a Juris Doctorate from Howard University, Washington, D. C., and a Bachelor of Arts in government from Simmons College, Brookline, Massachusetts.



The Persians, under Darius I, were among the first to use the horse for communications and transportation.

A history of communications carriers; from Noah's dove to satellites

Noah, his wife, his children, and the animals board an ark. Rain falls in torrents for 40 days and 40 nights. After 150 days of anguish, the waters recede.

Noah wants to know whether land has reappeared. He sends out a raven. Finding no perch, the raven returns.

A few days later, Noah sends out a dove. It returns with an olive branch, which Noah accepts as proof that the waters have ebbed.

This article is based on information from the 100th Anniversary issue of the International Telecommunication Union Journal and the Columbia Encyclopedia.

Noah's dove was an early form of radar. He sent out a signal, and it brought back intelligence from a distance. This, according to the etymology of the word, is telecommunications, the carrying or transmission of information over distances.

Noah had with him the basic communications carriers to which man was limited for 10,000 years or more, until as recently as 100 years ago.

These communications carriers were man's voice, sight, and hearing; his ability to walk, run, and swim; his animals (the horse); the birds; and a ship.

From archaeological exploration, it is known that city-states, Eridu as perhaps the earliest example, existed as far back as the 8th millennium B.C. in Mesopotamia, the region between the Tigris and Euphrates Rivers, which now comprises Iraq.

The Sumer culture is noted for (1) its tall buildings, from which references to the Tower of Babel might have originated; for (2) the worship of the water god, Ea, and the mythology of floods; and for (3) the invention of cuneiform script with its characters consisting of four kinds of wedge strokes impressed into stone or clay.

The Sumer culture tells us that by

this period man's mind was quite well developed, that his speech was becoming articulate, and that when he wrote or drew a picture, his written communications could be baked in clay and taken from one place to another. He no longer had to rely on the "grapevine" alone to spread his words.

Although horses are known to have existed as far back as 45 million years ago, they are a derivation of the fox and probably were not ridden until after the beginning of recorded history. Even the horses of Darius the First (500 B.C.) were very small by today's standards.

By the 5th millennium B.C., an Egyptian culture flourished in the Nile River Valley. The Egyptians invented hieroglyphic script, and introduced a novel method of getting the word around. Being hearty people with strong lungs, they developed the art of megaphoning messages. According to legend, they became so adept that the spoken word could be transmitted several miles.

Several thousand years B.C., Chinese princes had developed use of pigeons into a highly efficient means of carrying information. They also became familiar with the lodestone and the magnetic needle, essential elements of the compass, which they developed many centuries later.

By the 3rd millennium B.C., writing on stone and clay tablets was a common means of communication. The great code of laws of Hammurabi, about 2000 B.C., were inscribed on a giant stone tablet. Hammurabi ruled over Canaan (now Palestine), perhaps in the days of Abraham, and the Ten Commandments given by God to Moses, perhaps around 1450 B.C., were also inscribed on stone tablets.

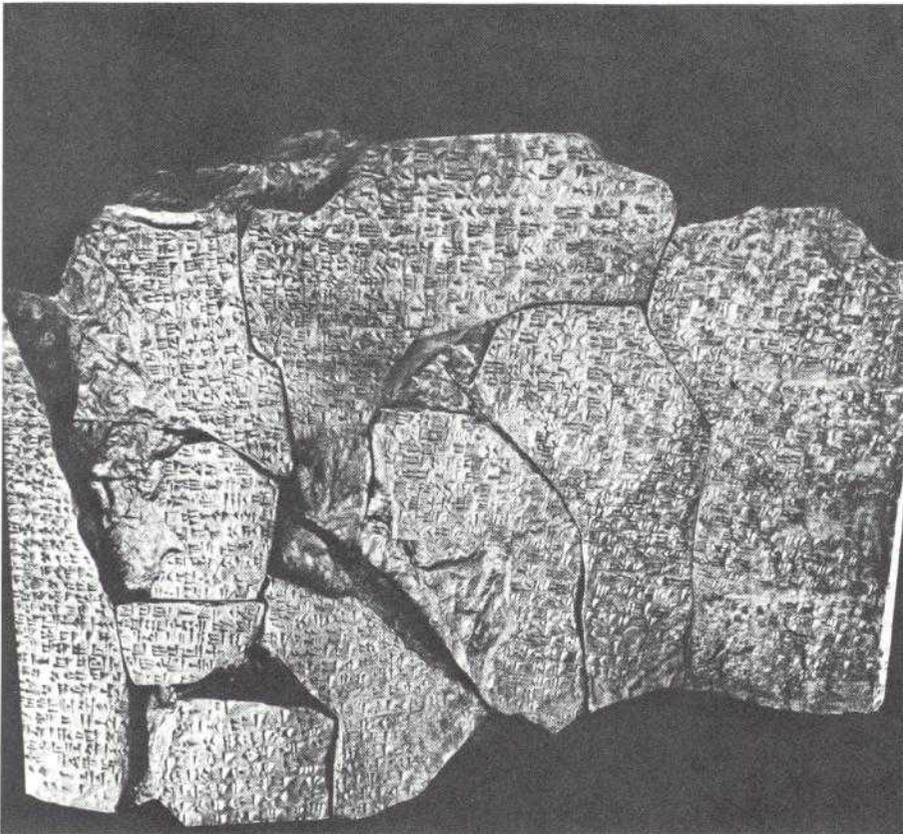
Another interesting document of this time is the oldest peace treaty in the world written on a clay tablet recovered in 1906 from the site of the Hittite capital, Hattusas, in Central Turkey.

Concluded in 1269 B.C. between Hattusilis, King of the Hittites, and Rameses II, King of Egypt, the treaty was written in both Accadian (early 3rd millennium Sumer) cuneiform and the Egyptian hieroglyphic script.

It is somewhat ironic that this treaty promises eternal friendship,



The early Egyptians developed the art of megaphoning messages.



The oldest known peace treaty in the world was concluded in 1296 B.C.

lasting peace, territorial integrity, non-aggression, and mutual assistance. A copper replica is displayed at U.N. headquarters in New York City.

Papyrus was invented by the Egyptians, probably during the latter part of the 2nd millennium. Now man could more easily have his writings reach as far and as fast as he or his horse could run, or the winds could sail a ship. His works and thought could be spread more widely.

About 500 B.C., under Darius the First, the administration of the entire Persian empire was molded into a centralized system, remarkable for its efficiency, even by today's standards. The empire was supported by an intricate and excellent system of communications, for the Persians were the first to use the horse efficiently for communications, as well as transportation. Darius's couriers carried his word into every corner of the empire.

The Greeks introduced another method of relaying communications. They were the first to employ heliographs, although in a primitive way. Using highly polished shields, they developed a rudimentary version of what we know as the flashing light technique.

This system did not work at night, or when there was no sun. But it was an early example of the line-of-sight technique which is used today in the terrestrial microwave systems which span nations with microwave relay towers at 30-mile line-of-sight intervals.

The Romans improved the Persian's courier system by building vast networks of roads wherever their banners flew. They also improved on the Greek heliograph by devising a fire telegraph system in which they used smoke signals by day and blazing beacons at night. The Romans were also among the first to use flag signals.

Then, for more than 1,500 years, there was little progress in the means of relaying communications. As late as the 14th century A.D., even the most sophisticated communications networks in Europe consisted of watchtowers and observation points on high lands, with communications being transmitted by smoke signals during the day and by fires at night.

Parchment was invented about the 2nd century B.C. It replaced papyrus because of greater durability. Paper seems to have been developed as early as the 8th century A.D. However, it was not until the 15th century that we come upon an invention that has left an indelible imprint on the world. This was the invention of moveable type by Gutenberg in 1437. With it and the printing press, paper began to take on a more important role in the world of communications.

By the 17th century, significant progress had been made in shipping communications: semaphore signals for land stations, and mast signals for ships. Each signal had a particular meaning, as in the past, but no real messages could be transmitted. Codes of optical signals were devised, and are still in use. There is, for example, the arm-signal semaphore code, with less than 28 combinations; and the flag code, now standardized as the International Code of Signals, with 40 combinations.

The first really usable telegraph system over long distances was invented by a Frenchman, Claude Chappe. His code offered 196 signals—representing letters, numbers, and punctuation marks—that were produced optically by positioning two arms and a central beam in semaphore style.

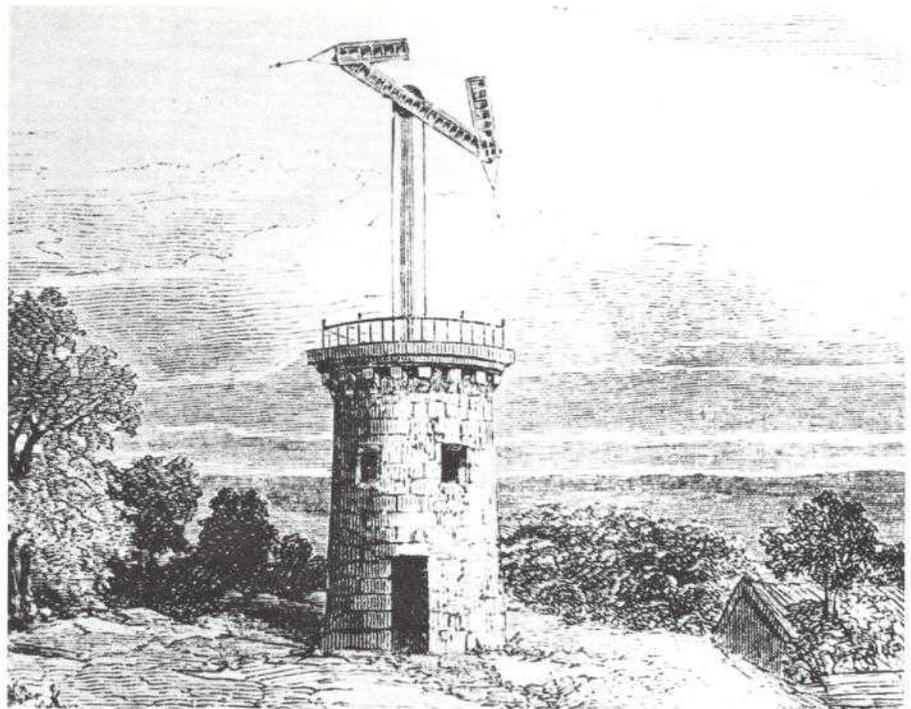
As with the ancient Greek heliographs, Chappe's system was operated from hill tops, and stations had to be close enough to each other to permit recognition with a telescope.

Chappe's system became extensive: From 1794 on, it grew to reach 3,000 miles in length, with more than 500 stations, linking 30 provincial towns with Paris.

Although much work had been done in the fields of electricity and magnetism by many different scientists and inventors beginning in the 18th century, it was Samuel F. B. Morse who is credited with the development of the first workable electric telegraph in 1837.

Morse followed in 1840 with his invention of the dots and dashes telegraph alphabet, which bears his name and is still used today. These developments led to the initiation of commercial telegraph service in 1848.

The electrical telegraph was man's



A typical optical telegraph, as designed by Chappe in France, with two movable arms attached to a long beam which turned on a central point.

first big breakthrough in communications transmission. He could now, for the first time, send a signal over long distances at the speed of light. He was no longer limited by the primitive physical forms of communication transmission which earlier men relied on.

Morse's invention set off a telegraph wire-stringing and cable-laying race from the early 1850s that culminated in completion of the first transcontinental telegraph line on October 24, 1861. The historic message that was flashed from Stephen J. Field, Chief Justice of California, in San Francisco, to President Lincoln, in Washington, D. C., said, in part: "The people of California express their loyalty to the Union, and their determination to stand by its Government on this its day of trial." These were very comforting words to a troubled President, from a pivotal state far away.

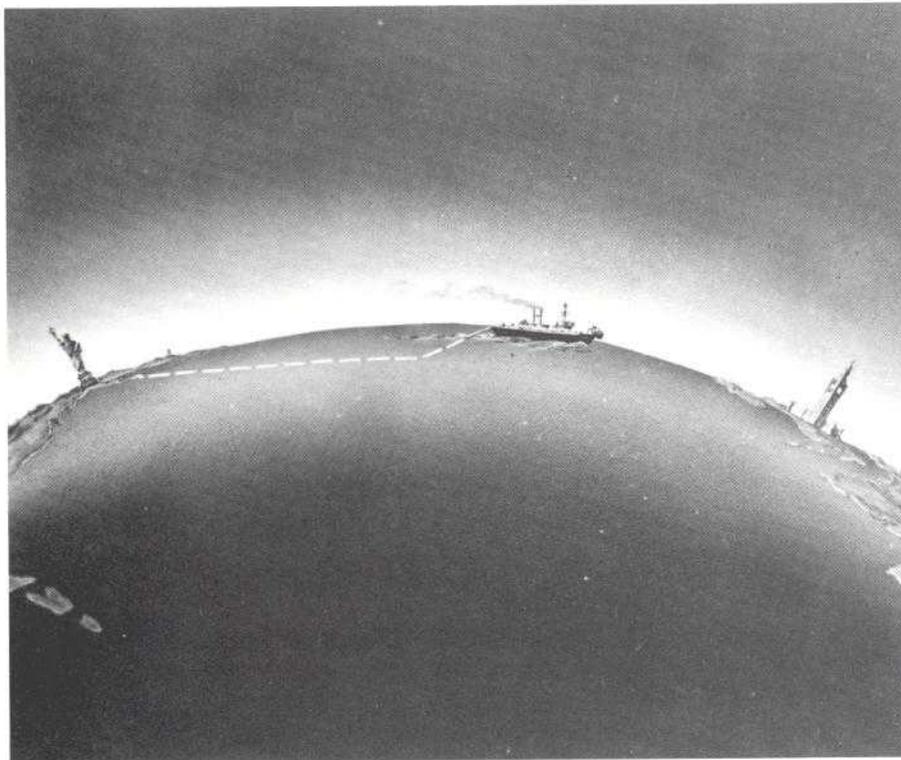
In 1866, the first transatlantic telegraph cable brought the United States and England as close as minutes apart. Only a few months earlier, it had taken two weeks for the tragic news of Abraham Lincoln's assassination to reach London by way of train and ocean liner. A new

day had dawned in international communications.

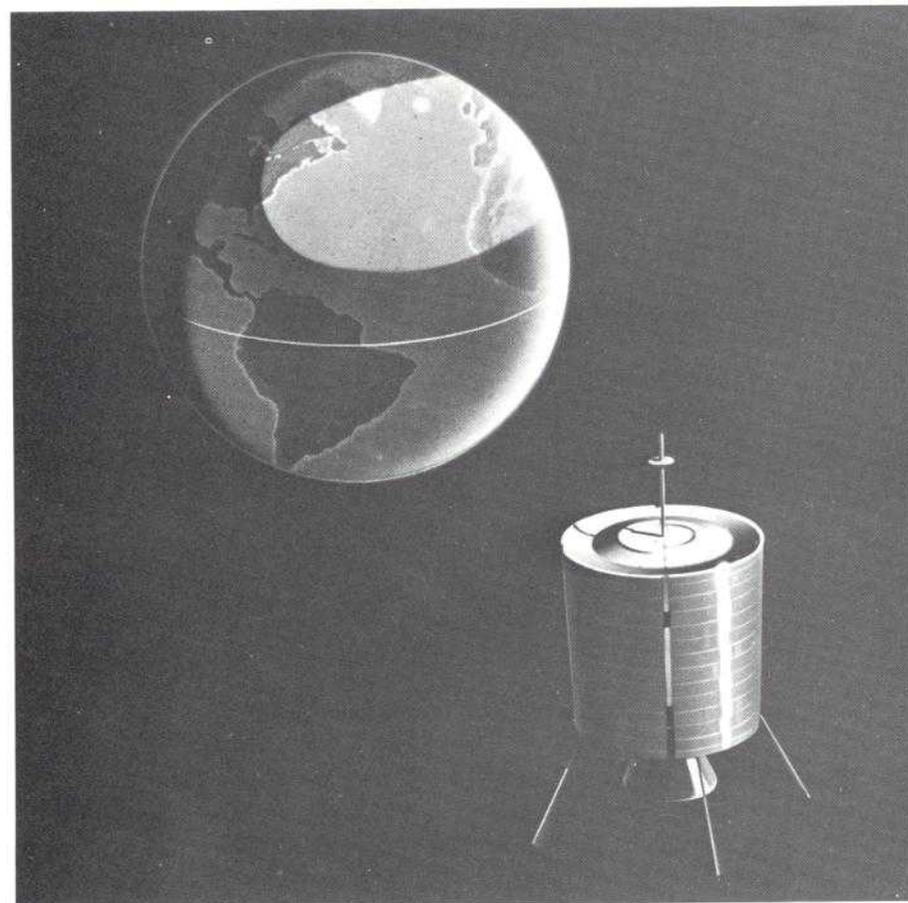
Another new means of communication was already on its way. The first successful telephone experiment had been conducted by the German, J. P. Reiss, in 1861. This kicked off a highly active research period. Alexander Graham Bell was the first in the United States to file his patent, on February 14, 1876, just several hours before Elisha Gray. (Otherwise, the Bell System might well have been the Gray System.) The first commercial telephone exchange in the United States was then opened in New Haven, Connecticut, in January 1878.

While a widening network of wires and cables was being woven throughout the United States, Marconi again changed the course of communications transmission by sending the first radio signal in Italy in 1865. He got a British patent the following year, and then sent the first radio message across the Atlantic, from England to Newfoundland, in 1901.

By the 1920s the telephone had become a common household item, and the era of broadcasting had arrived with the crystal set. These developments led to the initiation of radiotelephone service across the Atlantic Ocean in 1927. Now man had



There was no reliable means of voice communication across the oceans until the first transatlantic telephone cable was laid in 1956.



Early Bird, the world's first commercial communications satellite, ushered in a new communications era on June 28, 1965.

made another giant step forward in international communications. He could not only send a message by telegraph, he could make himself heard across the sea, although often with great difficulty due to static and interference.

This same year, a tall young man made communications history in another way. Charles A. Lindberg flew from New York to Paris in 33 hours.

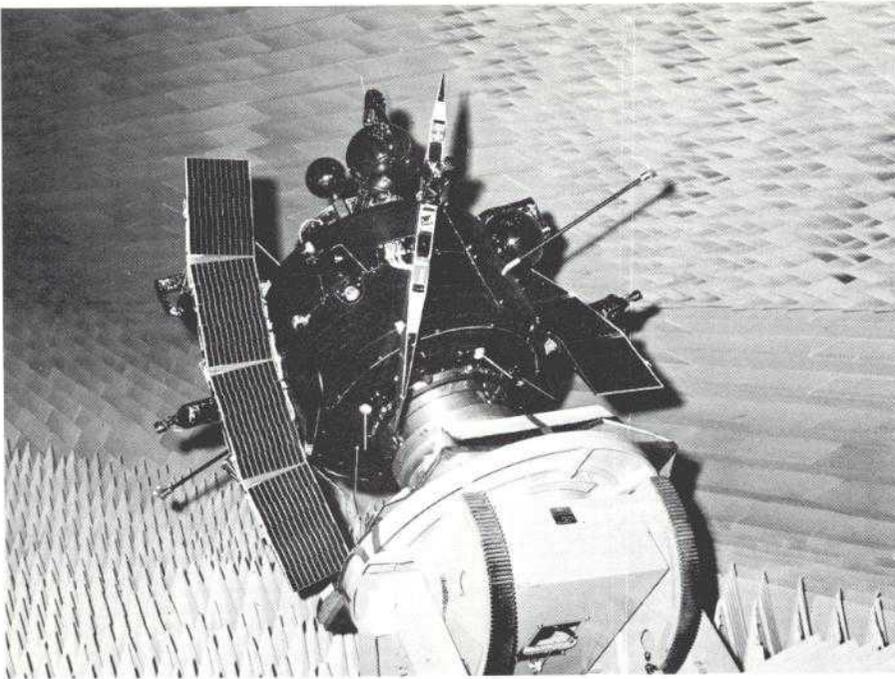
There was still, however, no reliable means of providing high quality voice communications across the oceans until as recently as 1956 when the first transatlantic telephone cable was laid to England; nor to the Far East until 1964, when the first transpacific cable linked the United States with Japan.

Now, less than ten years later, a global system of high capacity satellites, positioned 22,300 miles over the Atlantic, Pacific, and Indian Oceans, provides instant communications of all kinds, directly and simultaneously, among nearly 100 countries, territories or possessions of the world.

Along these electromagnetic pathways flow most of the world's long distance international communications. High quality telephone calls can now be made to more than 20 countries that are not connected by cables, the only other means of providing reliable telephone service, and one out of every four people on earth could see an important event on TV, as it happens, "Live Via Satellite."

In a very short time the satellite has revolutionized world communications. It has made it possible for man to reach and stay in constant touch with his fellow man, almost anywhere on earth. It has bridged the millenia-old gap of isolation of people and nations. It has projected all nations into the mainstream of modern world communications, trade, education, entertainment, and the many kinds of political, professional, and personal discourse which President Kennedy regarded as essential to healthy human relationships and international understanding.

The communications satellite made it possible for man to achieve in 10 years an objective that had eluded him for 10,000 years, or more.



RAE-B satellite tested in Labs' anechoic chamber

NASA made use of COMSAT Labs' anechoic chamber to test the first Radio Astronomy Explorer (RAE-B) satellite. Scheduled for launch in June from Cape Kennedy, this spacecraft will measure the intensity of radio signals from a variety of celestial sources and also provide a capability to map celestial galaxies without interference from the effects of the terrestrial ionosphere. In the photo above, the RAE-B spacecraft is shown during a test.

Governing Board highlights of 2nd meeting

The second meeting of the INTELSAT Board of Governors was held May 9 to May 18, in Washington, D. C. In the absence of the Chairman and Vice-Chairman, Mr. Eliassen and Mr. Seidel, the Board unanimously selected Mr. Alegrett, Governor from Venezuela-Colombia-Chile, as its Acting Chairman.

Among its major actions, the Board:

- Interviewed five candidates for the position of Secretary General and agreed to postpone elections until the Board's third meeting.
- Received and approved a report from its Management Services Contract Group recommending a presentation of an outline contract to the third board meeting, presentation of a draft contract to the fourth meeting, and approval of the Management Services Contract at the fifth meeting.

- Agreed that the first meeting of the Meeting of Signatories will be held November 12-16, 1973, at the Ramada Inn, Rosslyn, Virginia, and tentatively scheduled the second meeting of the group for April 1-5, 1974, at Loew's L'Enfant Plaza Hotel.

- Agreed to tentatively schedule the first meeting of the Assembly of Parties for February 4-8, 1974, at Loew's L'Enfant Plaza Hotel.

- Established a Special Committee of Governors and Alternate Governors who live in Washington, D. C., to review the proposed lease agreement for INTELSAT Headquarters and the final drawings and specifications. The Committee is empowered specifically to authorize the Manager to execute the lease and to provide direction in such areas as construction priorities, floor configuration and office utilization, layout of the Board's conference room table, selection of office equipment, and interior design of the INTELSAT Headquarters, including selection of the carpeting and paneling.

- Postponed the fifth INTELSAT IV launch so that the receiver gain anomalies being experienced in the in-orbit INTELSAT IV satellites can be better understood and appropriate improvements made.

- Adopted a revised capital expenditure budget for 1973 of \$50,817,000 on the recommendation of the Advisory Committee on Finance.

- Requested the Manager to carry out additional maritime satellite studies as recommended by the Advisory Committee on Technical Matters for definition of quality of communications, consideration of user requirements, and determination of satellite capacity requirements for varying ship terminal capabilities.

- Approved a one-year extension of the term of Mr. Feve, a nominee of the French Signatory working on the Manager's Technical staff.

- Scheduled the next meeting of the Board of Governors for July 11-19 in Washington, D. C.

