RADIO, TV and RECORDING

TECHNICIAN-ENGINEER

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PROJECT VANGUARD

STORY INSIDE

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The INTERNATIONAL BROTHERHOOD of ELECTRICAL WORKERS
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JEREMIAH P. SULLIVAN International Treasurer

ALBERT O. HARDY Editor, Technician-Engineer

. . . in this issue

. . . the cover

A Navy Viking Rocket begins its mad rush into the sky from a platform in Florida. A rocket such as this will serve as the first stage of a three-stage projectile which will toss the first space satellite into its moon-like orbit sometime in 1957-58 —the International Geophysical Year. Scientists from the Naval Research Laboratory in Washington, D. C., are test-firing rockets such as this to obtain data for the satellite flight. The rocket on our cover ascended vertically "a short distance" and then turned slowly toward the horizontal. It reached a peak velocity of 4,000 miles per hour and climbed to an altitude of 125 miles, ending its flight in the Atlantic Ocean about 180 miles from the launching base. The Vanguard Project rockets must do much better than that.

commentary

The highest individual salary reported to Congress under the Federal Lobbying Act in 1955 was paid to Harold E. Fellows, president of the National Association of Radio and Television Broadcasters, a management group. His salary was $52,916. Congressional Quarterly, which compiles data on lobbying activities in the nation's capital, said that the total salaries received by a five-man NARTB lobbying staff during 1955 amounted to $113,092.

Mr. Fellows stated on NARTB's report to Congress that the Lobbying Act was "not applicable to me or this organization" but that he filed "in order that I may be free to consider and discuss legislation without question." (which is the reason all lobbyists file statements.)

Fellows appeared numerous times before Congressional committees in 1955 and 1956 to testify in behalf of broadcast interests. It is his organization which has tried desperately to extend the scope of remote control operations.

The salaries paid to him and his staff indicate what the IBEW faces in its efforts to protect member interests in Washington.

the index . . .

For the benefit of local unions needing such information in negotiations and planning, here are the latest figures for the cost-of-living index, compared with 1955 figures: December, 1956—118.0; December, 1955—114.7.

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