IV-A contract signed

COMSAT, as manager for INTELSAT, has signed a contract for \$72 million with the Hughes Aircraft Company of Culver City, California, for three INTELSAT IV-A satellites. Each of the IV-A satellites is designed to have almost twice the capacity of today's IV satellites.

Under terms of the contract, Hughes will deliver the first spacecraft within 25 months from the contract signing date. This satellite, intended for use in the Atlantic region, is planned for launch in 1975.

The cost of the program, including the Atlas-Centaur launch vehicles and launch services will be approximately \$125 million. The National Aeronautics and Space Administration (NASA) will launch the satellites on a cost reimbursable basis.

The contract with Hughes for \$72 million includes development costs, supporting items and services, and allowances for full performance incentives for seven years.



Asia Office personnel attending a staff conference.

COMSAT's Asia Office opens its doors; assists 19 INTELSAT members

BY MILES L. MERIANS

COMSAT's Asia Office opened its doors for business on January 2, 1973. As the newest group in the International System Division, this office serves as the Corporation's liaison with governments and operating telecommunications organizations in an area that stretches from the Middle East to the Western Pacific.

Under the direction of Roman I. Ulans, the Asia Office is prepared to assist this area's 19 INTELSAT member countries (12 of whom are on the Board of Governors) as they develop their satellite communications requirements, both domestic and international.

These activities promise a busy, interesting, and productive assignment for the Asia Office.

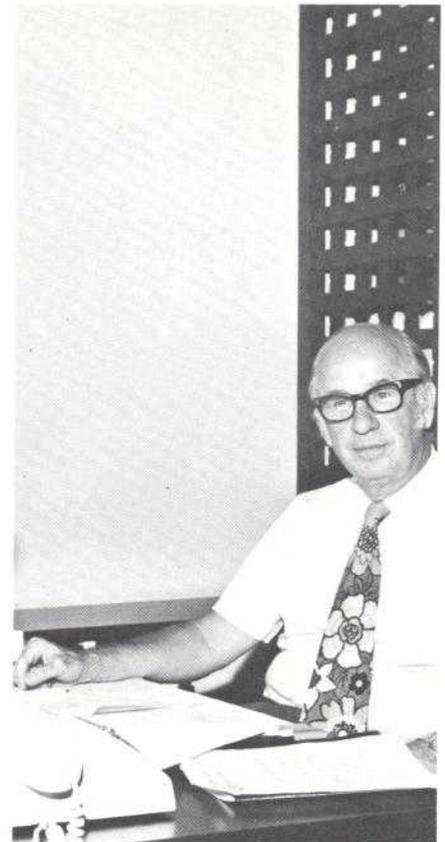
Singapore was chosen as the site for this new office because of its geographically central location, good airline connections, and the availability of high-quality personnel having English as their mother tongue.

■ *Mr. Merians is Assistant Director, Asia Office.*

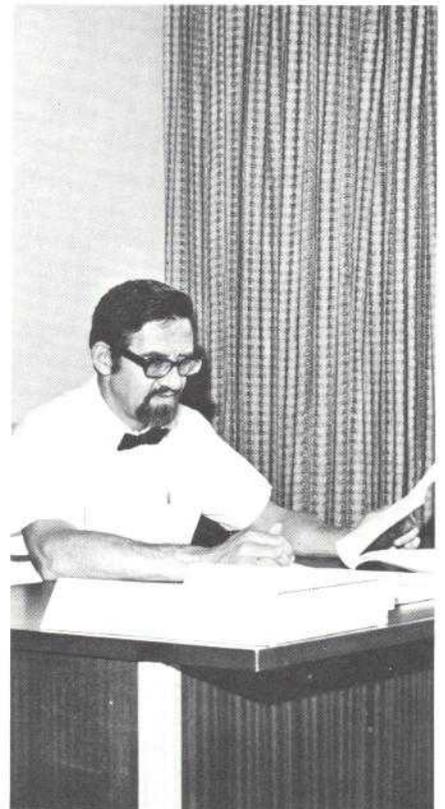
Shortly after the office opened, Mrs. Lucy Kwok and Miss Patricia Chen joined the staff as administrative assistant and secretary, respectively. Although the field of satellite communications is still new to them, they are now at home among such esoteric terms as rate adjustment factor, TDMA, and orbital slots.

The Asia Office is presently located in a two-room suite in a hotel near the center of town. This has solved such problems incidental to opening a new office as housekeeping, switchboard and telex service, and air-conditioning. These are provided for. The hotel's swimming pool is also very welcome indeed, and a refreshing dip during lunchtime or after work is often in order.

Singapore represents quite a change from Washington, where Mr. Ulans was manager for Middle East development, and Geneva, where he was a liaison officer in COMSAT's European Office. The climate is constantly tropical with daily temperatures in the 80s or above with high humidity and frequent heavy rainfall.



Director Roman I. Ulans pauses in his work.



Assistant Director Miles L. Merians reviews a document.



Administrative assistant Lucy Kwok records a message.



Secretary Patricia Chen proofs a letter at her desk.

Eating habits are different, too. Apples, for example, are a luxury item and it is much more economical to eat the local fresh fruits such as pineapple, mango, mangosteen, and durian.

Singapore is also a melting pot of Oriental cuisine, bathed in the spices and recipes of China, Indonesia, India, and Malaysia. There is something for every taste, and a taste for everything. Barbeques are replaced by a succulent beef or lamb satay, broiled on delicate bamboo spits and dipped in peanut sauce. Sunday chicken dinner becomes a flaming curry and a quick lunch consists of half a dozen small, tasty dishes called tim-sum, a sort of Chinese smorgasbord.

Among the peculiarities of working so far from home is the fact that there is absolutely no overlap in office hours between Singapore and Washington. When the Plaza opens at 9:00 a.m., it is 9:30 p.m. in the Asia Office, and it is 5:00 a.m. in Singapore when Headquarters closes in Washington. It is necessary to make prior arrangements for phone calls, to be sure of catching your party at his desk. The time difference has an unexpected advantage for telex messages, however. A telex sent from the Asia Office at the close of business arrives in Washington before COMSAT even opens up that same day.

We in the Asia Office hope that COMSAT home-folks remember that they have friends in Singapore. Drop by the office any time. With today's jumbo jets, package tours and long vacations, this is not as farfetched as it may once have seemed.

Briskman, Hyde elected to local IEEE posts

At its May meeting, the Washington Section of the Institute of Electrical and Electronics Engineers (IEEE) elected two long-time COMSAT employees to posts of responsibility within the section for the coming year.

Robert D. Briskman, Director, Domestic System Program, COMSAT General, was elected as secretary of the Washington section, while Dr. Geoffrey Hyde, Senior Staff Scientist, R. F. Transmission Laboratory, COMSAT Labs, was elected to the Executive Committee.

First impressions of Singapore

BY MORWENNA C. ULANS

Living in Singapore is somewhat like a vacation at the seashore. The sun shines hot and the humidity is heavy. This feeling comes from being on an island, I guess. The way the houses are constructed with never a thought to cold winter weather, and with everything airy and open, adds to the temporary summertime feeling. The dinky gas stove in the kitchen with its flint sparker in place of a pilot, the top-of-the-stove toaster, our makeshift dishes, and kitchen equipment, all remind one of a rented beach house. So does the clothing or rather the lack of it. Everybody goes barefooted inside the house (it would be too hot to do this on the pavement outside) and wears a minimum of clothing—no pantyhose—no slippers—no girdles—no matter.

However, the beach isn't just around the corner. About 14 miles from the center of the city is the national beach, but it's not too good. One reason for the lack of a beach is that Singapore is a deep-water port, and huge ships dock close to the land wherever possible. But the 54 islands with names (and many more unnamed ones) around Singapore do have white sandy beaches, and are attractively deserted, and make a wonderful place to take a picnic. Get a restaurant at dock-side to fix up a Chinese lunch (all kinds of goodies wrapped in big leaves and packed in a paper shopping bag—complete with chop sticks and Cokes), hire a boat-taxi, and you are on your way. Umm, does it taste good as you watch the ships go by from your "own" island.

An umbrella is a necessary bit of equipment here. A rainstorm can come up very suddenly. Five minutes later, it's all over and the sun is shining again and you need your umbrella for shade. The Japanese oiled-paper

■ Mrs. Ulans is the wife of Roman I. Ulans, Director, Asia Office. Her impressions were written for her family, but she has been kind enough to share them with COMSAT News.

parasol is popular and cheap, but the sophisticates use folding umbrellas that fit into the purse.

The heat is quite oppressive—and this is the winter season! Perhaps the one mistake we've made so far has been insisting on living in a house. A centrally air-conditioned apartment would have been more comfortable. Our house has four bedrooms with an air-conditioner in each. No houses are centrally air-conditioned. The temperature day and night is in the 80s. One evening recently, it dropped to the upper 70s so we tried sleeping without air-conditioning and all the windows open, but it was very noisy. Packs of wild dogs forage nightly through the rubbish cans. We have a high barbed wire fence, but the dogs get in anyway. We've tied the cover onto our rubbish can so we don't have a messy backyard every morning.

Our house is big, modern, and expensive. One reason for the high cost of the rent is that no more single-family houses are allowed to be built in Singapore as land is so scarce. There are so many people that high-rise apartments are all that are being built. Our house has many balconies and patios extending from every room downstairs. Both the living room and dining room have marble floors and the dining room is raised two circular steps up from the living room. The windows and doors have decorative iron grills and no screens as they aren't necessary here. Full-length sliding doors make up the outside wall of each room. There is almost always a breeze and if there isn't, then we use ceiling fans to stir up the air. The furnishings are new and Danish modern in design. However, our landlady has placed a few irresistible Chinese antiques in strategic places. There is a chest on the upstairs landing that I would really like to have. It's black lacquer inlaid luxuriously with mother-of-pearl in a flower and bird design.

Our landlady, by the way, is a character right out of an Oriental intrigue. She is a typical Chinese business lady in her early fifties. She is shrewd and for every concession she has made to us there has been a struggle. She even created a scene and faked a heart attack. It's funny in retrospect, but it was shattering at the time. But I

must get to be good friends with her because I do want that black lacquer chest.

We have already found two amahs or helpers who take care of the house for us. Annie, our general amah, is a clean, hardworking Chinese Christian about 40 years old, who admittedly is "not kwever" (clever). She does all the cooking, general housework, makes beds, and dusts. Annie's sister, Margaret, comes in every morning. She is our half-day wash amah who washes clothes with a scrubbing board in a large plastic tub on a tile platform at the back of the house. She also irons, washes windows, and does all the heavy scrubbing (floors, walls, walks, carport). Annie and Margaret are a good pair and we're already being spoiled rotten. Annie's cooking is out of this world. We haven't tired of Chinese food yet but when we do she can cook European. They both speak enough English to communicate with us even though it is really a mixture of their own native dialect and "British" English. Sometimes we do have to resort to gestures.

As for food shopping, there are three big supermarkets nearby. The Chinese Emporium has things from China. Roman bought some white wine there. "Red" white wine, he called it. Then there's Fitzpatricks which I think is UK oriented—meat from Australia, butter from New Zealand, and tinned foods from England. The third store is called Cold Storage and stocks many U.S. items, local foods, and has a big deep freeze department. If you can substitute a local or Malayan product for a similar U.S. item, you can live quite cheaply—but if you must have the real McCoy, you pay through the nose. For example, one quart of mayonnaise costs \$1.60 in U.S. money.

I have not investigated shopping other than for food as yet, but I plan to get to the local Thieves' Market soon with a friend. This market was, at one time, the outlet for the island's stolen goods. It's still a second-hand junky place, so I am told, with the possibilities of a treasure in old Chinese furniture or bric-a-brac. It's in the midst of Chinatown which in itself is an antique. People live there as they did 100 years ago.

As I write this, a band is passing

under my window, and believe it or not they are playing *Way Down Upon the Swanee River*—not too well but definitely recognizable! Behind the band is what looks like a parade float decorated with bright colors. Following the float are some people and cars with honking horns. My amah tells me it is a funeral—probably Christian because of the tune, the legacy no doubt of some early Christian missionary.

These are some of my first impressions of the sights and sounds of our new life here in Singapore.



Mr. Weiss

Weiss named director

In a move to further increase the effectiveness of the recently combined Systems and Special Projects Divisions of the COMSAT Labs, Hans J. Weiss was recently appointed Director, Systems Engineering.

In his new capacity, he will be responsible for the Terrestrial Interface and Earth Stations, the Engineering Economics, and the Communications Systems Departments.

Mr. Weiss is a graduate of the University of Karlsruhe, Germany, and has been a COMSAT employee since August 1964.



Dave Eggers (left) accepts his door prize from Mrs. Charyk (second from right) as Linda Kortbawi and Bob Swensen watch.

COMSAT EMPLOYEE NEWS

Spring plaza party

Approximately 250 COMSAT employees and their guests enjoyed the CEA Annual Spring Plaza Party.

COMSAT President Joseph V. Charyk was on hand to welcome the many members of the INTELSAT Board of Governors who attended the festivities.

Mrs. Charyk added her charm to the evening as she drew Dave Eggers' name as the winner of the door prize, a Panasonic 12" black and white television set.

PHOTOS BY ALLAN GALFUND



Ann Younger and Russell Poulsen enjoy a fast number.



Good conversation is an ingredient of a pleasant evening and a successful party.

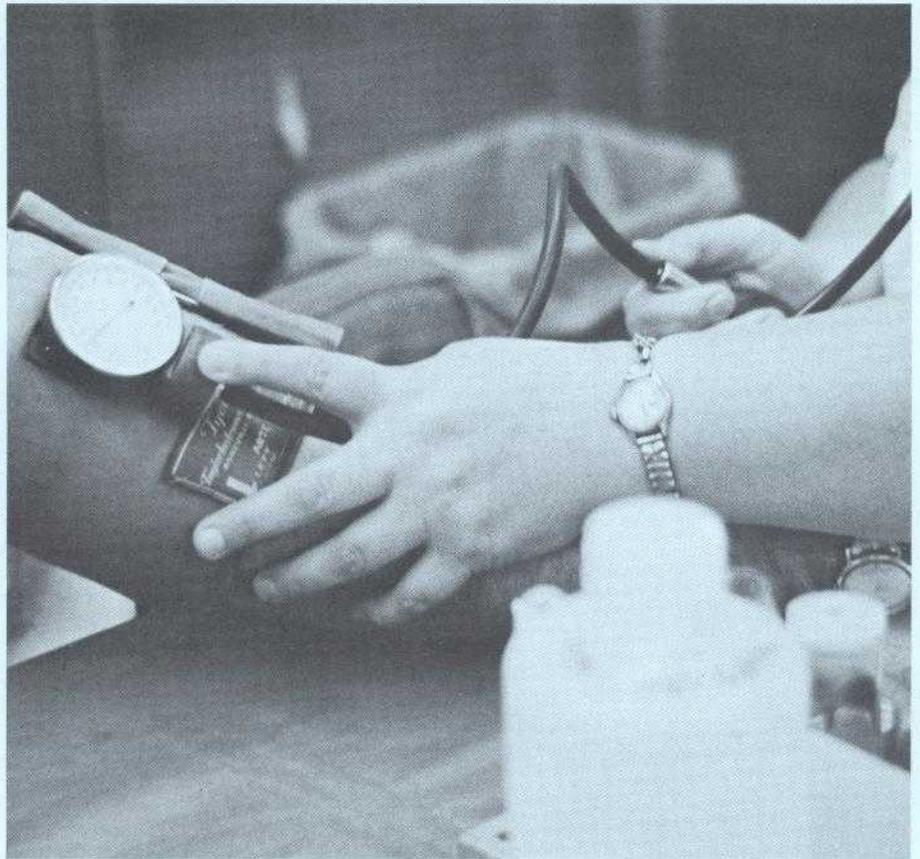


Bill Cox donates his blood.

1973 blood drive

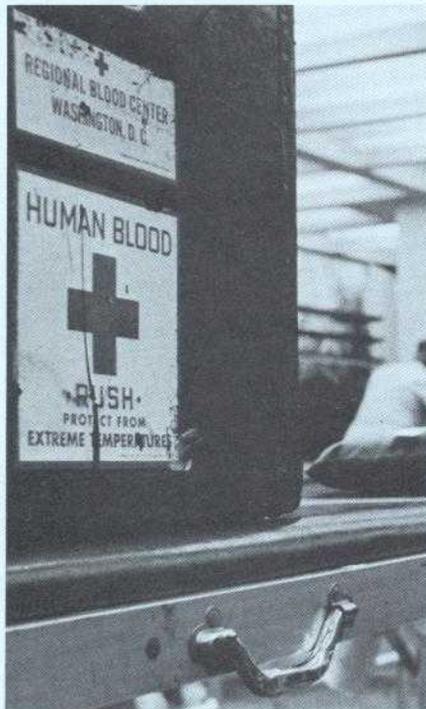
The COMSAT Headquarters and Labs medical units recently sponsored Red Cross blood drives.

More than 145 COMSAT employees participated in the two programs under the supervision of Headquarters Nurse Hazel Durant and Labs Nurse Betty Mowen.



A blood pressure reading is a prerequisite.

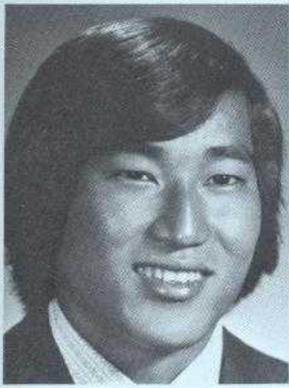
PHOTOS BY ALLAN GOLFUND AND WALLY MERCER



Ready to save a life.



Burt Falkofske discusses his donation with the staff nurse.



Neal S. Kumasaka, son of Mr. and Mrs. Robert N. Kumasaka (Paumalu), Mid-Pacific Institute, Honolulu, Hawaii.



Kathryn J. Waldman, daughter of Mr. and Mrs. Myron Waldman (Headquarters), Bachelor of Science in clinical psychology, University of Virginia, Charlottesville, Virginia.



Eugene Carl Saltz, son of Mr. and Mrs. Irving L. Saltz (Headquarters), Bachelor of Science in electrical engineering, Rutgers University, New Brunswick, New Jersey.



Debra Lynn Stauffer, daughter of Mr. and Mrs. Melvin M. Stauffer (Jamesburg), Carmel High School, Carmel, California.



John W. Keyes, son of Mr. and Mrs. John A. Keyes (Headquarters), Bachelor of Arts in interdisciplinary studies, University of Portland, Portland, Oregon.



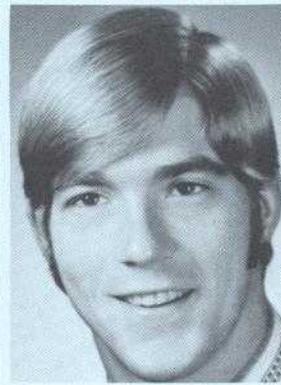
Paul F. Ross, son of Mr. and Mrs. Donald S. Ross (Headquarters), Garfield High School, Woodbridge, Virginia.



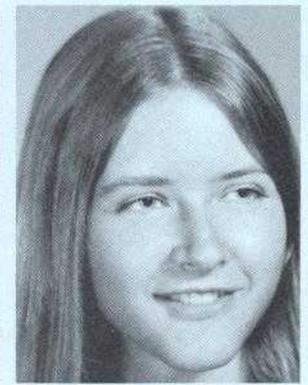
Kathryn O'Connor, daughter of Mr. and Mrs. Joseph H. O'Connor (Headquarters), Bachelor of Arts in sociology, Hollins College, Roanoke, Virginia.



Katherine D. Wood, daughter of Mr. and Mrs. H. W. Wood (Headquarters), W. T. Woodson High School, Fairfax, Virginia.



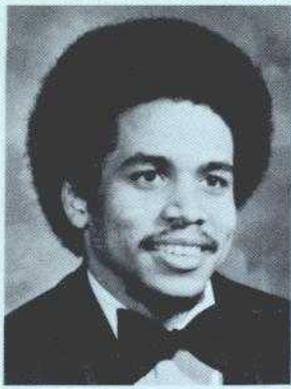
John J. Thaler, II, son of Mr. and Mrs. John B. Thaler (Headquarters), Bachelor of Science in mathematics, Holy Cross College, Worcester, Massachusetts.



Susan E. Strauss, daughter of Mr. and Mrs. Robert Strauss (Labs), Langley High School, McLean, Virginia.

THE 1973 GRADUATES

The 35 graduates of 1973, pictured on these pages, include not only the sons and daughters of COMSAT employees, but also some employees who received degrees. The following graduate photo was not available: Belinda Briggs, daughter of Mr. and Mrs. Alden A. Briggs (Andover), Telstar High School, Bethel, Maine.



Darrell (Skip) Brooks, son of Mr. Kenneth E. Brooks (Headquarters), Bachelor of Science in business, Livingstone College, Salisbury, North Carolina.



Marian A. Inman, daughter of Mr. and Mrs. Jack H. Inman (Jamesburg), Salinas High School, Salinas, California.



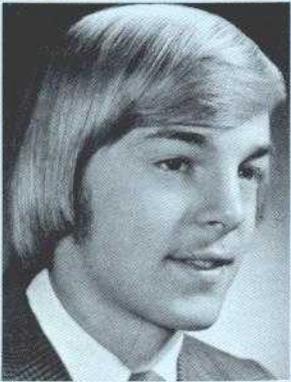
Richard C. Mott (Labs), Master of Science in microwave communications, George Washington University, Washington, D. C.



Mary Hook, daughter of Mr. and Mrs. Fred J. Hook (Headquarters), Woodward High School, Rockville, Maryland.



Bartolo Serafini (Labs), Bachelor of Science in electronic engineering technology, Capitol Institute of Technology, Kensington, Maryland.



Mark Hofmann, son of Mr. and Mrs. Melvin Hofmann (Brewster), Pateros High School, Pateros, Washington.



Christine Frazier, daughter of Mr. and Mrs. Harold L. Frazier (Andover), Telstar High School, Bethel, Maine.



Jeanmarie Frances Mercer, daughter of Mr. and Mrs. Wallace P. Mercer (Labs), Brunswick High School, Brunswick, Maryland.



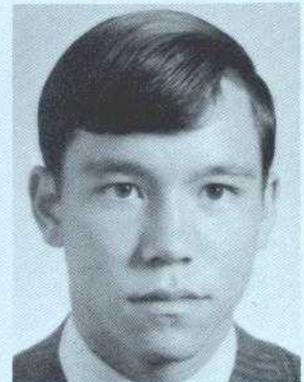
Stephen S. Edelson, son of Dr. and Mrs. Burton I. Edelson (Labs), Bethesda-Chevy Chase High School, Bethesda, Maryland.



Celia Attwood, daughter of Mr. and Mrs. Richard A. Attwood (Brewster), Joel E. Ferris High School, Spokane, Washington.



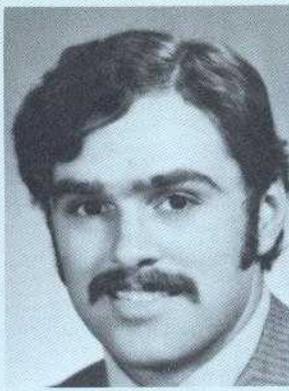
Patricia Early Yorty, daughter of Mr. and Mrs. L. B. Early (Headquarters), Winston Churchill Senior High School, Potomac, Maryland.



Greg R. Gullette, son of the late Mr. Philip L. and Mrs. Gullette (Headquarters), Woodson High School, Fairfax, Virginia.



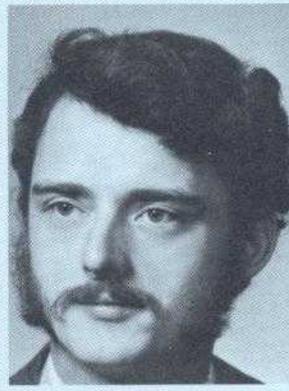
Cathy Wyrick, daughter of Mr. and Mrs. Clarence Wyrick (Brewster), Brewster High School, Brewster, Washington.



DeVoe E. Reagan, son of Mr. and Mrs. L. Howard Reagan (Headquarters), Bachelor of Science in business administration, Lehigh University, Bethlehem, Pennsylvania.



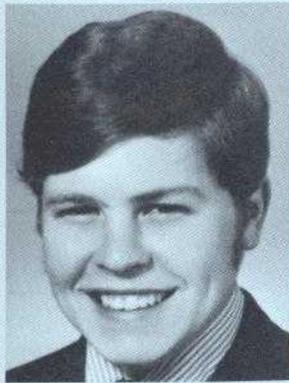
Mary Lane (Headquarters), Bachelor of Arts in English and history, University of Maryland.



Jack T. Inman, son of Mr. and Mrs. Jack H. Inman (Jamesburg), Bachelor of Science in computer science, California State University, San Luis Obispo, California.



Melody Anne Gray, daughter of Mr. and Mrs. John E. Gray (Headquarters), Garfield High School, Woodbridge, Virginia.



Mark Steven Scheiter, son of Mr. and Mrs. Alvin R. Scheiter (Jamesburg), Carmel High School, Carmel, California.



Lynn May, daughter of Mr. and Mrs. James May (Headquarters), Langley High School, McLean, Virginia.



Nancy Ann Leighton, daughter of Mr. and Mrs. Joachim Kaiser (Labs), Bachelor of Arts in art, Rollins College, Winter Park, Florida.



Wendell Kalani Ogata, son of Mr. and Mrs. C. N. Ogata (Paumalu), Castle High School, Kaneohe, Hawaii.



Sally Ann Keck, daughter of Mr. and Mrs. William J. Keck (COMSAT West), Rolling Hills High School, Palos Verdes Peninsula, California.



Laurie E. Landesberg, daughter of Viola Newhouse (Headquarters), John F. Kennedy High School, Silver Spring, Maryland.



Linda Susan Hayes, daughter of Mr. and Mrs. Joachim Kaiser (Labs), Master of Science in library science, Wayne State University, Detroit, Michigan.



Raymond E. Caudle, son of Mr. and Mrs. Raymond M. Caudle (Headquarters), The Bullis School, Potomac, Maryland.

Brauer shoots low gross in CEA golf tourney

Bill Brauer, International System Division, won the CEA Spring Golf Tournament on May 1 by shooting a low gross score of 83 at the Washingtonian Country Club in Gaithersburg, Md.

Dave Burks, International System Division, won low net honors as he carded an 84-11-73.

Over 50 players, including two ladies, enjoyed the spring day on the links.

While neither would discuss exact scores, Shirley Oliver, International System Division, won ladies' low gross honors and Lee Giafaglione, Administrative Services, won low net.

Other first and second place winners were:

First Flight—Low Net: Bill Wood, International System Division; John Welch, International System Division.

Second Flight—Low Net: Arnold Satterlee, International System Division; Buck Jones, COMSAT Labs.

Third Flight—Low Net: Norm Schroeder, International System Division; John Heck, Administrative Services.

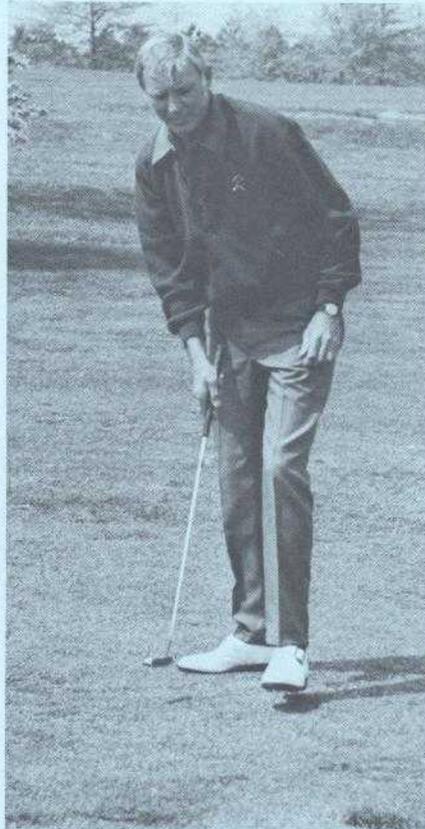
Closest to the pin on the 180-yard eleventh hole: Bob Redick, COMSAT Labs.

Longest drive on the 420-yard ninth hole: Dave Burks with a 300-yarder down the middle.

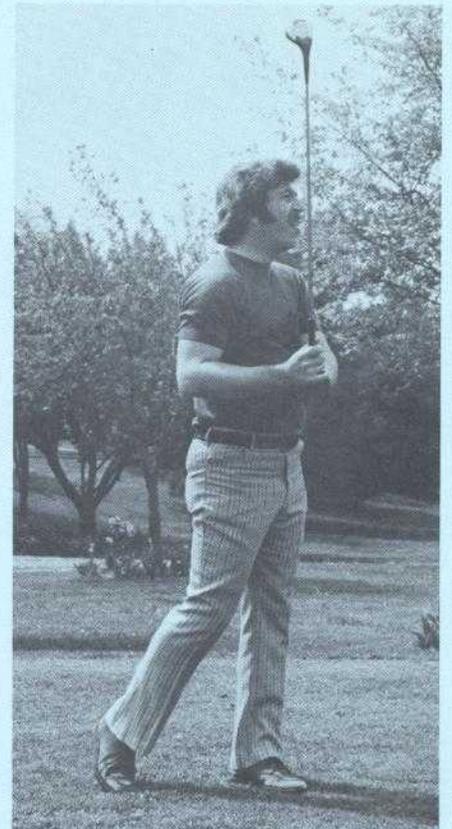
Raffle winners were Sid Browne and Jim Potts, both of the International System Division.

Arrangements for the outing were coordinated by Paul Flemming, COMSAT Labs, and Alan Kasper, Legal.

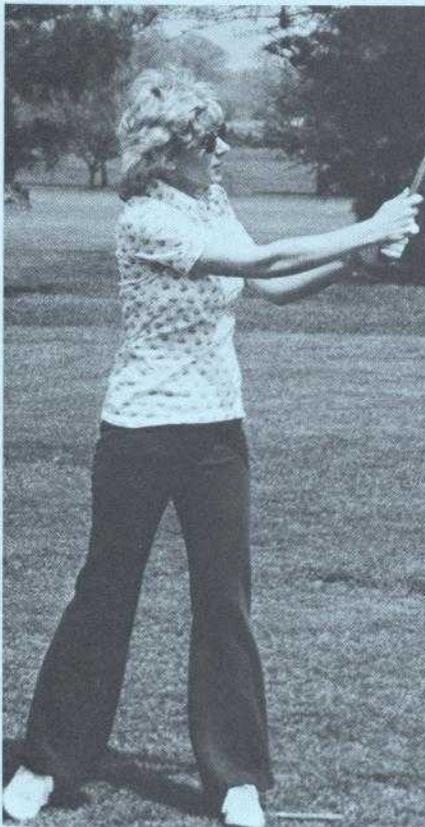
PHOTOS BY WALLY MERCER



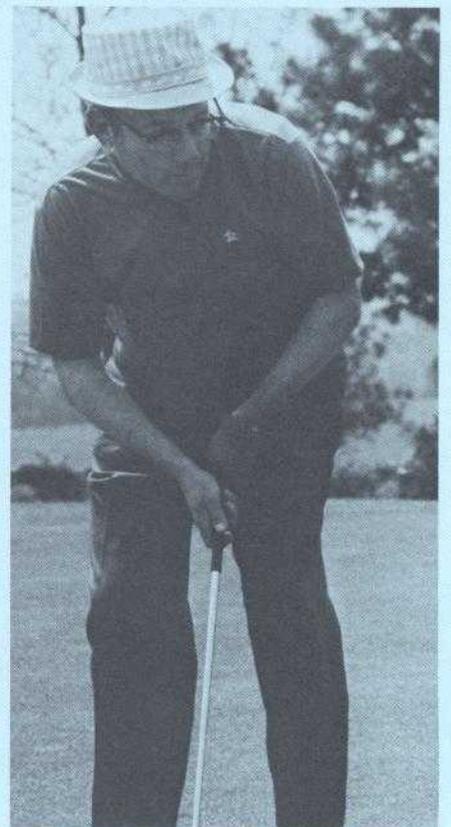
Bill Brauer watches as his ball disappears into the hole.



Joe Sculli watches his drive disappear from sight.



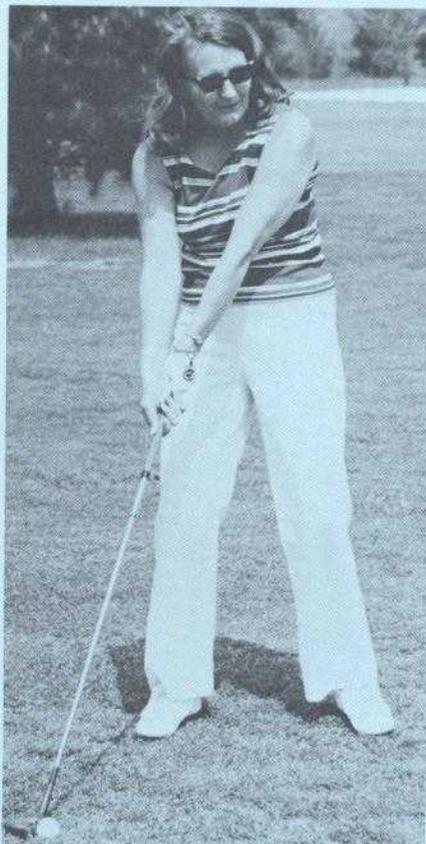
Shirley Oliver hits an approach shot to the green.



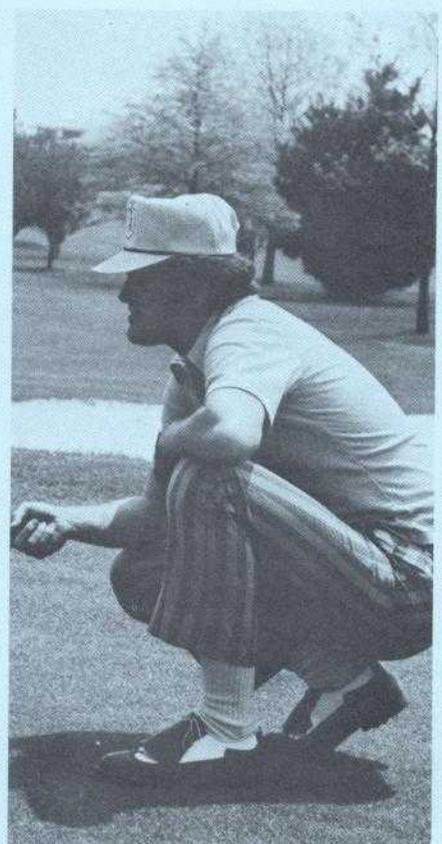
Lew Meyer putts for a birdie.



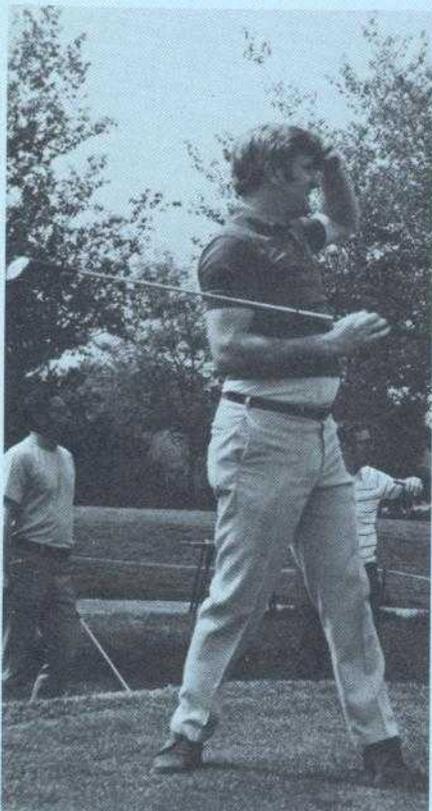
Gus Rauschenbach successfully blasts out of a sandtrap.



Lee Giafaglione prepares to hit a fairway shot.



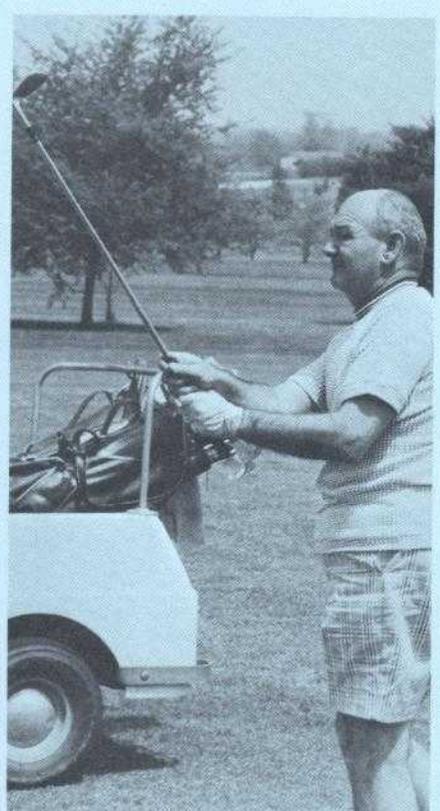
Dave Burks lines up a putt.



Arnie Satterlee watches his drive up the fairway.



Jack Rutter wonders if his drive is out-of-bounds.



John Gerstner hopes his iron shot reaches the green.



Dr. Joseph V. Charyk (left) congratulates Stephen S. Edelson, COMSAT's 1973 National Merit Scholarship winner. PHOTO BY ALLAN GALFUND

Stephen Edelson wins merit scholarship, presentation made by Dr. Charyk

The 1973 COMSAT National Merit Scholarship winner is Stephen S. Edelson, son of Dr. Burton I. Edelson, Assistant Vice President and Acting Director of COMSAT Labs.

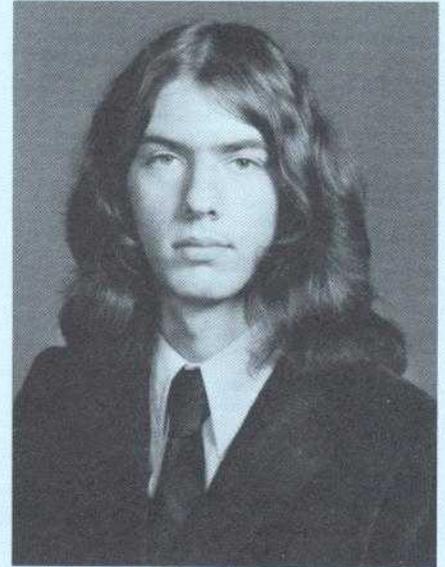
COMSAT President Dr. Joseph V. Charyk awarded the scholarship to Stephen in a ceremony at Headquarters.

A recent graduate of Bethesda-Chevy Chase High School, Bethesda, Md., Steve participated in several

dramatic productions, played clarinet in the orchestra, and was captain of his school's soccer team.

Steve will enter Yale University, New Haven, Conn., in September.

The COMSAT scholarship, offered each year to the son or daughter of a COMSAT employee who obtains the highest total score on the National Merit Scholarship Examination, provides for a yearly stipend for four years of undergraduate study.



Thomas M. Tuozzo

Former employee's son wins merit scholarship

Thomas M. Tuozzo, the 17-year-old son of former Executive receptionist Corrinne Tuozzo, has won an IBM four-year National Merit Scholarship.

He joins Stephen S. Edelson, son of COMSAT Assistant Vice President Burton I. Edelson, as one of 1,100 seniors who were chosen from 14,000 finalists in this year's competition.

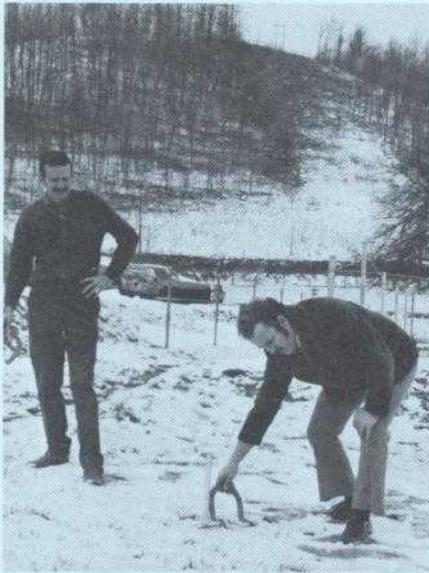
Tom, a recent honors graduate of Walter Johnson High School in Bethesda, Md., hopes to attend Yale University, in New Haven, Conn., and major in linguistics.

Rutter elected by Personnel Forum

Members of the Washington Technical Personnel Forum recently elected Personnel's Jack Rutter as president of their group for the 1973-74 season which begins in September. It will be Mr. Rutter's second term as president in the 15-year history of the organization.

The Forum, composed of 49 member-companies and 150 individual members, was organized as a vehicle for the exchange of ideas among local industrial relations personnel and as a podium for speakers to discuss topics of current interest to the personnel field.

The group meets monthly from September to May at a restaurant in Bethesda, Md.



Don Gaston (left) watches as Bill Mayes reaches for a horseshoe.

At Etam

BY BEVERLY J. CONNOR

If you don't believe in gremlins, you just haven't been around earth stations very much. It was just one year ago that we experienced seven successive power failures, minutes after the station's digital clock read 13:13:13:13, which to nonearth station types translates as the 13th day, 13th hour (GMT), 13th minute and 13th second.

This year it was even more nerve-racking, as Friday, April 13 approached again. And sure enough, our gremlins were not asleep. After experiencing one of the warmest winters on record in West Virginia, and after installing our horseshoe pits in anticipation of the summer schedule of hamburgers and horseshoes each Wednesday noon, our gremlins provided us with one of the biggest snowfalls of the year (and some of the coldest temperatures, too) as four inches of the white stuff covered the ground before it was all over.

Our station personnel were not to be impeded by such minor meteorological disturbances, however, and the season's opening game took place as scheduled. Erratic scoring by the judge in the early rounds was elimi-

■ Mrs. Connor is a secretary at the Etam Earth Station.

nated when black shoes were used for easy identification in the snow. Final results were never announced, come to think of it. Wonder why?

SPADE training certificates were recently presented to our operations and electronic maintenance personnel by instructor Mike O'Hara. John Banister, Spencer Everly, John Formella, Don Gaston, Leonard Gifford, Paul Helfgott, Bill Mayes, Vic Molek, and Lynn Rector completed the two-week training course.

The ECEA held its spring party on Saturday, April 14, at the Pizza Pub in nearby McHenry, Maryland. Eleven couples were on hand to hear tunes by a "musician and singer" at the piano and to dine on pizza and draft beer. A gala time was had by all.

Mrs. Peggy Wolfe of Etam is our temporary secretary these days, helping out while Mrs. Deloris Goodwin is on maternity leave.

Senior technician John Stanko, resigned in May. He transferred to Etam from Paumalu in April 1972, but John's heart stayed in Hawaii. Now he is returning to "where his heart is." Etam's "Mr. Clean," Harley Sanders, our janitor since November 1968, also recently resigned to accept another position in Kingwood, West Virginia. He was a most congenial and hard working employee during his years at Etam. Our best wishes to both in their new undertakings.

Two of our aviators have obtained advanced pilot ratings. Station manager Bill Carroll recently received a commercial pilot's license, and Sam St. Clair has added an instrument rating to his new commercial license.

The Plaza scene

BY JEAN QUINN

In the spring young men's fancies turn to thoughts of "girl watching"? With all the sunshine and warm temperatures this spring, more and more "brown baggers" can be found around the fountain watching the girls and of course, an occasional tourist or two as they eat lunch.

By popular request the National Park Service has begun presenting weekly lunch time activities again this

season. "Summer In the Parks" will have various bands and rock groups performing one day a week "free of charge" for your entertainment.

Congratulations to the Legal Department's latest groom and his new bride. On May 6, John B. Gantt married Miss Isabel Mizrack of New York. The couple were married in the Versailles Room at the St. Regis-Sheraton in New York and spent their honeymoon in Europe.

Personnel's Sherry Braham recently returned to work after a short leave of absence. On March 9, 1973, the Brahams became the proud parents of their first child, Scott Alan. Congratulations and welcome back, Sherry!

The Hans Dodels also became parents for the first time recently. Annette Christina weighing 8 lbs. and 6 oz., was born on April 23, Hans is in the COMSAT Labs Systems Engineering Division.

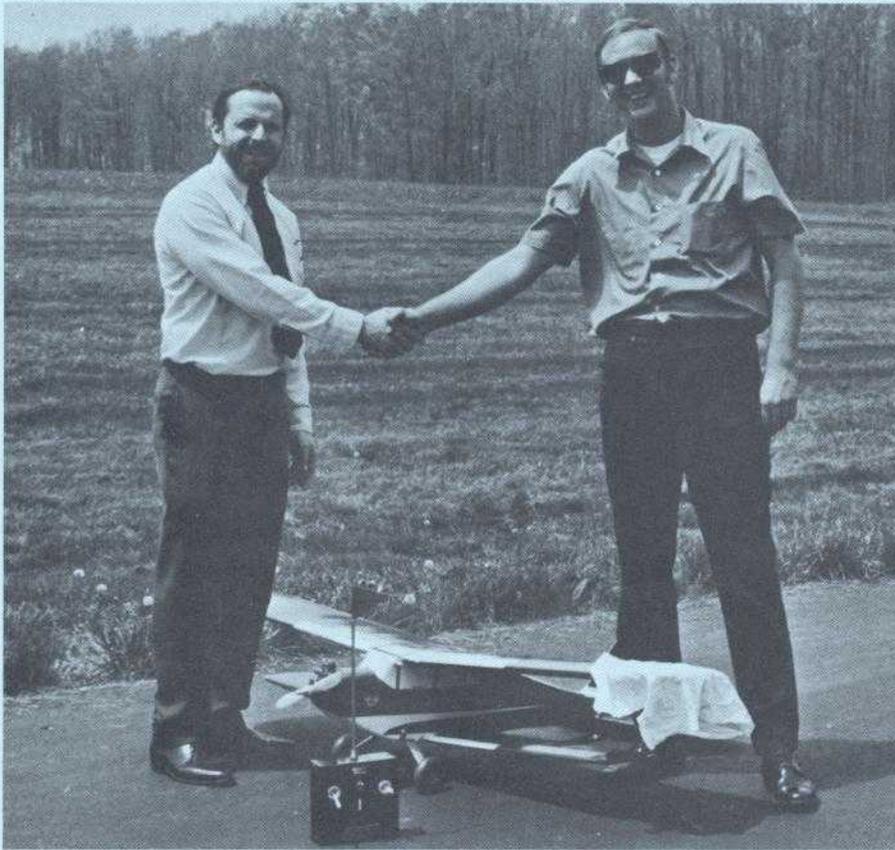
Also among our new parents at the Plaza is Roman Rollins of Finance. Roman is now the proud father of a baby boy born on March 5. Christopher Alan is the second child for the Rollins family.

On May 2, Fernando A. VanReigersburg addressed the graduating class of interpreters and translators at Georgetown University on "Career Opportunities in the Language Field". Mr. VanReigersberg, manager, language services department, INTELSTAT, is an alumnus of Georgetown University and has served with the U.S. Department of State.

I'm sure everyone has heard the moans and groans from the COMSAT girls' softball team, the "Tigerettes". Practice sessions have been under way for some time with all games being played on Thursday evenings at the Lincoln Memorial. Spectators are always welcome to attend the games. The team has 16 players: Ruth Adams, Vicki Araujo, Harriett Biddle, Lisa Cook, Roz Declue, Pat Dellar, Nancy Ebeltoft, Kitty Harbin, Carolyn Jones (co-captain), Linda Kortbawi, Lu Pete (co-captain), Bert Runfola, Jo Samuels, Evelyn Smith, Claudia Toy, and Dottie Young.

The team manager is Joyce Przelenski and the coach is John DeCaro.

■ Miss Quinn is a secretary in Finance.



Dr. Edelson (left) congratulates Bob Cool on the first flight of his radio controlled airplane.

Life at the Labs

By CAROL LOUTHAN

If you enjoy the clean smell of fresh cut grass, come on out to the Labs some afternoon. Our Interstate 70-S location always has the feel of Spring about it. It's a lovely place to work and it's a lovely place to see, but remember, someone has to keep it that way. "Hats off" to our ground crew who make our days more pleasant by providing us with such nice surroundings.

A belated congratulations to Ernie and Betty Jo (B.J.) Robertson on the birth of their son Kevin Arthur, who was born January 23, 1973.

Roger Taur and his wife Sharon also have a newcomer in the family.

■ Mrs. Louthan is a secretary at the COMSAT Laboratories.

Alan Shin-hwa was born on January 8, 1973, at Holy Cross Hospital in Silver Spring.

Very special congratulations to James Su who became a United States citizen on May 10.

The CAM Club (COMSAT Aero Modelers) held an official field dedication on May 1, 1973. Presiding over the dedication were Assistant Vice President and Acting Director of the Laboratories Dr. B. I. Edelson. Ceremonies included the first flight of a radio controlled airplane, operated by CAM Club President Bob Cool.

The Club was originally established in November 1972 by a group of active aero modelers as a way of furthering their construction skills, technical proficiency, and enjoyment of building and flying model airplanes.

The 1973 COMSAT Labs Slow Pitch Softball League officially began on Monday, May 7. The opening game

saw Blaine Shatzer's team defeating the team captained by Hank Mueller. Wednesday, May 9, paired Bill Windell's sluggers against Bill Burch's drafting team. After an extra inning, Bill Windell's defending champs came out on top. The season's early yet and anything can happen, so stay tuned for further details.

Congratulations to the Wombats, winner of COMSAT's first bowling league. Captained by Hank Mueller, team members included Denise and Paul Lucas, Helen Caviston, and Paul Fleming. A special note of congratulations to Hank on his fine 213 game in the roll offs. After 35 nights of bowling, he finally got that 200 game, and what a very important night to do so. Second place in the league was won by the Eightballs.

5 year awards

The following personnel received five year service awards during May and June.

Administrative Services: Odell Whitmore and Johnnie E. Wiggins.

Cayey: Jose M. Carriles, Elnren V. Castro, Frank J. Falmar, Efrain Flores-Santos, John J. Gonzalez, Otto R. Irizarry-Muniz, Luis G. Maldonado-Ramas, Paul J. McGranahan, Luis Medina-Santos, and Juan Sierra.

COMSAT General: Thomas Gabriszeski.

Etam: Deloris F. Goodwin.

Finance: Ranjit L. Chauhan and Carolyn V. Dredge.

General Counsel: Elizabeth S. Garrison.

International System Division: Robert F. Camann, John T. Melville, and Jeremy F. Parker.

Jamesburg: M. Lee Dorsey, Albert F. Eleshio, and Wilfred S. Nubin.

Laboratories: Bela A. Banyasz, Harold E. Ford, Raymond H. Lanier, Henry J. Meyerhoff, Norman P. Miller, Ronald Price, Paul C. Redman, Carl H. Schmitt, Blaine T. Shatzer, John V. Sickel, Fredrick A. Smith, and Henri G. Suyderhoud.

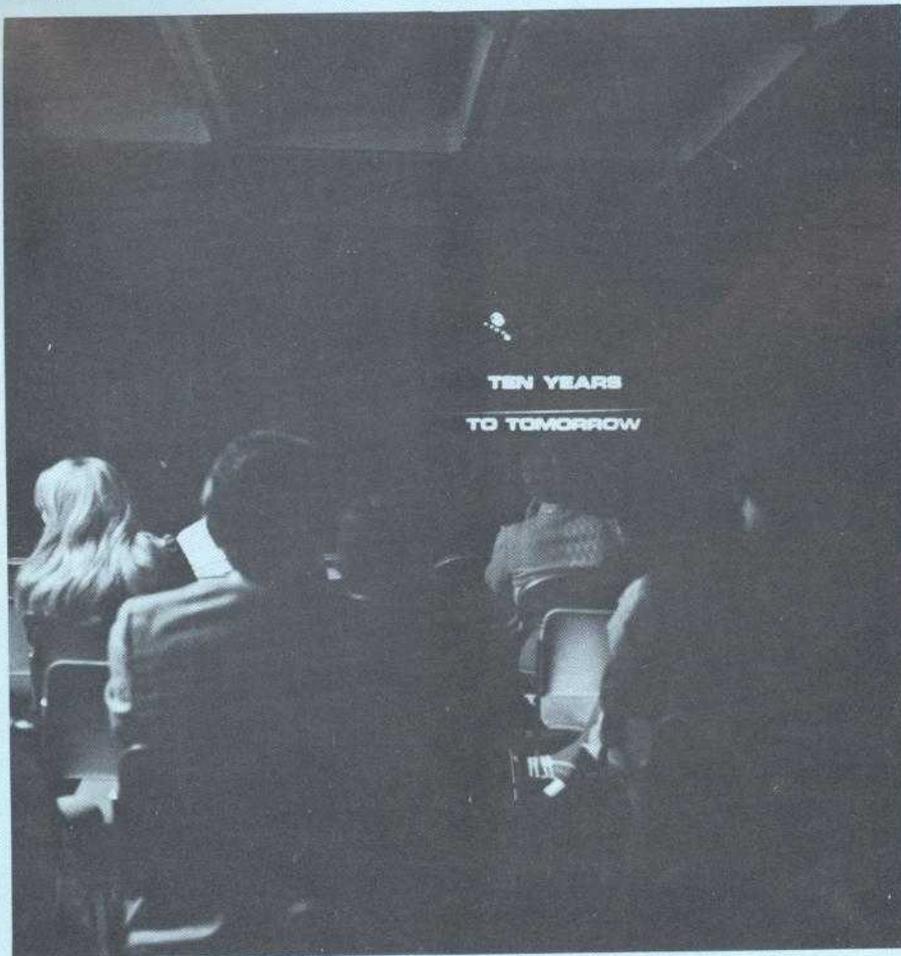
Paumalu: Jeffrey L. Gnass and Kent Hunter.



Joe and Chris Speek combine their reception with the JCEA party.



Newlyweds Robbie and Jean Robinson enjoy the JCEA party.



New film shown to employees

PHOTO BY ALLAN GALFUND

COMSAT's newest film, *Ten Years To Tomorrow*, was recently shown to all interested Headquarters employees. The 26½-minute color film is a documentary which demonstrates, through sight and sound, the importance of modern communications to a developing country as well as the world.

News and notes from Jamesburg

By M. LEE DORSEY

The JCEA held its first quarterly party of 1973 at the Carmel Valley Community Center on April 7. This was a dual function in that the early part of the evening was devoted to a wedding reception for senior technician Joseph O. Speek and the former Grete "Chris" Hawkins. Facilities engineer Walter D. "Robbie" Robinson also announced at the party that he and the former Jean Ohlemacher were married the previous weekend. Congratulations to both couples!

Senior technician Donald J. Tucker was transferred in May to Headquarters. Don has become an operations coordinator in IOC. Our very best to you Don!

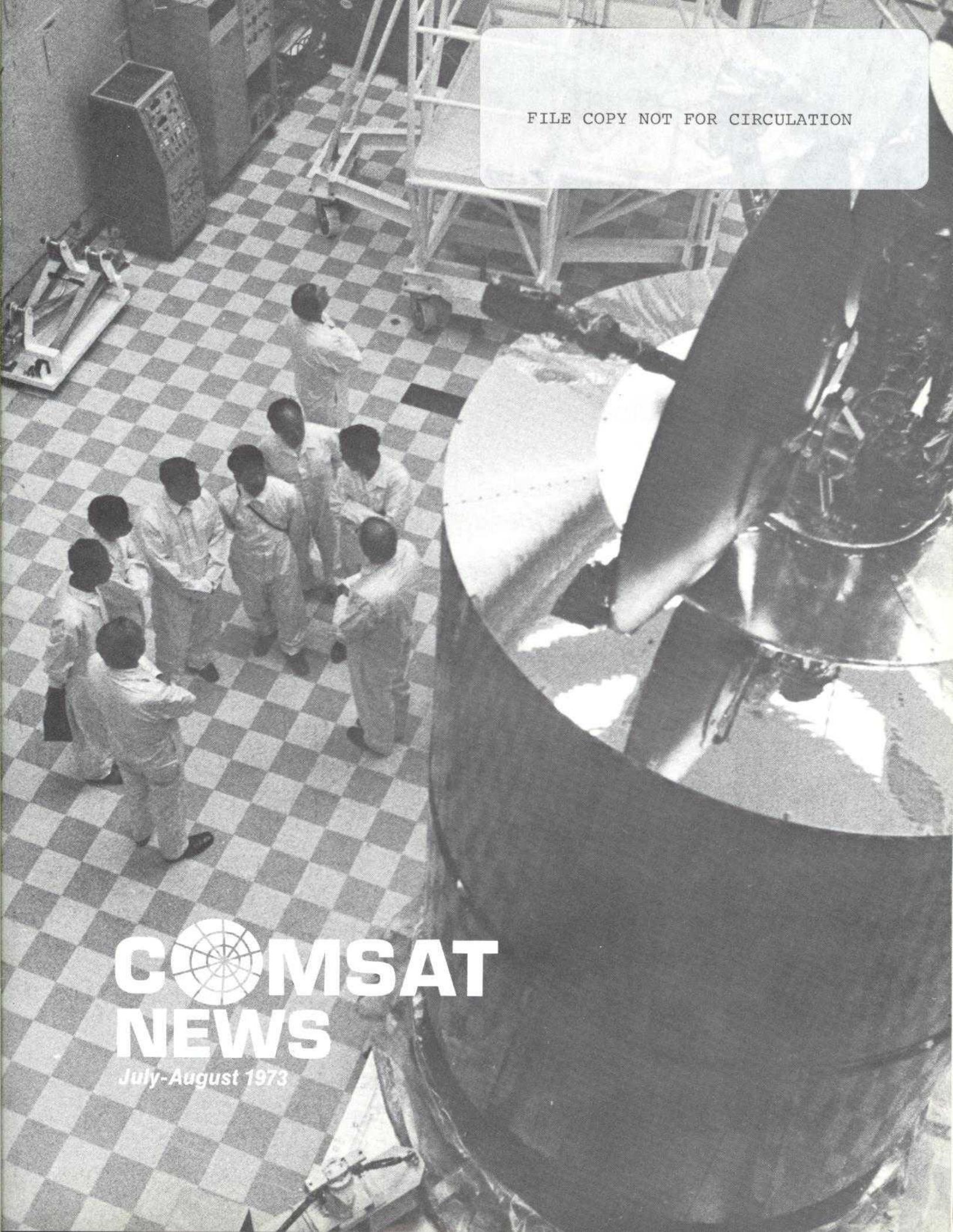
A warm welcome to Bill Hamilton and his family. Bill joins us this month from Andover and will be one of our senior technicians. We hope the Hamiltons enjoy our beautiful Monterey Peninsula and Carmel Valley.

Station engineer Michael J. Downey resigned in the middle of May. He has accepted a position with the American Satellite Corporation in Germantown, Md. We, at Jamesburg, wish him the best of luck.

From kindergarten to college—it is really worth noting when a family has a youngster graduating from kindergarten, one from high school, and one from college all in the same month! Just ask electronics engineer Jack Inman about it. He is the proud father of the three graduates in the Inman family.

■ Mrs. Dorsey is finance-personnel clerk at the Jamesburg Earth Station.

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COMSAT
NEWS

July-August 1973

COMSAT NEWS

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On the cover

The seven-man study group from the People's Republic of China who were guests of COMSAT views INTELSAT IV, F-7 as it is being prepared for its forthcoming launch during their recent visit to Cape Kennedy. For additional details of their trip see page 1. *Photo by Allan Galfund.*

July-August 1973—8th Year, No. 4

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**Matthew Gordon, Assistant Vice
President for Public Information**

James H. Kilcoyne, Jr., Editor



COMSAT Senior Vice President George P. Sampson (with glasses) and Marketing Director George A. Lawler greet the study team members.

People's Republic of China study group visits COMSAT for satellite discussions

A satellite communications study group from the People's Republic of China were recent guests of COMSAT.

The seven-member study group, headed by Liu Yuan, Vice Director of the Peking Administration of Long-Distance Telecommunications, arrived in Washington on July 9.

The other six members were Jen Shou-Hu, leading member of the Peking Earth Station; Wu Hsueh-Tsai, engineer of the Peking Administration of Long-Distance Telecommunications; Shou Keng-Ju, ground communication system technician of the Shanghai Earth Station; Yang Yu-Feng, technician of the Peking Administration of Long-Distance Telecommunications in charge of circuit regulation and tariffs; Li Fu-Fa, ground communication system technician of the Peking Administration of Long-Distance Telecommunications; and Tang Wei-Min, Assistant of Serv-

ices and Interpreter of the Peking Administration of Long-Distance Telecommunications.

During their five day stay in Washington, the study group met regularly with COMSAT officials at L'Enfant Plaza and the Labs for in-depth discussions on various operational and technical aspects of communication satellite services.

Also included in their busy itinerary were many of the things that all tourists do when they visit the Nation's Capital. Escorted sightseeing tours to the White House and the Capitol, a visit to the Zoo, a musical at the Kennedy Center and even a boat ride down the Potomac occupied the group's leisure hours.

On July 14, the study group flew to Florida, toured Cape Kennedy, took a quick look at Disney World and, on July 15, flew to New York City.

The following morning featured a trip to the United Nations and a three-hour tour of the city.

After visiting with common carrier representatives, the study group jetted to California where they visited the Jamesburg Earth Station and COMSAT's West Coast Technical Project Office.

Following a weekend flight to Hawaii, July 23 was spent touring the Paumalu Earth Station. The following afternoon saw the group depart for Hong Kong and home.

Many COMSAT employees contributed to the success of the study group's visit. Senior Vice President George P. Sampson was instrumental in arranging the numerous details of the project. He was ably assisted by Marketing Director George A. Lawler. Dr. Herbert H. Chu and Susanna Wong served as interpreters. Senior Information Officer Allan W. Galfund worked long and hard as he photographically recorded the visit while Senior Information Officer Larry G. Hastings arranged the many details of the Cape Kennedy tour.



COMSAT President Dr. J. V. Charyk welcomes the study group leader, Mr. Liu.



Washington to Peking, via satellite.

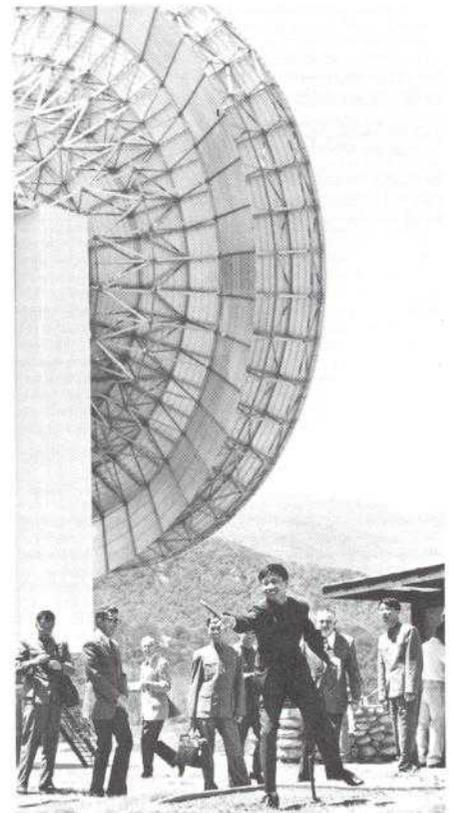


H. William Wood recommends an old American favorite, the hot dog.



Group members are briefed on launch techniques during their visit at the Cape.

PHOTOS BY ALLAN GALFUND



The Jamesburg Earth Station hosts a game of horseshoes.



Mr. Astrain

Chile's Astrain named INTELSAT Secretary General

Santiago Astrain Castro was recently appointed as the Secretary General of INTELSAT by the Board of Governors.

In this capacity, he will be the legal representative of INTELSAT and will head its executive organ. As Secretary General, he will be responsible to the Board of Governors for the performance of management services other than those relating to the technical and operational management services which will continue to be performed by COMSAT under a contract with INTELSAT.

Mr. Astrain comes from the International Bank for Reconstruction and Development where he had been serving as Chief of the Power Section for Latin America and the Caribbean.

Previously he had been the Dele-

gate of Chile to the Plenipotentiary Conferences on Definitive Arrangements for INTELSAT which were held in Washington, D. C. in 1969, 1970, and 1971, and served as the Chairman of the Intersessional Working Group established by the 1970 Conference which prepared the draft Definitive Agreements that were subsequently opened for signature on August 20, 1971 and entered into force on February 12, 1973.

He also had been the Delegate of Chile to the Conference on the exploration and Peaceful Uses of Outer Space, held in Vienna, Austria, in 1968.

Mr. Astrain had a long and distinguished career with the National Electric Power Corporation, Ltd., Chile (ENDESA) which began in 1942 and included such positions as Chief of the Electrical Engineering Section, Chief of the New York Office, and Deputy Manager-Secretary General.

In 1964, Mr. Astrain participated in the organization and establishment of a new telecommunications subsidiary of Production Development Corporation, the parent organization of ENDESA. The new subsidiary became known as ENTEL-CHILE and the following year he was appointed its first General Manager. ENTEL built and placed into service in July 1968 the first satellite communications earth station in Latin America at Longovilo, near Santiago.

Among his many other activities, Mr. Astrain has been a member of the Board of Directors (one year as Chairman) of CALICANTO Savings and Loan Association, a member of the Board of Directors (two years as Chairman) of the Chilean Engineering Institute, a member of the Board of Directors of ENDESA, a member of the Board of Directors of the Chilean Telephone Company, a member of the Rate Committee responsible for setting rates charged by Chilean public utilities, and a member of the Board of Directors of the Pedro de Valdivia Insurance Company.

He is a recipient of the Marcos Orrego Puelma and Eliodoro Gormaz awards for academic achievement at the University of Chile.

Mr. Astrain, his wife and their daughter reside in McLean, Virginia.

Net income up, second quarter dividend increased

COMSAT reported net income of \$8,157,000 or 82 cents per share for the second quarter of 1973, compared with \$6,070,000 or 61 cents per share for the second quarter of last year.

For the first six months of 1973 net income amounted to \$15,223,000 or \$1.52 per share, compared with \$12,566,000 or \$1.26 per share for the first six months of last year.

The second quarter and first six months net income for this year were the highest in the Corporation's history, largely resulting from a gain in the number of full-time commercial half circuits leased by COMSAT to its customers. The number of full-time half circuits leased as of June 30, 1973, totaled 3,320, compared with 2,620 leased at the same time a year ago.

Net operating income for the second quarter of this year was \$6,789,000 or 68 cents per share, compared with \$4,886,000 or 49 cents per share for the second quarter of last year. For the first six months of this year, net operating income amounted to \$12,466,000 or \$1.25 per share, compared with \$9,892,000 or 99 cents per share for the first six months of last year.

Operating expenses, including income taxes, for the second quarter were \$22,011,000 and \$43,436,000 for the first six months, compared with \$20,732,000 for the second quarter of last year and \$40,966,000 for the first six months of last year.

The COMSAT Board of Directors, at its monthly meeting on July 20, increased the quarterly dividend from 14 cents per share to 17 cents per share. The dividend, COMSAT's 12th consecutive quarterly payment, is payable on September 10 to shareholders of record as of the close of business on August 10. At the new rate, the Corporation's total dividends in 1973 would be the maximum permitted to the Corporation in 1973 by President Nixon's Committee on Interest and Dividends.



Mr. Alegrett

Board of Governors elects Jose Alegrett

Jose Alegrett of Venezuela was elected Vice-Chairman of the Board of Governors of INTELSAT at the third meeting of the Board which concluded in Washington on July 19. He succeeds Mr. Bernhard Seidel of the Federal Republic of Germany who resigned. Mr. Ernst Eliassen of Canada is the Chairman of the INTELSAT Board of Governors.

Under the definitive Agreements which entered into force on February 12, the Board of Governors succeeds the Interim Communications Satellite Committee which had served as the policy making body of INTELSAT under the interim Agreements since August 1964.

Mr. Alegrett has been a member of the INTELSAT governing body since 1966, representing Venezuela, Colombia and Chile. He also represented Venezuela during the negotiation of the INTELSAT definitive Agreements in 1969, 1970 and 1971.

Mr. Alegrett is a counselor at the Venezuelan Embassy in Washington.

SPEC field tests begin at two earth stations

The Brewster and Paumalu Earth Stations have been selected as the locations for the field tests of COMSAT's newly developed Speech Predictive Encoding Communications System (SPEC). These tests began August 13 and are scheduled to last for three weeks.

SPEC, developed in the Communications Processing Lab of the COMSAT Laboratories, is designed to handle 64 PCM telephone trunks in a capacity of 32 PCM channels. Redundant speech samples are removed at the transmitter, during talk bursts and silent intervals, by examining incoming telephone trunks every 125 μ sec to determine which samples must be transmitted and which are redundant. The SPEC system also avoids speech clipping effects by properly organizing the transmission of digital bit streams at a high rate and by predicting redundant speech samples at the receiver.

Technical objectives of the West Coast field tests are scheduled to be completed within three weeks after testing begins, but may be extended for additional demonstrations. The major purpose of the field tests is to show that SPEC can accommodate 64 PCM telephone trunks in a capacity of 32 PCM channels without any significant degradation in the received voice signals and that this objective can be met in the actual telephony environment.

In addition to on-site evaluation, a four-wire line between the Brewster Earth Station and the Labs will allow conversation via satellite over the system with personnel at the Paumalu station. Users will evaluate the system on a category judgment (excellent, good, fair, etc.) basis.

Upon successful completion of the field tests, SPEC will be considered for introduction into both terrestrial and satellite networks.

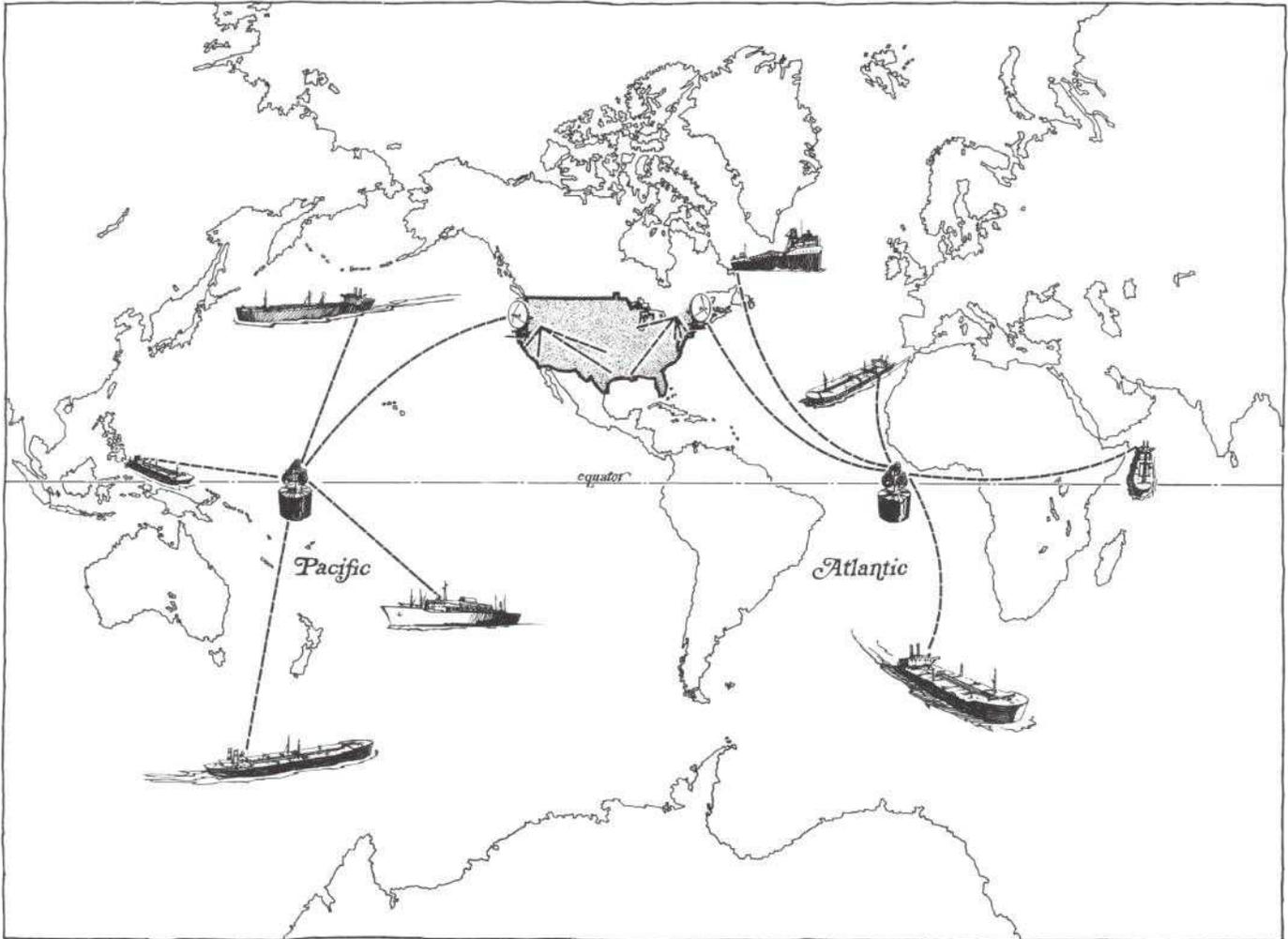


Mr. Colino

Colino named U.S. Governor to INTELSAT

Richard R. Colino, Assistant Vice President—International Affairs, International System Division, has been named as COMSAT's permanent representative on the INTELSAT Board of Governors. As the new Governor, Mr. Colino succeeds John A. Johnson, Senior Vice President of COMSAT and President of COMSAT General Corporation, who has represented the Corporation since the first INTELSAT meeting in 1964.

Mr. Colino has been with the Corporation since 1965, serving successively as Director of the INTELSAT Affairs Division, first Director of the European Office, Assistant Vice President—International, and since February of this year in his present position. He has served as Alternate U.S. Representative to the ICSC from December 1965 until February 1973 and as Alternate Governor to the INTELSAT Board of Governors from February 1973 to the present.



An artist's rendering depicts the proposed Navy/Maritime system.

COMSAT General asks for proposals to construct earth station facilities

COMSAT General Corporation, a wholly owned subsidiary of COMSAT, has asked for proposals from industry for construction of earth station facilities on the east and west coasts to serve the Navy/Maritime satellite program, and to provide technical support services for the satellites to be leased to American Telephone and Telegraph Company.

The Requests for Proposals (RFPs) were issued by COMSAT General in early July.

The station sites for these new terminal facilities are at Southbury, Conn., about 60 miles northeast of New York City and at Santa Paula, Calif., about 50 miles northwest of Los Angeles.

The RFPs sent to a list of potential suppliers seek construction at each

site of two 42-foot diameter antennas, one 32-foot diameter antenna, related electronic equipment, roads and other civil works, and a 4,000-square-foot central control building.

The facilities will be used to provide tracking, telemetry and command of satellites, both in transfer and synchronous orbits, to provide communications monitoring capabilities, as well as maritime communications. (AT&T plans to construct its own earth stations for communications traffic).

Responses by suppliers to the RFPs are due to be submitted to COMSAT General this month; they will be evaluated and contract awards made at a later date.

COMSAT earlier announced the award of a \$40 million contract to

Hughes Aircraft Company for the spacecraft for the Navy/Maritime system. Applications for the Navy/Maritime program, as well as for the satellites to be leased to AT&T, are pending before the Federal Communications Commission (FCC).

Meanwhile amendments to the original applications for the Navy/Maritime system have been filed with the FCC to allow for participation and co-ownership in the program by other carriers. Three carriers, RCA Global Communications, Inc., ITT World Communications, Inc., and Western Union International, Inc., have expressed an interest in participating in the program to the extent of a total of approximately 20 percent. Carriers authorized by the FCC to become joint owners will assume with COMSAT General all costs and business risks in proportion to their allocated investment shares. A decision on all remaining issues in the case is pending before the Commission.



COMSAT President Dr. Joseph V. Charyk (left), Project Hope President Dr. William B. Walsh, and the Labs' Joseph Campanella (seated) discuss a printout sent from the *S.S. Hope*.

Final series of demonstrations completes successful Project Hope-COMSAT program

Early this year COMSAT and Project Hope, The People-to-People Health Foundation, entered into an agreement which provided for the installation of a small, parabolic antenna and a transmit-receive satellite terminal aboard the *S. S. Hope*. The purpose of the agreement was to permit a series of medical experiments, utilizing an Atlantic INTELSAT IV satellite, in assessing the impact of reliable long-distance communications with medical teams in remote areas.

The *S. S. Hope*, fitted out with a small 8-foot diameter antenna on its upper deck, sailed from Baltimore, Md., and arrived in Maceio, capital of Alagoas, Brazil, last February.

Since then, the experiment has successfully utilized not only the INTELSAT satellite system but a Tele-

serv electrocardiogram unit, a Xerox 400 telecopier, an RCA slow-scan TV, as well as normal voice and teleprinted communications, all of which were available for daily use between the ship and Project Hope headquarters in downtown Washington, D. C.

This satellite link proved that this new mode of communications using small, easily installed antennas in remote locations permitted immediate transmission of voice, facsimile, data, teletype, and high resolution slow-scan television.

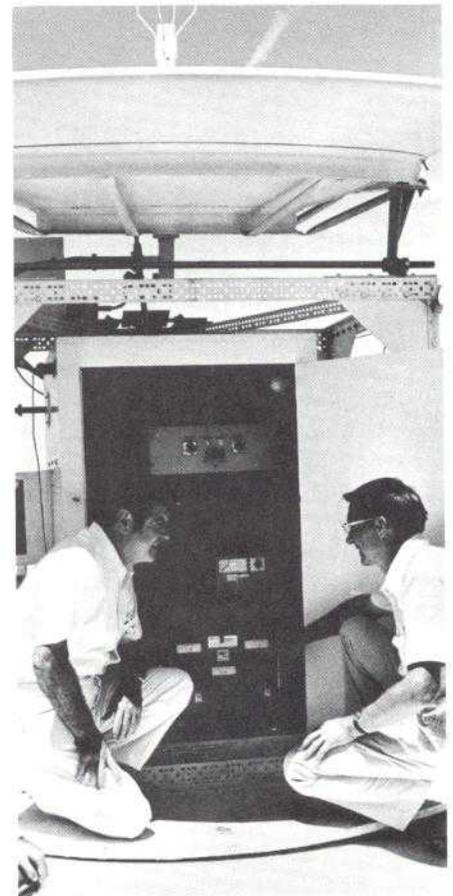
On June 21, a special program concluded the experiment as invited guests from the medical world, Capitol Hill, and the media gathered at COMSAT headquarters in Washington, D. C., to examine the results of the past months' efforts.

The program reviewed four major areas:

- Teaching,
- Consulting,
- Support of remote health care facilities, and
- Administration.

Transmissions from the *Hope* included a medical lecture, a patient's breathing sounds, X-rays, an electrocardiogram, and orders for medical supplies.

In his closing remarks that day, Dr. William B. Walsh, founder and President of Project Hope, in referring to the future of such programs said, "there is no greater problem than public health education, both abroad and at home. Overpopulation, malnutrition, and the constant spread of communicable disease are most frequently the result of ignorance. The communications satellite can be utilized, in our opinion, far more cheaply and more effectively than a massive television education system."



COMSAT project manager Kim Kaiser (right) discusses the shipboard antenna with Dr. Walsh.



INTELSAT III displayed at Smithsonian

PHOTO BY J. T. MCKENNA

COMSAT's Bill Barr (left), Gordon Johnson (center), and Louis Purnell of the National Air and Space Museum place the INTELSAT III, EM-1 engineering model on display in the Smithsonian Institution's Air and Space Museum. This is the third such satellite now on display at the Museum.

Highlights of Board of Governors' third meeting

The third meeting of the INTELSAT Board of Governors was held from July 11 to July 19, 1973, in Washington, D. C. Twenty Governors representing a total of 55 of the 83 Signatories were present.

Among its major actions, the Board:

- Unanimously appointed Mr. Santiago Astrain, the nominee of the Chilean Signatory, Secretary General for INTELSAT. It is expected that Mr. Astrain will assume office on about September 1, 1973.

- Unanimously elected Mr. Jose Alegrett, Governor for Venezuela-Colombia-Chile, Vice-Chairman to fill the remainder of the term of Mr. Seidel of Germany. Mr. Seidel has resigned due to illness in his family.

- Approved an outline contract presented by the Special Committee on the Management Services Contract as a basis for negotiation with COMSAT.

- Authorized the Special Committee to negotiate a draft contract with COMSAT.

- Noted that the Special Committee on Preparation of INTELSAT Headquarters, chaired by the U.S. Governor, had exercised the authority granted to it at the second Board meeting and approved the five-year lease and architect-engineer drawings.

- Authorized, on the recommendation of the Manager and the Advisory Committee on Technical Matters, an interchange as soon as possible of Atlantic Primary and Major Path traffic between the INTELSAT IV, F-2 and IV, F-3 spacecraft. Immediately following the transfer of traffic, the INTELSAT IV, F-2 will be drifted to the Atlantic spare position of 340.5° East longitude.

- Decided to proceed as soon as possible with the INTELSAT IV, F-7 launch if the tests confirm that the satellite will not experience the receiver gain degradation of the INTELSAT IV spacecraft in orbit.

- Approved an addition to the 1973 budget of \$65,000 for in-house work for the design, development, and testing of an engineering model of an adaptive polarization compensating system for earth stations. The Board also approved a \$30,000 increase for additional cross polarization measurements at the COMSAT Laboratories under the 1973 program.

- Granted initial access to INTELSAT IV satellites to the Cambita (Dominican Republic), Sintra (Portugal), Boane (Mozambique) and Cacucio (Angola) standard earth stations. The Board granted formal approval to the Deh Mandro (Pakistan) standard station to operate with INTELSAT IV satellites.

- Scheduled the next meeting of the Board of Governors for September 5 to 12 in Washington, D. C.

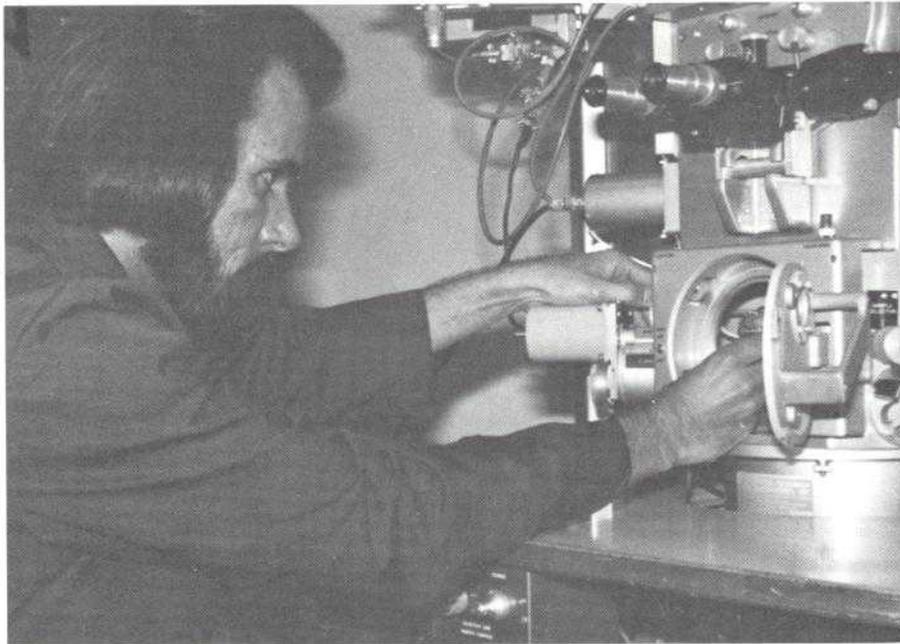
Contracts awarded for nickel-hydrogen cells

INTELSAT has awarded contracts to the Energy Research Corporation, Bethel, Connecticut, and Eagle-Picher Industries, Inc., Joplin, Missouri, for the development of nickel-hydrogen cells.

The nine-month contracts, in the fixed price amounts of \$85,000 and \$70,000 respectively, provide for the design, evaluation, fabrication, testing and delivery of the nickel-hydrogen cells.

COMSAT at 10

Personal copies of *COMSAT at 10*, a publication commemorating the first decade of COMSAT have been allocated for distribution to all employees. They bear the name of each employee stamped in gold on the cover. In an accompanying note, Dr. Charyk comments that he hopes "this pictorial review will bring to mind some of the memorable events of our first 10 years."



John Hannsen places a sample in the electron probe.

PHOTOS BY J. T. McKENNA

A uniquely versatile instrument; the electron probe microanalyzer

By T. D. KIRKENDALL

In the past 10 years or so, the methods of materials analysis have shown revolutionary changes. New techniques have been developed and rapidly adopted to yield a concomitant expansion of capabilities. This is particularly true of the microanalytical techniques used to measure low concentrations of elements in small quantities of "sample," where much of the impetus has come from the development of solid state devices and miniaturization of electronic components. Consequently, "wet" chemical analysis has literally been displaced to an obscure corner of the fume hood by the growing sphere of instrumental chemical analysis because instrumental methods are faster, more accurate and frequently the only way to obtain an answer.

One of the most sophisticated of these new analytical instruments is the electron probe microanalyzer, such as the one which forms the backbone of the materials analysis capabilities at COMSAT Laboratories. Plans to es-

■ *Mr. Kirkendall is a member of the technical staff, Applied Sciences Division, COMSAT Labs.*

tablish the analytical laboratory were formulated five years ago by Dr. Peter F. Váradi, and were defined and finalized when I arrived a year later. The electron probe, built to COMSAT specifications by the Applied Research Laboratories, Sunland, California, was installed in 1971. Since that time, technical specialist John C. Hannsen has diligently applied his varied talents to the operation and maintenance of the probe laboratory.

The applications of the combination electron probe-scanning electron microscope, in its two years at the Laboratories, have touched on many areas of R&D, engineering, and failure analysis that involve materials performance considerations. Some results of an in-depth characterization of a solid state device were published in the article, "Physical and Chemical Analysis of Germanium Tunnel Diodes," which appeared in the Spring 1973 issue of the *COMSAT Technical Review*.

A short description of the varied functions of the electron probe will emphasize its capabilities. It is a

uniquely versatile instrument with several modes of operation which make it an excellent choice for the wide range of needs in materials characterization at COMSAT.

In the operation of an electron probe, a high voltage electron beam (up to 30,000 volts) is focused on a sample so that the material produces characteristic X-rays for each constituent element. By identifying the wavelength and intensity of the fluorescent X-rays, one may determine the elements in that spot on the sample as well as the concentration of each. This method may be used to qualitatively and quantitatively analyze all elements above beryllium (which has an atomic number of four) in the periodic chart in areas as small as a micrometer in diameter ($1 \mu\text{m} = 0.00004$ inch). Quantitative measurements can be made at elemental concentrations as low as 10 to 100 parts per million (1 part per million = 0.0001 percent), and if three analytical determinations are made, accuracy is typically within 5 percent relative for a standard deviation of 2σ .



Tom Kirkendall prepares a sample to be analyzed.

Measurements of the X-ray fluorescence of the sample are accomplished with two wavelength dispersive X-ray spectrometers equipped with four crystals of different interplanar spacings for Bragg diffraction over the X-ray wavelength range of 1 to 92 Angstroms. A qualitative analysis is performed by scanning the spectrometers to determine the wavelength of all the fluorescent X-rays. A quantitative analysis is made by positioning a spectrometer to selectively analyze a narrow wavelength region which contains the X-ray photons generated by only one element. These photons are counted over a 10- to 30-second time interval and later related to similar measurements on standard samples of known concentrations. An extensive computer program is used to make the quantitative calculations, and at the same time to correct for electron backscatter (a function of average atomic number) and interelement effects such as X-ray fluorescence and absorption.

Another major capability of the probe is distributional analysis of individual elements. If a spectrometer is positioned to sample only one element while the electron beam is swept on the sample surface in a raster fashion (in the same manner as the scanning beam in a TV camera), the probe will display the spatial distribution of that one element. In this mode of analysis, the elemental distribution is viewed on a CRT (cathode ray tube) by modulating the gun (Z axis) with the pulsing signal from the X-ray spectrometer while the X and Y positioning of the spot on the CRT is synchronized with an analogous position of the electron beam striking the sample.

In this beam sweeping mode, the largest area of a sample that can be "viewed" by the electron beam is about a millimeter square. Since this area is typically expanded to cover an area about 10 centimeters square on the CRT, the sample is electronically magnified 100 times. This is the minimum practical magnification of the instrument; higher magnifications are achieved simply by decreasing the size of the raster that the electron beam scans on the sample. This maximum magnification is of the order of 20,000 times, the limit being

set by the size of the area of the sample from which the signal appears to originate. This area is a function of parameters such as probe spot diameter, astigmatism, electron scatter in the sample and secondary X-ray fluorescence.

The generation of X-ray fluorescence is only one physical phenomenon caused by the interaction of the electron beam with the sample surface. Another important and useful result is the generation of low energy secondary electrons. These electrons may be collected by a scintillator-photomultiplier system, amplified, and then used to produce a quasi-optical picture of the sample on the CRT by the use of synchronized raster scanning. This is the familiar scanning electron microscope function which is so useful in obtaining scanning electron microscope (SEM) images with high resolution and large magnification with an incomparable impression of depth in the image. Other signals, such as those produced by high energy, backscattered electrons, and sample current may be imaged to yield additional information about a specimen. Such versatility in one instrument allows the analyst to use several different approaches to fully characterize a sample. Additional flexibility and capability have been gained by interfacing the probe to a small laboratory computer which monitors and controls the sample position, X-ray spectrometers, timer, scalars and electron beam position.

Figure 1 shows a SE (secondary electron) image of a tunnel diode similar to those used as amplifiers in the front end of the INTELSAT IV transponders operating at 4- and 6-

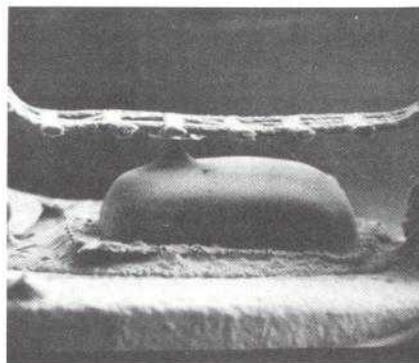


Figure 1. SE image of a tunnel diode magnified approximately 200 times.

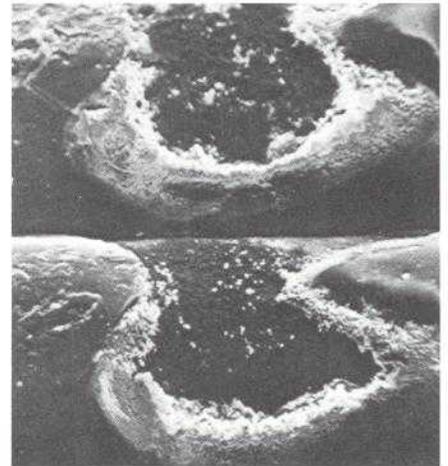


Figure 2. SE image of insulation breakdown in an RET transformer magnified approximately 50 times.

GHz. One can appreciate the miniature, actually micro, size of this device by comparing the grid which makes contact to the flattened tin ball above the n-p junction to something of a known size. For instance, one wire in the grid is about equal to one tenth the size of a human hair. The area at the region of the junction is no larger.

In addition to the tunnel diode, other components used on the INTELSAT IV satellites have been examined and analyzed in the probe, e.g., the tungsten carbide valve seats and poppets, particles of debris from the bearing and power transfer assembly, nickel-cadmium battery plates and feedthroughs, and tantalum capacitors.

In the Reliable Earth Terminal (RET) program, the probe was applied to determine the failure mechanism of an inverter transformer. Insufficient penetration of potting into the interior windings of the transformer resulted in the breakdown of the insulation on the secondary windings when put under voltage stress, as shown in Figure 2.

Parts made of Invar, an alloy of 64 percent iron and 36 percent nickel, which is widely used in fabricating microwave filters because of its near-zero thermal coefficient of expansion, have been in the microprobe several times. The results of one study supported the efforts to use silver-copper brazing techniques to assemble filters, simplifying fabrication, reducing

weight and minimizing machining time. Figure 3 is interesting in that it shows the grain structure of the Invar and the slight migration of the braze material along the grain boundaries at the edges of the one-mil thick braze fillet.

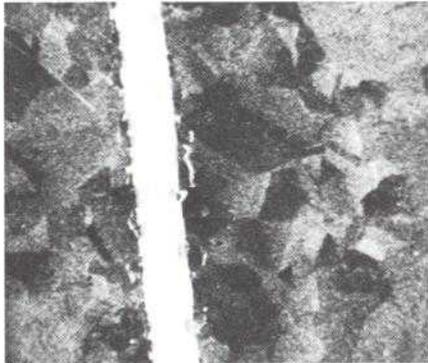


Figure 3. SE image of Invar filter magnified approximately 166 times.

A recent article in the *COMSAT News* provided up-to-date information on microwave integrated circuit (MIC) technology and the developmental efforts at the Laboratories. Part of that continuing program is the evaluation of the advantages of using ion deposition and etching techniques to fabricate the MICs. Figure 4 shows an area at the edge of a 0.5-mil thick copper line on a ceramic substrate which was exposed by ion etching. Although the plating appears rough, this characteristic is typical of all objects at this high magnification, and the edge definition of the line is good. The fractured surface of the ceramic can be seen to fall off in the lower right-hand corner of the image.

There are numerous other and interesting examples of analyses being performed at the Laboratories by this marvelous analytical tool, and each

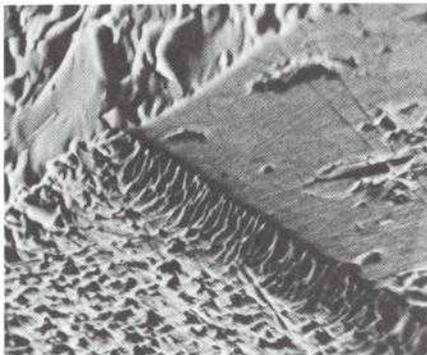


Figure 4. SE image of an MIC copper line magnified 1000 times.



Ten-year service awards selected

PHOTO BY J. T. McKENNA

Administrative Services' Laura Weber admires the newly-selected awards for COMSAT employees who have completed 10 years of service. Each employee will choose a desk clock, a silver serving tray, or a set of cut crystal glasses.

subject would be a report in itself. Such subjects would include solar cells, ATS-F transponder components, fuel cells, and welds, brazes and particles of contaminants from numerous sources.

Proven and potential applications of the electron probe microanalyzer in R&D, engineering and failure analysis are numerous. This facility, teamed with the complementary capabilities of X-ray fluorescence pulse height analysis, thermal gravimetric analysis, infrared spectroscopy, and wet chemical analysis, comprises the basic materials analysis potential of the Laboratories.

Lockheed to develop inertia simulator

INTELSAT has awarded a contract to Lockheed Missiles and Space Company, Inc., for the design, development, and testing of a flexible inertia simulator. The \$200,000 contract is to be completed within one year.

Recent studies indicate that future INTELSAT satellites could be body (rather than spin) stabilized with large flexible solar arrays and antennas extending from the main section of the satellite. This new simulator will study the pointing accuracy of these new designs.



Lt. General G. E. Pickett USA, Deputy Assistant Secretary of Defense (Management) places a SPADE call.

SPADE system demonstrated at AFCEA meeting

SPADE, the new communications transmission system that allows satellite circuit users access to the INTELSAT system on a demand basis was demonstrated at the 27th annual convention of the Armed Forces Communications and Electronics Association (AFCEA) held at the Sheraton Park Hotel in Washington, D. C. in early June.

The demonstration utilized a SPADE terminal located at the Etam, West Virginia Earth Station and an Atlantic INTELSAT IV satellite. By simply dialing the proper number, calls were completed to a series of overseas locations on an "as needed" basis. At the completion of each call, the circuit was immediately relinquished to the circuit pool and became available for calls to other destinations.

PHOTOS BY ALLAN GALFUND



The COMSAT exhibit drew overflow crowds during the convention.



Major General J. A. Albright USA, Commanding General U.S. Army Strategic Communications Command, receives a deck of "SPADE playing cards" from COMSAT hostess Jackie Sparrow.



Vasant Sawant (left) and John Jenkins review the Sri Lanka agreement.
PHOTO BY J. T. McKENNA

Technical assistance agreement to provide consultant services

BY JOHN B. C. JENKINS

COMSAT General Corporation recently signed an agreement with the Ministry of Posts and Telecommunications of the Government of Sri Lanka to provide consultant services for the construction of a new earth station and an international telephone switching center. In addition, the contract calls for COMSAT General to provide consultant services for the construction of a microwave link between the earth station and the center to be located in the capital city of Colombo.

Sri Lanka, which means "great and beautiful island" was formerly known as Ceylon. The island is about 270 miles long and 100 miles wide and lies near the southern tip of India, within a few degrees of the Equator. Tea, rubber and coconut are its major exports. Home of Bud-

■ *Mr. Jenkins is Manager, Projects Analysis Department, COMSAT General, and participated in the agreement negotiations.*

dhists, Christians, Hindus and Moslems, it is the crossroads to the East. Arthur C. Clarke, the popular and prolific science fiction writer has lived there for many years.

Sri Lanka is the 24th country to use COMSAT's expertise to help it enter the mainstream of international communications via satellite.

The scope of work to be provided Sri Lanka, under the terms of the agreement, comprises three major phases:

- Pre-construction including the preparation of specifications for all aspects of the earth station, microwave link, and the switching center,
- Project implementation including engineering supervision of construction activities in Sri Lanka and monitoring of in-plant equipment fabrication, and
- Installation and testing including on-site supervision and an evaluation of the complete earth station, microwave link and switching center.

To ensure that all conditions of the contract are met, COMSAT General has nominated a team of up to 14 men under the direction of Technical Advisory Department Manager Vasant N. Sawant. Included in this group are site evaluation experts, civil, mechanical, and structural engineers as well as switching and transmission specialists.

The agreement calls for COMSAT General to provide 27 man-months of services with approximately 20 man-months to be rendered on site.

The project, including the services of COMSAT General's Technical Services Division, is being financed by the Asian Development Bank; an earlier financial feasibility study was undertaken in 1970 under the auspices of the Bank. The award for consultant services was made after international competition among six companies.

Brezhnev visit on TV

The recent visit of Soviet party leader Leonid Brezhnev to the United States was widely televised throughout Europe and in the Soviet Union.

A 28-man Russian camera crew was on hand at Andrews Air Force Base, Md. to film Brezhnev's arrival and closely cooperated with NBC during his nine day visit. In fact, the American public watched the arrival ceremonies on video tape provided to the networks by their Russian colleagues.

The overseas telecasts were routed from the Etam, West Virginia Earth Station to the Raisting Earth Station in West Germany via an Atlantic INTELSAT IV, then over landlines to Moscow.

In Europe, both Intervision, the Communist bloc network, and Eurovision, the Western Europe network, used these Russian-provided satellite telecasts.

From June 18 (the day Mr. Brezhnev arrived) to June 24 (his departure date), the Russians transmitted a total of 16 hours and 52 minutes of TV via satellite.

COMSAT displays at National Urban League Conference

A display featuring the Corporation's role in today's global communications satellite system, and including proposed future domestic and maritime services, highlighted COMSAT's recently redesigned transportable exhibit at the 63rd National Urban League Conference at the Washington Hilton Hotel, July 22 to 25.

The National Urban League, founded in 1910, is committed to the elimination of poverty and racism. It is an inter-racial, non-profit, non-partisan organization which seeks to secure equal opportunities for black Americans and other minorities. Its conference, a national forum on race relations, is held annually.

Personnel's William B. Lockett was COMSAT's representative at the conference. There were approximately 200 displays from industry, government, and labor that attracted some 2,700 registered delegates to the four-day meeting.

More than 7,000 especially designed posters were distributed to those who visited the COMSAT exhibit.

Service center concept featured in *The Office*

The Office, a national publication devoted to improving management efficiency through the proper use of equipment and automation, discussed COMSAT's service center concept in a major article in its June issue.

The article emphasized that each center is tailored to the particular needs of the floor it serves, but in every case a center operator offers copying, mail-correspondence and supply distribution services to everyone on his floor.

Paul Eckley, COMSAT's assistant for reprographics, is prominently mentioned in the article as the originator of the three-way service center concept.



Many attendees visited the COMSAT exhibit during the conference.

PHOTOS BY J. T. McKENNA



Personnel's Nora Godfrey (left) gives a COMSAT poster to a visitor.



Bernie and Maude watch pre-launch data in the tracking center.

PHOTOS BY LARRY G. HASTINGS

NASA invites COMSAT's Bernie Coleman to witness second Skylab launch

BY LARRY G. HASTINGS

"Tourists to Dominate Space Shot Crowd" headlined *The Miami Herald* on the morning of the second Skylab launch.

This was a Saturday launch and at the height of the tourist season, so in spite of the early (7:00 a.m.) lift-off time, it was reasonable to expect a crush of spectators and autos in the Brevard County area.

There were two people visiting Cocoa Beach who were certainly excited at the prospect of witnessing the next-to-last Skylab launch and who would be up early to be a part of that crowd.

COMSAT's Aaron B. (Bernie) Coleman and his wife Maude were the guests of NASA's Manned Space Flight Awareness program. Companies participating in or supporting the manned launches were invited to send a representative to the launch

■ *Mr. Hastings is a COMSAT senior information officer and a veteran of many Cape Kennedy launches.*

as an honored guest. Bernie, a senior data technician in the International System Division, was chosen as the COMSAT representative.

The Colemans flew to Florida, checked in at their Cocoa Beach ocean-front motel, and registered with NASA. The planned schedule was a full one. On T-minus one, breakfast was followed by an air-conditioned bus ride out to Cape Kennedy. The morning was spent in seeing Atlas pads, Titan launch sites, and historic spots of earlier-manned launches, all familiar to Bernie and Maude from past TV and press accounts.

Then, the big thrill—the bus took them right up to Skylab Launch Pad 39A. There sat the huge Saturn rocket on its pedestal, fueled and ready to hurl Astronauts Bean, Garriott and Lousma up to rendezvous with the already-orbiting lab, some 270 miles overhead. Then, a look at the vast firing room where the launch would be controlled by almost 400

scientists, engineers, and technicians. A guided tour of the more-than-500-foot-tall vehicle assembly building (VAB), where Apollo, and now Skylab, launch vehicles have been assembled, followed. Already taking shape in the VAB was the Saturn rocket to be used for the third and final mission of this series.

Another bus ride to Cocoa Beach for lunch, and a detailed look at the Goddard Space Flight Center's tracking station completed the day's activities.

At 6:00 p.m. that evening, there was a closed reception for NASA guests and high-ranking space officials. Among those on hand was Apollo 17 Astronaut Ron Evans. Genial Ron dispensed his autograph to Bernie and Maude with a smile and a friendly remark. No sooner had they turned from Evans than more astronauts came in. General Tom Stafford of the Apollo 10 crew, Deke Slayton, who with Stafford will rendezvous with the U.S.S.R.'s Soyuz in 1975, and Karl G. Henize who will fly in the later Skylab mission, joined the party.

A little later on, there was a commotion at the door as "America's first man in space" Al Shepard came into the room. Now Admiral Shepard, he was immediately surrounded by a throng of men and women, thrusting pens, pencils, programs, brochures and napkins at him for his autograph.

And so it went for about two hours. Lots of celebrities, lots of people and lots of heat! Bernie and Maude, along with most of the throng, finally filed out into the relatively cool 86 degree, 90 per cent humidity of the Florida evening in search of some food and rest.

Next morning the uncivilized hour of 4:00 a.m. was heralded by the wake-up call from the motel operator. Get up any later and one might miss the bus, or perhaps catch the bus and miss breakfast.

Traffic was light all the way to the Cape. No jams, no row upon row of cars and campers near the south gate. The accuracy of *The Miami Herald's* crowd prediction might miss the mark by a wide margin.

Back across the Cape, the Colemans arrived at the VIP viewing site next to the tall VAB. The crowd



The Colemans visit the COMSAT display in the Visitors Center.

there was large, but no match in size when compared to the earlier manned launches. (Still, the media interest appeared to be lively as over 800 reporters, technicians, public information officers and others had been accredited by NASA officials to utilize the press site for the launch).

As the sun rose the early-morning fog dissipated to a light haze. A large, solid cloud bank hung over the Atlantic Ocean just off the Cape. The count-down proceeded without incident. At 7:11 a.m. EST the Saturn lifted from its pad, trailing a 300-foot, searing white and orange tail of flame. Bernie and Maude were awe-struck with the spectacle, and seconds after the lift-off heard the tremendous roar and felt the concussion of the blast even though they were about three miles from the pad. In spite of the overcast, the crowd was able to follow the accelerating white rocket for 40 seconds before it went behind the clouds. Twelve minutes later, the Colemans joined the other guests in cheering the announcement that Skylab II had achieved orbit.

After the launch as the bus moved back off the Cape, the couple talked about the history-in-making that they had just witnessed and, between sen-

tences, reflected on their feelings within themselves.

"What I was particularly aware of," Bernie said later, "was the way that these thousands of applications of advanced technology had been drawn together so successfully to enable this complicated launch to take place exactly at the programmed hour, minute and second." Maude's comment was that she was not only overwhelmed at the spectacle of the launch but "that I was present and witnessing in person a piece of history in the making."

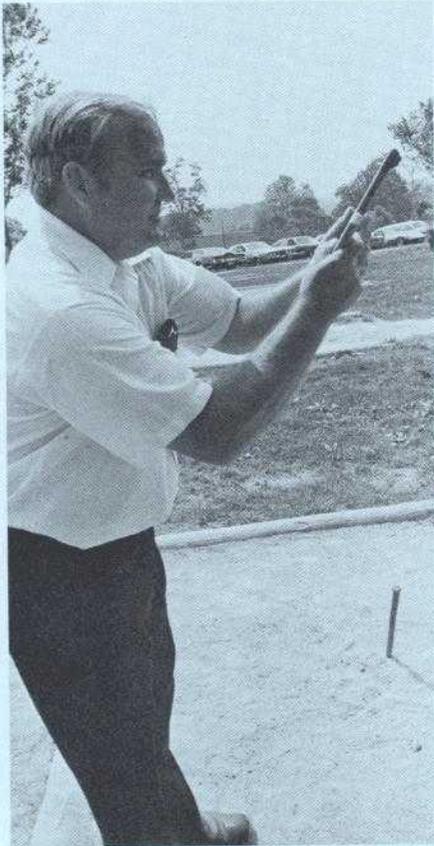
Over the second cup of morning coffee, they discussed the plans for the rest of their trip. That afternoon called for a guided visit of the COMSAT-INTELSAT facilities where the INTELSAT IV spacecraft was being assembled and tested; next was a view of the imposing beehive-shaped Atlas-Centaur blockhouse where the firing is controlled, and finally, a close-up look at the Atlas-Centaur launch site itself. The 130-foot rocket was already being prepared for a planned late August launch so Bernie and Maude donned hard-hats to take a look.

To wrap up their private tour, they went to the Cape Kennedy Visitors Center to buy souvenirs for the children and to take a look at COMSAT's popular exhibit. On the way back to the motel one stop was a must; Pollicchicio's Orange Grove to buy fresh oranges to take home and to sample freshly-squeezed orange juice. After dinner and an all-too-short night's rest, they visited Disney World on Sunday and headed home that evening on a pleasant dinner-flight with tired feet, tired bodies, but with their minds full of happy memories.

By contrast to the Saturday morning, pre-launch newspapers, the Sunday papers the day following launch, reported the surprisingly small crowds parked along highways in Brevard County to watch the launch. According to the Florida Highway Patrol, perhaps only 100,000 persons witnessed the event. But just about four years earlier, more than a million people had clogged the highways, beaches and vacant lots to see Apollo 11 leave for the first landing on the moon. Outside of the Cape's Gate One, over 10,000 persons had camped, slept in cars, waited overnight in sleeping bags, and dozed in lawn chairs to be sure of a good spot to view the launch. Yet, leaving that same gate at T-plus 50—50 minutes after launch of Skylab II—there were only seven autos and two campers in sight along that same road.

One paper even reported that Skylab II commander Al Bean's parents had not attended because, the paper said, "it was too hot and too much of a hassle."

Samuel Johnson (1709-1784) said it, "Worth seeing? Yes; but not worth going to see." But not true for Bernie and Maude Coleman. Just ask them.



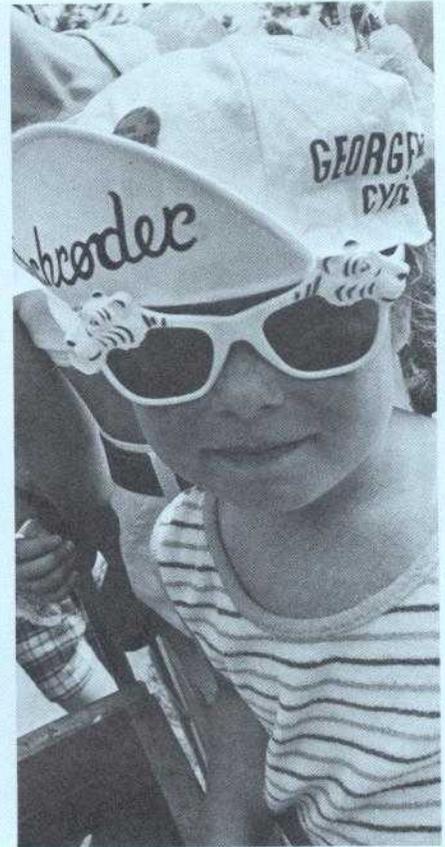
Pitching for a ringer.

COMSAT EMPLOYEE NEWS

CEA annual picnic

More than 500 employees and their families attended this year's Annual Picnic at Smokey Glen Farm, Gaithersburg, Md., on June 11. Everyone was treated to a chicken dinner, cokes and beer. Later in the afternoon, hamburgers and hot dogs were served to those who had worked up an appetite playing soccer, baseball, or horseshoes.

Chuckles the Clown and a Punch and Judy puppet show entertained the youngsters (of all ages) in spite of the day's high temperatures.



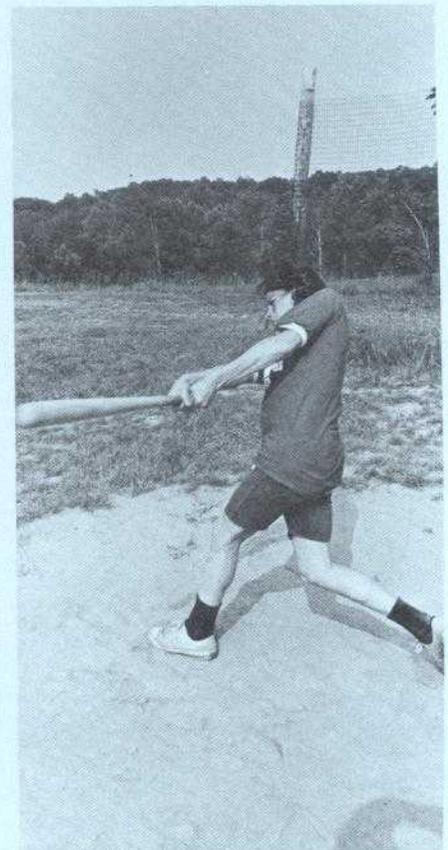
A future Miss America?



COMSAT's Tom Sawyer.



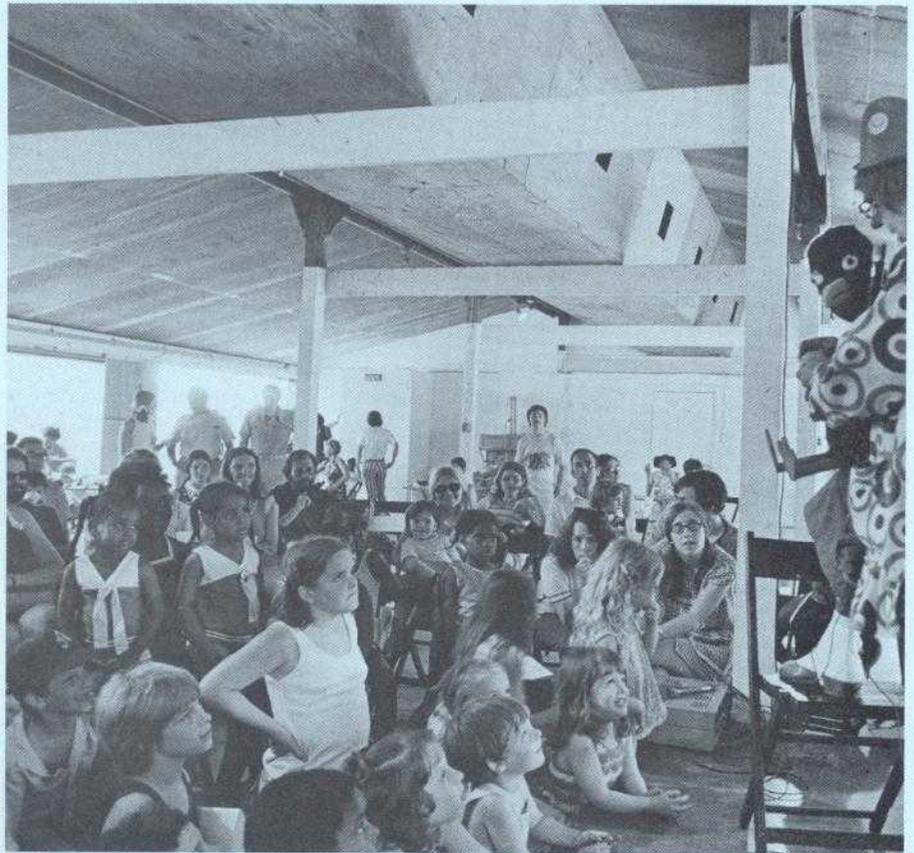
A fast game of soccer.



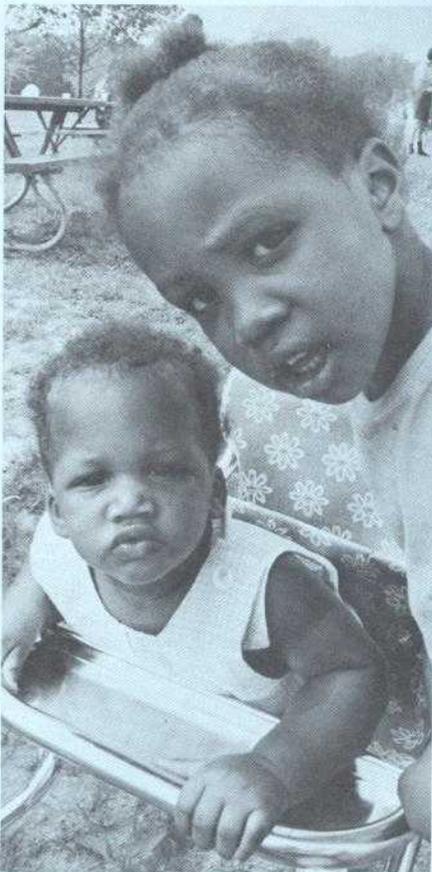
A line drive to center field.



Hold tight!



Chuckles the Clown entertains children of all ages.



Just who are you?



Relaxation is the order of the day at a picnic.

High-flying models appear over Paumalu

BY ROBERT N. KUMASAKA

There is a new interest among a group of Paumalu staffers these days as more and more RPM's appear in the Hawaiian sky and sea.

RPM stands for "remotely piloted model" and includes both airplanes and speedboats.

The interest in this activity started last summer with the arrival of senior technician Hank Schutzbier. Hank, formerly COMSAT's representative at the Fucino, Italy TT&C Station, spent a mountain of lire, and in four years plowed up a good bit of the Italian countryside as he learned the rudiments of radio-controlled flying.

To date, he has interested five others in learning this fast-moving hobby. Technician Douglas Long is now flying his scale Huey Cobra copter; senior technician Norman Murakami pilots his own Falcon, while operations controller Charles Ogata works with his 9-foot EZ-Juan glider. The sole radio-controlled boating enthusiast, operations controller Al Prevo, is looking for company as he guides his SK-Daddle speedboat around a convenient lagoon.

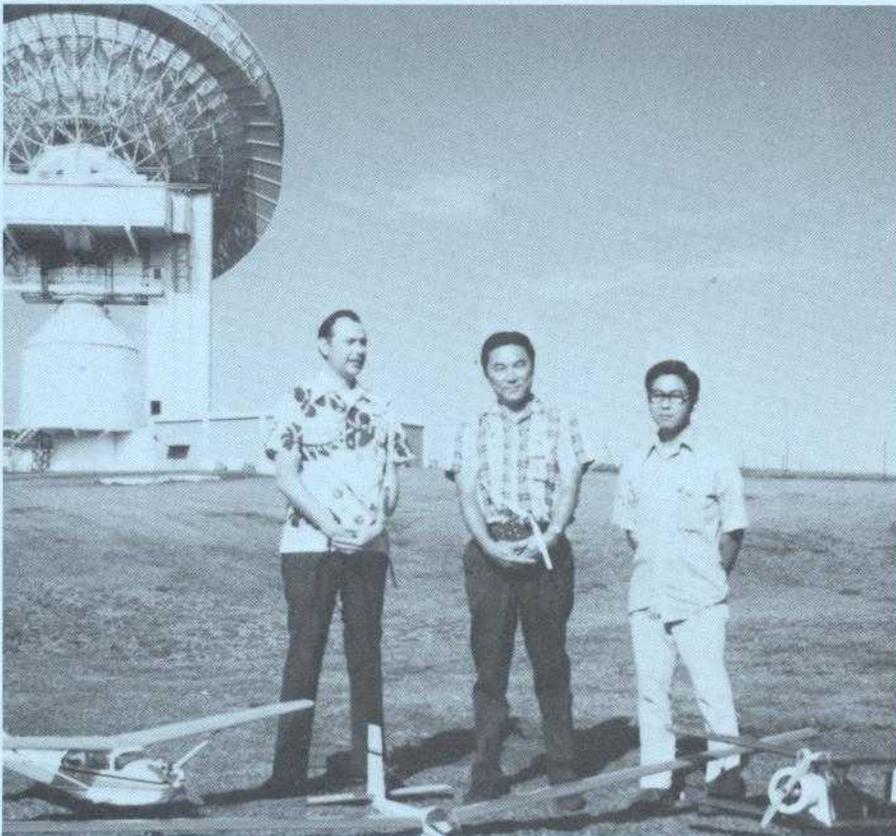
Radio-controlled flying is far from easy, but with the assistance of an accomplished teacher, a novice can learn quickly, thereby reducing the risk of violent disaster to his pocket-book and aircraft. Suitable flying sites and weather also contribute greatly to one's success. In Hawaii there are a number of abandoned airstrips and city-provided sites which are used. The breezy weather also adds a certain spice to sharpen one's technique.

Contrary to some opinions, these radio-controlled models are not "toys." The cost of building and operating one could run anywhere from \$250 to \$700 depending on the model and the radio equipment used. The control radio gear, by the way, is operated in the Citizen's Band Class C Service and requires a special FCC license.

■ Mr. Kumasaka is administrator of the Paumalu Earth Station.



Douglas Long (left) and Al Prevo proudly display their models.



Hank Schutzbier (left), Charles Ogata (center) and Norman Murakami compare RPM experiences.



Carolyn Dredge opens a gift at her farewell party.

The Plaza scene

BY JOYCE ANN PRZELENSKI

The wet, rainy season is over and vacation weather has finally arrived. Many of our Plaza co-workers have begun their annual pilgrimages to the beaches and mountains.

Hazel Ewing, Corporate Secretary, and son Edward recently returned from vacationing at Niagara Falls and Hamilton, Canada. Hazel traveled to Niagara Falls to attend the wedding of co-worker Nancy Best of Legal. Nancy married Steven DeBernardi on June 16. The happy couple honeymooned in Florida.

After a week of work in Puerto Rico, Don Chontos of Personnel headed for the Virgin Islands where he was joined by his wife for a second week of sun and fun.

Ginny Oehler, Corporate Secretary, recently returned from vacationing in New York and Cape Cod.

Harriet Biddle, Finance, and Marion Timmons, Legal, joined the sun worshippers for a week in Jamaica and Haiti.

Montreal, Canada, is a great place to visit according to Kathleen Kiely of Legal. Kathleen got in a week of sightseeing in the Canadian city.

John Charyk, son of COMSAT President Dr. Joseph V. Charyk, registered a 2-up victory in golf over his opponent to win the Horstman Cup, emblematic of the men's championship at the Chevy Chase Club in nearby Maryland.

More weddings for Plaza employees—Martha Sanabria of Finance married Stephen Shirley on June 2. The couple honeymooned in the Pocono Mountains. Bert Runfola, Finance, married Jennings Stephenson on July 7. Bert has left COMSAT and is now living in Richmond, Virginia.

A farewell luncheon for Finance's Carolyn Dredge was attended by approximately 100 of her fellow employees recently. George Skinner presented her with several goodbye gifts. Carolyn and husband visited with his family for a month in Idaho. From the postcards, the trip cross-country was quite interesting. Carolyn hopes to do some part-time work now that she is back home.

A wine and cheese party was held in the fourth floor auditorium for Legal's Betty Garrison who recently left COMSAT. Not to be outdone, Betty's husband Bob retired from the government at the same time. Betty plans to devote all her "spare time" getting their home completed so that everyone can come visit them.

Congratulations are due to Mr. and Mrs. Anthony Vanhover on the arrival of their first child, a girl, June 14.

■ *Miss Przelenski is a senior MT/ST operator in the office of the General Counsel.*

Life at the Labs

BY CAROL LOUTHAN

With warm weather upon us, everyone's "fancies" turn to the beaches. And how lucky we are to have such a marvelous selection of nice beaches within our "gasoline allowances."

Sheila Norton and son Billy spent a recent weekend with daughter Donna at Rehoboth Beach, Delaware, where she is working for the summer. And last month they were off on a longer jaunt as Billy went to camp in North Carolina and Mom traveled on to Ft. Lauderdale for a week's vacation.

Bill Fallon survived a long weekend with son Billy and his Scout Troop on Assateague Island. Ditto for Sam Jones, who was with the boys the first part of the week. I'm told the weather was just beautiful.

Marie Curtis, Anne Speare and I also took a long weekend and traveled to Virginia Beach to bake in the sun and catch up on some night life. It turned out to be a perfect weekend in every way.

Fishing, crabbing, and digging for clams was in order for Norman Miller and his family as they spent two weeks camping in their travel trailer at Cape Charles on the Chesapeake Bay. All came home beautifully tanned.

Before turning to other matters, very special congratulations are in order for Norman's daughter, Kathy. In June she was elected a member of the Edwin W. Broome Chapter of the National Junior Honor Society of Secondary Schools. Kathy, an eighth grader at Edwin W. Broome High School in Rockville, has a very proud and admiring dad who works in our design and drafting department.

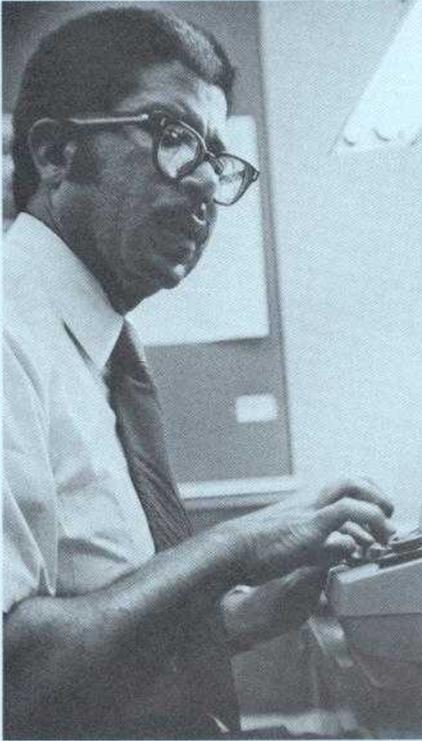
Congratulations also to Jeff and Nancy Rubin on the birth of their daughter, Melissa Carol, on June 15 at George Washington University Hospital. Mother, daughter Melissa, and even Poppa Jeff, are doing fine.

A recent Wednesday evening was the time chosen by the girls to "shower" Mrs. Don (Bettie Dorsey) Wentworth. Even though everyone knew of the upcoming marriage, Don and Bettie managed to pull a "sneaky" and were quietly married on June 1.

The COMSAT Labs Third Annual Slow Pitch All-Star Softball game was played June 21. The "match-up" was between the East (Windell's Wizkids and Shatzer's Sluggers) against the West (Burch's Bandits and Mueller's Marvels). After nine innings it seems that the East came out a "few" runs on top. Between rain showers, there was plenty to eat and drink for all.

Windell's Wizkids are also due congratulations as they won the first half of the season's schedule. But, watch out, because the second half is just beginning.

■ *Mrs. Louthan is a secretary at the COMSAT Laboratories.*



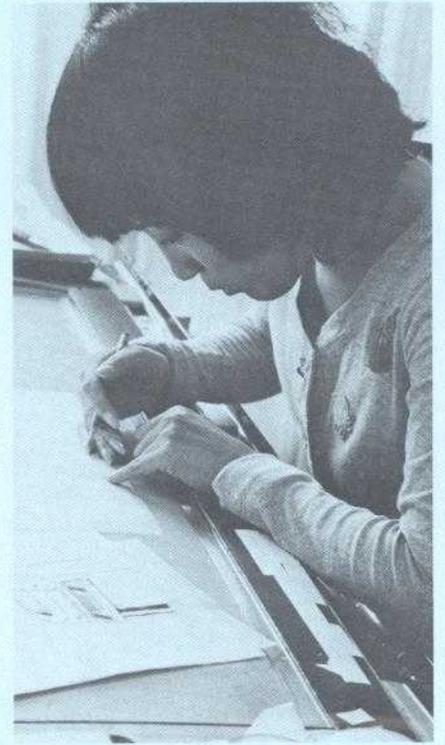
Composing specialist Carl Johnson prepares copy.

Graphic Services offers diversified capabilities

Graphic Services, under the supervision of Larry Kopp, provides a wide variety of visual services. The group's primary goal is to respond to the many graphics needs of the Corporation as quickly as possible.

Capabilities include production of Vu-graphs, 35 mm slides, briefing aids, and line-litho photography.

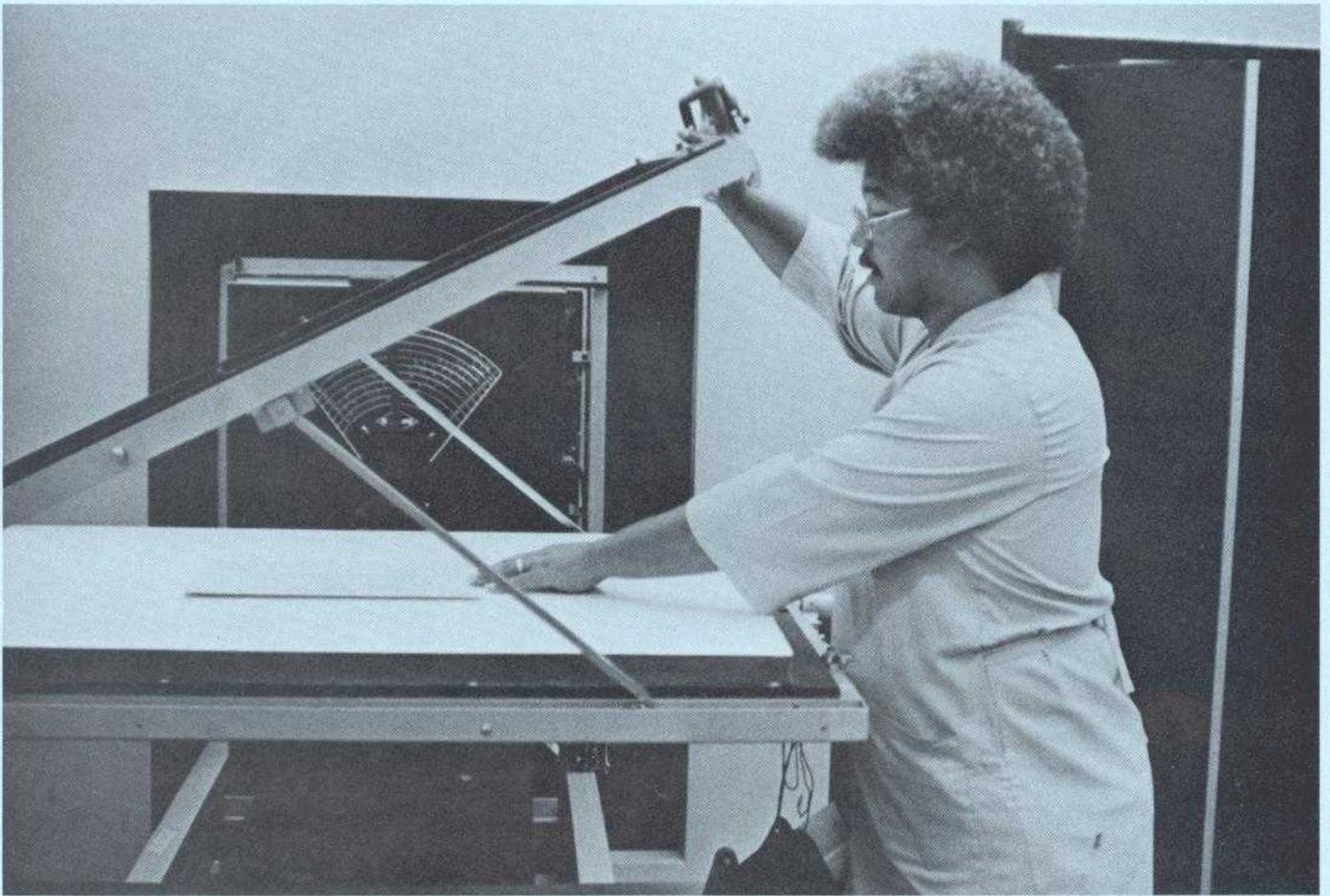
PHOTOS BY J. T. MCKENNA



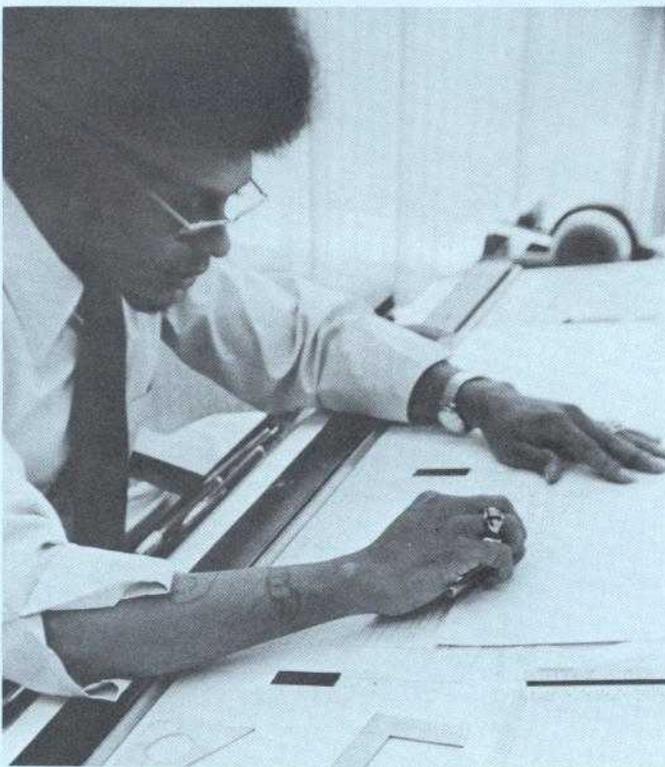
Illustrator Sookhi Ro works at her drawing board.



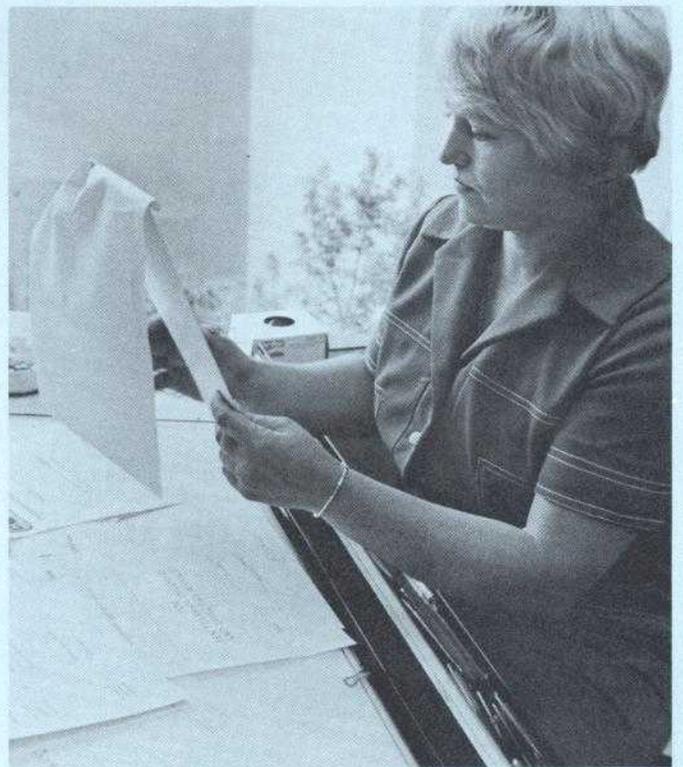
Manager Larry Kopp reviews his production schedule with secretary Sandy Kittrell.



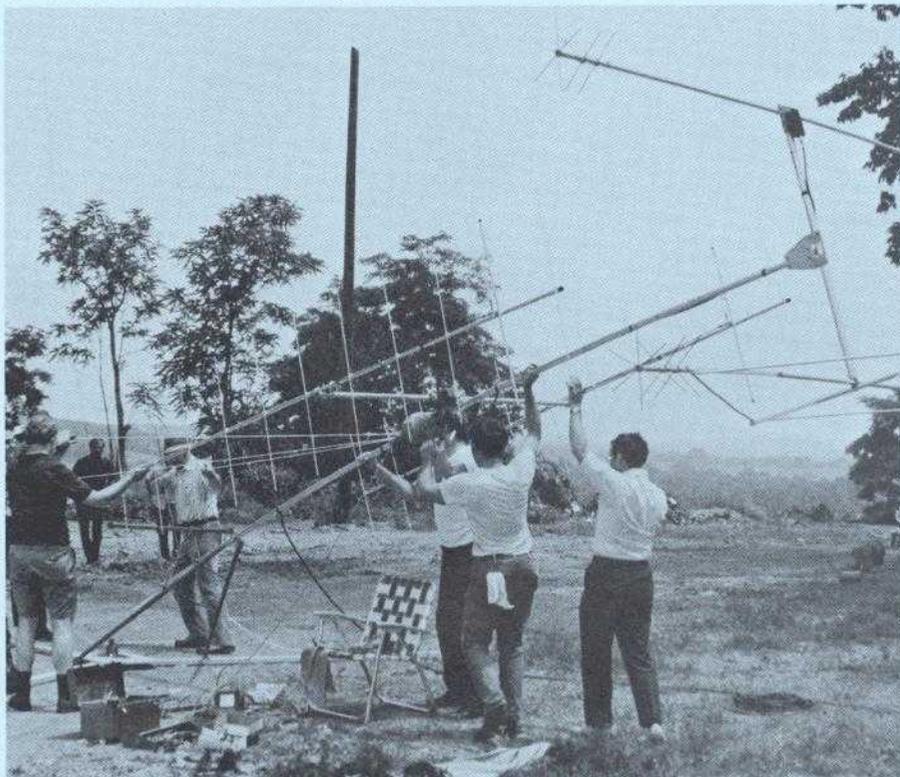
Line-litho photographer Melvin Harley adjusts a line negative.



Illustrator Roy Turrentine lays out an assignment.



Draftswoman Mary Pate reviews a job for accuracy.



The first order of the day is to raise the antenna. PHOTOS BY NILS JESPERSON

COMSAT radio club holds annual field day

BY CAL COTNER

The weekend of June 23 and 24 found the COMSAT and IBM Amateur Radio Clubs competing in another annual radio field day sponsored by the American Radio Relay League. This year our signals originated from the Hyattstown, Md., Fireman's Carnival Grounds.

Preparations began Friday evening and Saturday found activities in full swing. Six different antenna systems were installed for our four regular stations. Two single-banded voice stations were operated on amateur bands between 3.5- and 30-MHz. One CW (code) station was also operated on these bands and a fourth station was used on the 50-MHz and 144-MHz VHF bands.

Field day rules allowed a novice (beginners) station and a second station which communicated via the OSCAR 6 amateur satellite.

■ *Mr. Cotner is a member of the technical staff in the COMSAT Labs Technology Division and is President, COMSAT Amateur Radio Club.*

A total of 1,256 contacts were made with other amateurs during the 24-hour period, down somewhat from last year. A lightning storm required a shutdown of an hour on Saturday evening and we experienced generator problems, which not even Dave Reiser's "blinking box" power transfer system could cure. The novices did add over 100 contacts to our overall score however, while the satellite station accounted for one contact and a 50-point bonus.

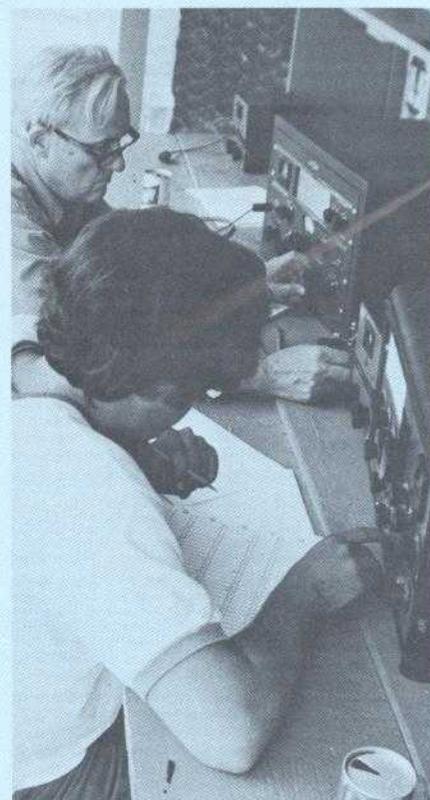
There were long faces at the satellite station until Nils Jespersen and I finally made our contact on Sunday morning.

One reason for only a single satellite contact is that the OSCAR 6 is in a polar orbit and only visible for about 15 minutes on each pass. Secondly, while Dave Bollinger of IBM provided a fine antenna system, our transmitter power was well below the required nominal figure to transmit via satellite.

The CEA-sponsored COMSAT Radio Club operates two stations. WA3LOS with Laurie Gray as license holder is located at the Labs, while WA3IGQ with Chuck Dorian as license holder is at the Plaza.



Cal Cotner aides a young amateur.



Laurie Gray (rear) prepares to transmit as Glen Friedenreich records the contact.

From COMSAT West

By SUZANNE POWELL

We've moved! COMSAT West has recently gone through the all-too-common trauma of moving. Our latest relocation wasn't our first, nor the furthest one we've made, but it was significant because our new offices are no longer under our spacecraft contractor's roof. In the past, COMSAT West personnel pursued their daily labors in office space provided by Hughes Aircraft. Early this spring, when Hughes announced plans to move us again, we decided to stop dancing the aerospace shuffle and find a permanent home for the COMSAT troops.

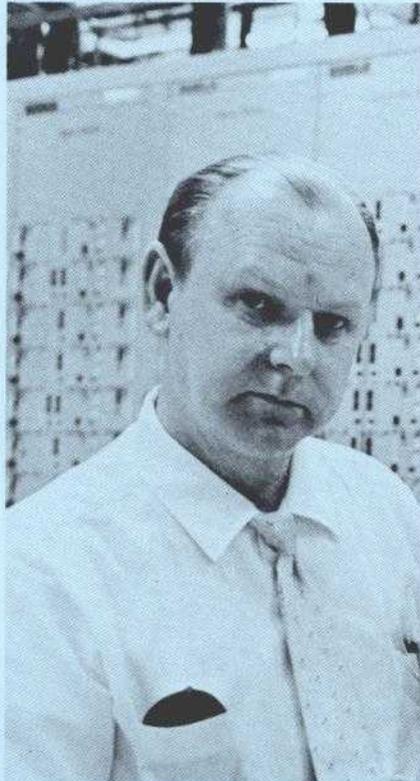
Our new home is 888 North Sepulveda Blvd., El Segundo, California; only five minutes walk from the Hughes facility. The new quarters are really nice. Each engineer has a carpeted private office with a view of beautiful downtown El Segundo. Despite the inconvenience and minor irritations of moving, everyone agreed it was a change for the better.

There was an open house for COMSAT employees and their families on July 15 at our new offices. Champagne and the Los Angeles premier of COMSAT's newest film, *Ten Years To Tomorrow*, were the order of the day.

The COMSAT Employees Association-West held its first annual boat ride to Catalina Island on Saturday, July 20. About 30 adults and 20 children made the one-day trip by steamer to the Wrigley paradise.

We've got a new secretary. Toni Boughton joined us in mid-June. We are pleased to have her on board; and her presence adds to the beauty of our new offices.

■ Mrs. Powell is a secretary in West Coast Project Office.



Mr. Hobbs

Etam's Hobbs publishes his first novel

Rupard N. Hobbs is published! His first book, entitled *Red Neck Rufus*, is now on the streets and from early reports is on its way to being a success.

Published by Vantage Press of New York City, *Red Neck Rufus* tells the story of the fast-vanishing mountain folk of Appalachia.

The book, just under 200 pages in length, took about 18 months to write and was illustrated by Carl Cooper, a fellow employee at Etam.

Rupe, as he is known, has been a COMSAT employee since 1966 when he joined the Brewster Earth Station staff. He transferred to Etam in 1968 and is presently supervisor of its Grey Team.

He reports that he already is at work on his second novel, and it will have a plot and locale totally different from *Red Neck Rufus*.

News and notes from Andover

By JOANNE WITAS

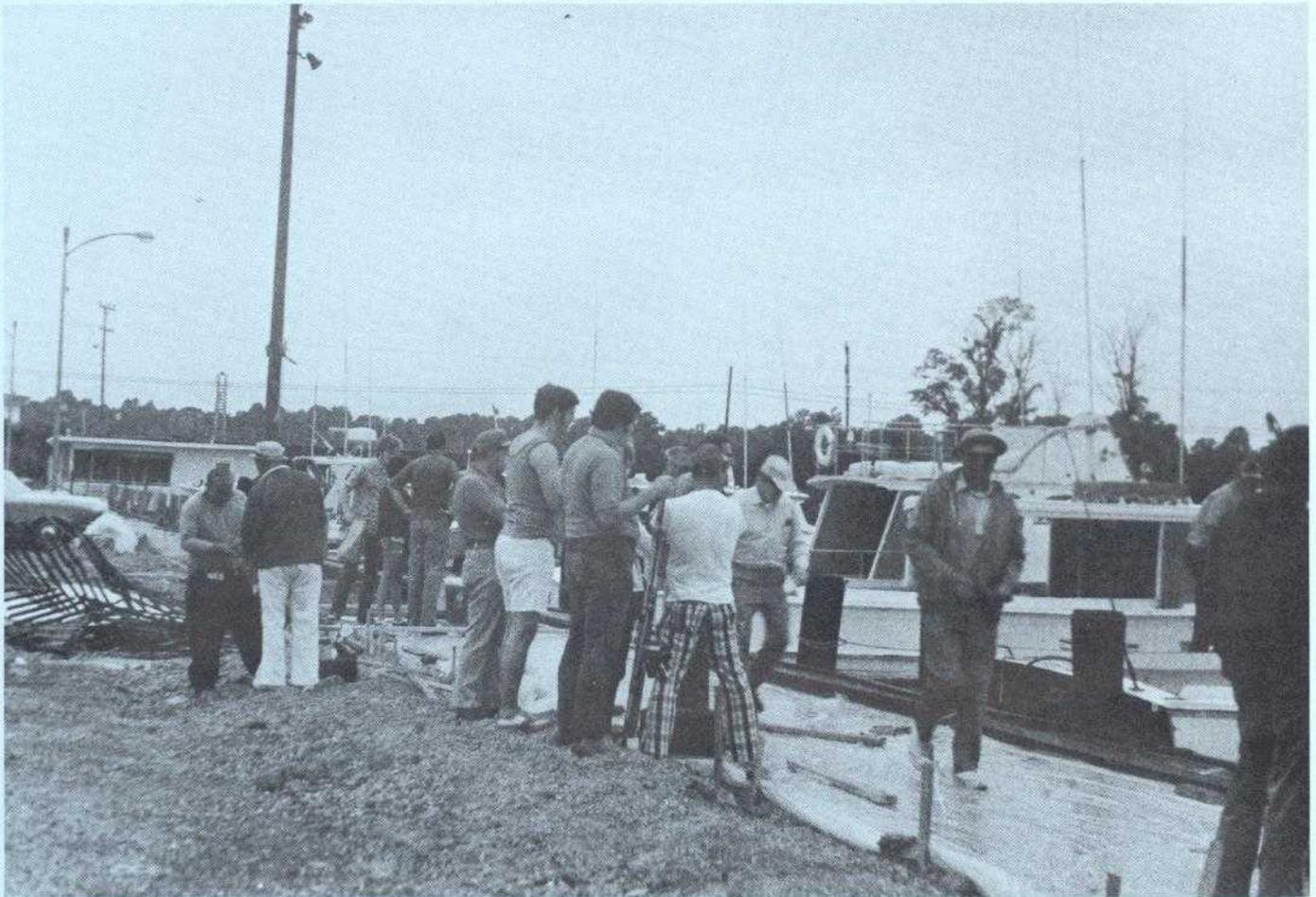
Our bowling league held its banquet at Dick's Restaurant in Mexico, Maine, on June 15. High average trophies were presented to Agnes Foster and Ed Snyder. Kathy Snyder and Bill Hamilton were also presented awards for individual high games. Kathy rolled a 108, while Bill had a fine 148.

Facilities mechanics Neil Merrill and Bobby Richardson recently attended the Solar Training School at San Diego, California. They received schooling in all phases of operating and maintaining the 800-KW turbine generator set which is to be installed shortly.

Andover's version of the "Hell's Angels" includes Jim Fogg, Stan Morse, Phil Morales, Gerry Michaud, Dick Plantier, Paul DeShong as well as AT&T's Ken Field and Bill Gill. Some of the motorcyclists recently toured the Rangeley Lakes Region about 30 miles north of here and returned home via a scenic route through parts of New Hampshire. On a recent Sunday, the wives accompanied their husbands on a trip to a motorcycle "scramble" held in Lisbon, Maine.

To keep in top physical condition, technician Larry Wood rides his bike to work. His home is located on Route 120, about seven miles from the station. Half of this jaunt is an up-hill climb. Larry's best travel time is 45 minutes, except on one occasion when he was working the midnight shift. He left home at his normal time but arrived at work earlier than usual and out of breath. When he was asked what had happened, Larry just shook his head and said, "You won't believe this. I was about a half mile from our entrance when I heard clump, clump, clump. I turned to see what was making that kind of noise and I was being followed by a moose." Needless to say, Larry made the last half mile in nothing flat. By the way, he can still be seen pedaling to work.

■ Mrs. Witas is personnel accounting clerk at the Andover Earth Station.



The day starts at sunup as the boats prepare to leave the dock.

PHOTOS BY SHIRLEY OLIVER AND ED WABNITZ

Spring fishing trip

Eighteen boats, all filled with COMSAT employees, recently took to the waters of the Chesapeake Bay as the first CEA-sponsored employee fishing trip proved to be a great success.

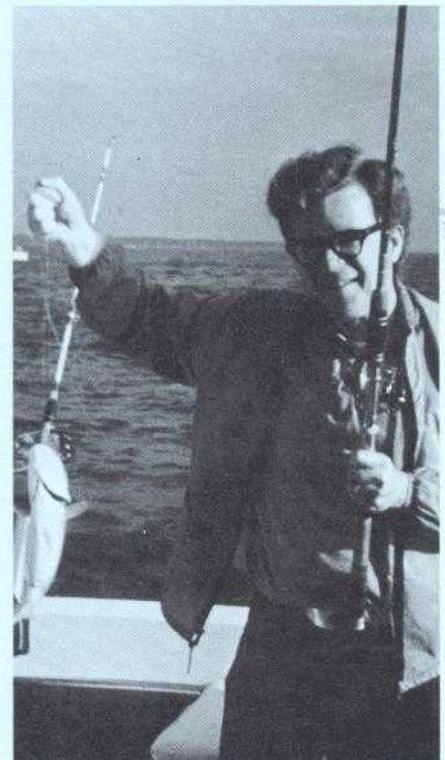
Leaving Chesapeake Beach, Md., at sunup, and again at 1:00 p.m., 76 COMSAT fisherpersons brought home an outstanding catch.

Bill Sandrin, COMSAT Labs, caught the day's biggest fish, an 18-pound rock, while Tom Easter, Administrative Services, landed the longest catch, a 23-inch beauty.

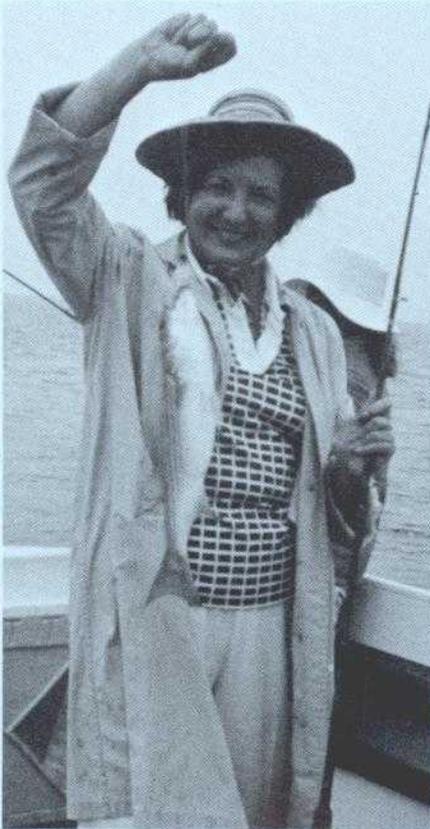
Don Ross, International System Division, took individual top honors for the "most caught and kept" as he brought in 17 big ones. The COMSAT Labs crew of Bob Cool, Chick Dahl, Bernie Free, and George Meadows won the "most caught and kept" award by a boat as they had 54 keepers.



Lisa Cook wonders what to do next.



John Vinter displays his catch.



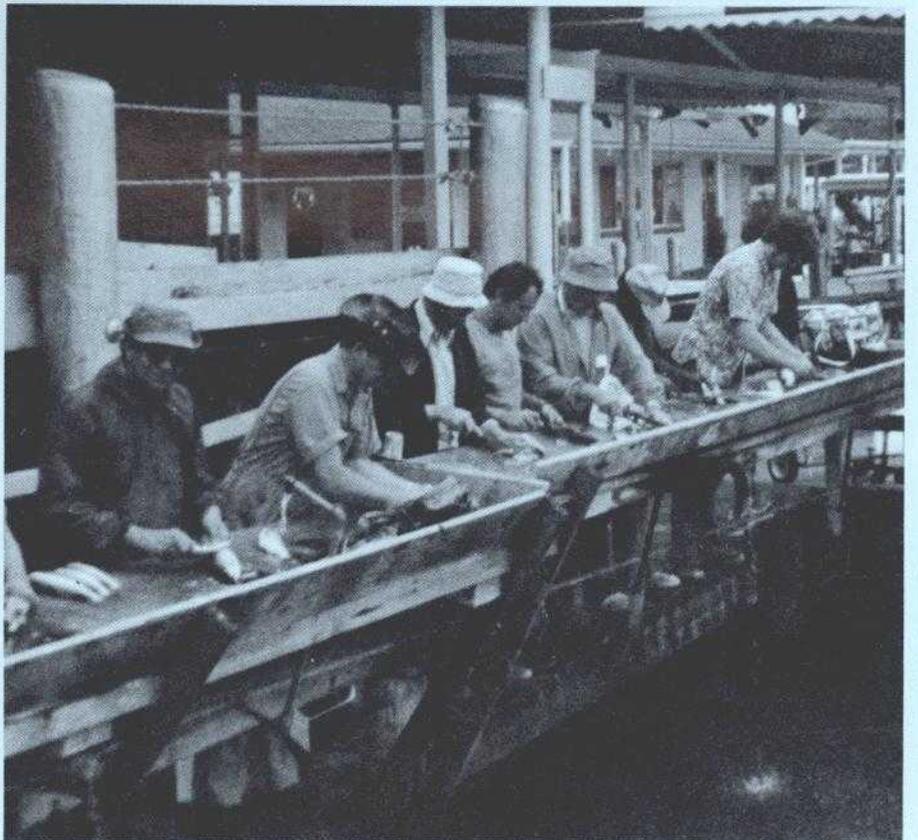
Wanda Mills smiles as she lands her first fish of the day.



Shirley Oliver and Marvin Rosenbluth (center) admire Bill Sandrin's prize-winning 18-pound rockfish.



Ted O'Brien enjoys a quiet moment as he waits for a bite.



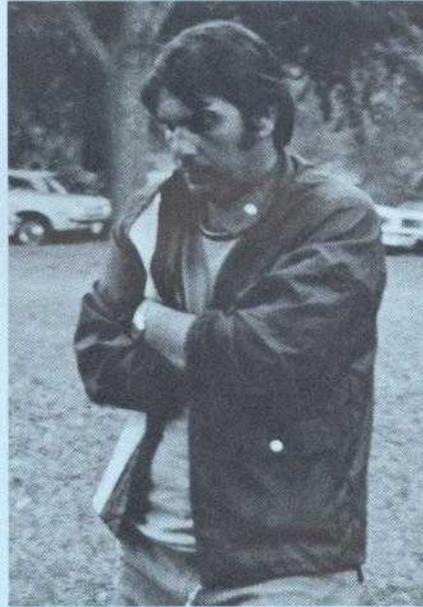
No one said anything about having to clean these things.



Kitty Harbin waits for her pitch.

Play ball

For the third consecutive year, COMSAT's Tigerettes are active in the D. C. Department of Recreation Women's Softball League. Games are played on the fields adjacent to the Lincoln Memorial on Thursdays at 6:30 p.m. throughout the season.



Coach DeCaro plans his game.

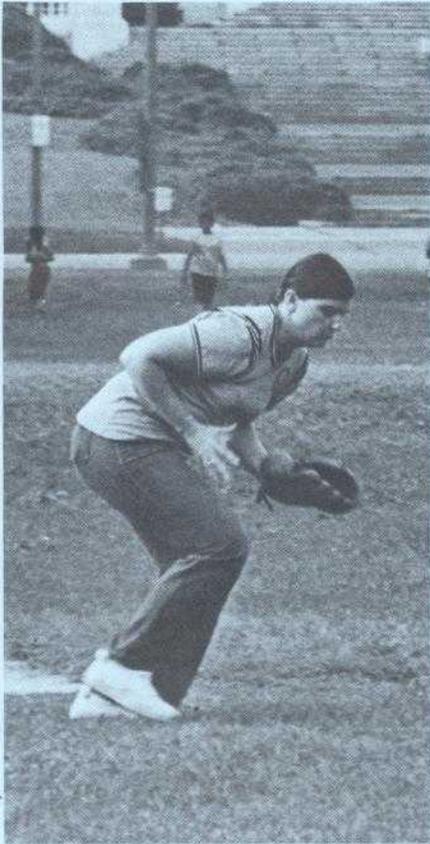


Rozz DeClue hurls a fast one.



Team members are (standing, left to right) Jo Samuels, Kitty Harbin, Ruth Adams, Lu Pete, Claudia Toy, Evelyn Smith, Harriet Biddle, Lisa Cook, Carolyn Jones; and (kneeling, left to right) Nancy Ebeltoft, Dottie Young, Rozz DeClue, Linda Kortbawi, and Pat Dellar.

PHOTOS BY JOYCE PRZELENSKI



Claudia Toy handles a hot one.



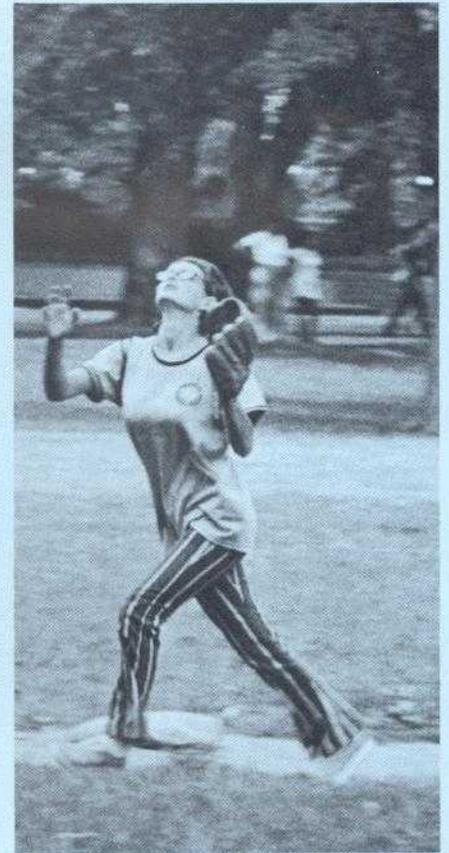
Co-captains, Lu Pete (left) and Carolyn Jones are ready for anything.



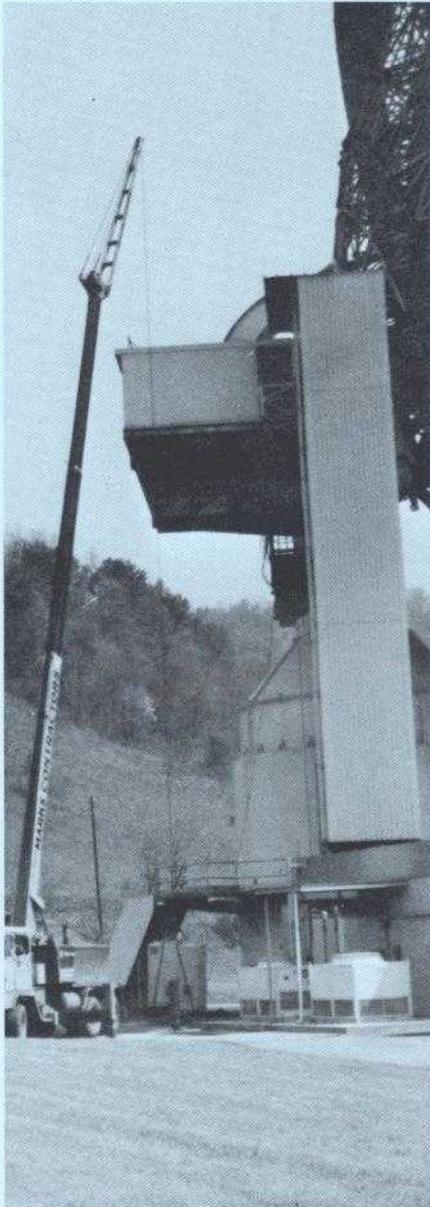
Pat Dellar waits for a pop up.



Evelyn Smith leads off third.



Linda Kortbawi chases a ball.



The high-powered amplifiers are put in place by crane.

At Etam

BY BEVERLY J. CONNOR

There has been lots of activity recently in the hills of West Virginia.

Deloris Goodwin, who normally writes this column, is the proud mother of a new daughter born on June 5.

We said goodbye to James Evans in early June. Jim resigned to accept a position with the American Satellite Corporation.

Next we welcomed Paul S. Mauzy,

■ Mrs. Connor is a secretary at the Etam Earth Station.

Jr. as a permanent employee. Paul has been assigned to our Red Team.

We all enjoyed seeing COMSAT's new film *Ten Years to Tomorrow*. Part of it was filmed here at Etam and members of both our Red Team and Blue Team were part-time actors during its production.

Several of our employees have been off on vacation trips. Mr. and Mrs. John Formella and family vacationed in Wisconsin, the Paul Helfgotts visited Miami and, of course, Disney World. Mr. and Mrs. Leonard Gifford saw Wyoming while the William Carrolls enjoyed a "Wild Water Expedition" at nearby Thurmond.

Last but not least, we all breathed a sigh of relief as our new high-powered amplifiers were successfully placed in the elevated equipment room on the antenna.

News from Brewster

BY DOROTHY BUCKINGHAM

Our annual CEA picnic was held at Alta Lake on June 23, with many families and guests on hand to enjoy the fun. Wayne and Bonnie Colpitts arranged for food and drink, while Tom and Audrey Cheeseman were responsible for the day's activities.

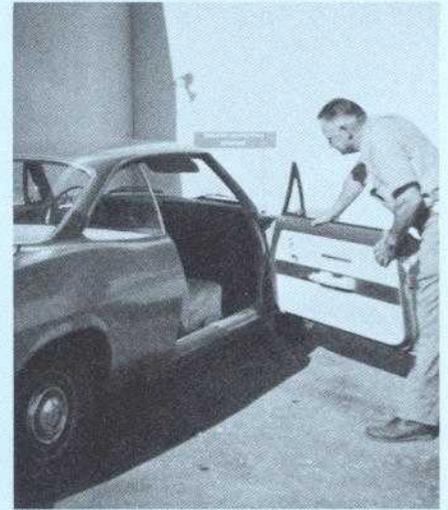
The high point of the day was a cream pie-eating contest. Jack Wohlford's son, Jim, consumed an entire pie in seven minutes and was declared the contest winner. In addition, horseshoes, games, and suds made for a great day in the sun.

Speaking of sun, vacation time is here again. The Harvey Andersens visited relatives in Iowa while the Dick Eliasons traveled to Connecticut to see their family. Jim Peasley and his family also visited with relatives in Seattle and did some camping in Montana.

Jerry Bowes ranged from South Dakota to Louisiana, the Mel Hofmanns toured Texas, while the Jim Erskines visited in Vancouver, British Columbia.

Wally and Doris Lauterbach also vacationed in a big way as they spent a month traveling in the United Kingdom, Scandinavia, and even saw Russia.

■ Mrs. Buckingham is a secretary at the Brewster Earth Station.



Walter D. Robinson inspects an employee vehicle.

Jamesburg offers vehicle inspection to its employees

BY WARREN S. NEU

As a supplement to its existing safety measures, the Jamesburg Earth Station has initiated a program of voluntary employee vehicle inspection.

Patterned after the compulsory but irregular California Highway Patrol plan, the project has already been worthwhile as several minor infractions have been noted and corrected.

Using a modified copy of the Patrol's inspection form as a guide, the actual examination is performed by a member of the Station Safety Committee.

It doesn't take long to inspect a car and anyone who knows the route we must travel to reach the station appreciates this additional safety service.

■ Mr. Neu is administrator of the Jamesburg Earth Station.

5-year awards

The following personnel received five-year service awards during July and August.

Administrative Services: William E. Alford and John W. Vinter.

Andover: Raymond L. Berton, John D. Foster, and James A. Goodwin.

Bartlett: Merle M. Albert and Dennis A. Hill.

Brewster: Dorothy I. Buckingham, Wayne K. Colpitts, Melvin C. Hofmann, and Stuart W. Miller, Jr.

Cayey: Agustin Ferrer.

COMSAT General: Betty J. Lotito and Viviane D. Trainor.

Corporate Secretary: Judith S. Elnicki.

Etam: John R. Banister.

Finance: Helen F. Baxter, Nellie S. Foxwell, Guyneth L. Maines, and James P. Tallon, Jr.

General Counsel: Ruth E. Adams and John S. Hannon, Jr.

International System Division: Sigrid B. Badinelli, Marvin S. Breen, David E. Burks, James R. Jennings, Richard A. Magee, James J. May, Christina R. Seville, George J. Tellman, Jr., Walter N. Temple, and Sylvia M. Walker.

Jamesburg: Patricia A. Blatnik.

Laboratories: Forrest L. Bolinger, William F. Burch, Norman J. Cloud, Paul L. Fleming, Charles J. Franklin, Robert D. Funkhouser, Joseph G. Haynos, George S. Hewlin, Geoffrey Hyde, Kyungsook A. Kim, Joseph Lindmayer, Wallace P. Mercer III, Helmo Raag, Donald M. Rivera, Lawrence R. Sparrow, Peter F. Váradi, George R. Welti, Carl L. Wenrich, and William D. Windell.

Paumalu: Richard I. Senones.



Jennifer Getsinger (left) and a crewmate with their trophy.

1970 COMSAT Merit Scholarship winner becomes accomplished oarswoman

Jennifer Getsinger, the 1970 COMSAT National Merit Scholarship winner, studies social anthropology when she isn't rowing.

The Radcliffe senior and daughter of COMSAT Labs' William J. Getsinger is a member of her school's championship rowing team.

Every school day this past winter, weather permitting, Jennifer and her teammates were on the Charles River at sunup for a couple of hours of practice before classes. On those days when it was impossible to be on the river, they worked out in an indoor pool.

Included in their overall training were special conditioning exercises

such as running up the concrete steps of the Harvard football stadium. There are 28 steps in all and it was not uncommon for the girls to go up and down them 50 times before their coach was satisfied.

The results of all this effort was worthwhile however, because on June 17 the Radcliffe Varsity established a new course record of 3:15.4 minutes on the Schuylkill River outside of Philadelphia as they won their first National Championship.

As a result of their victory at Philadelphia, the Radcliffe crew was chosen to represent the United States at the European Rowing Championships in Moscow in late August.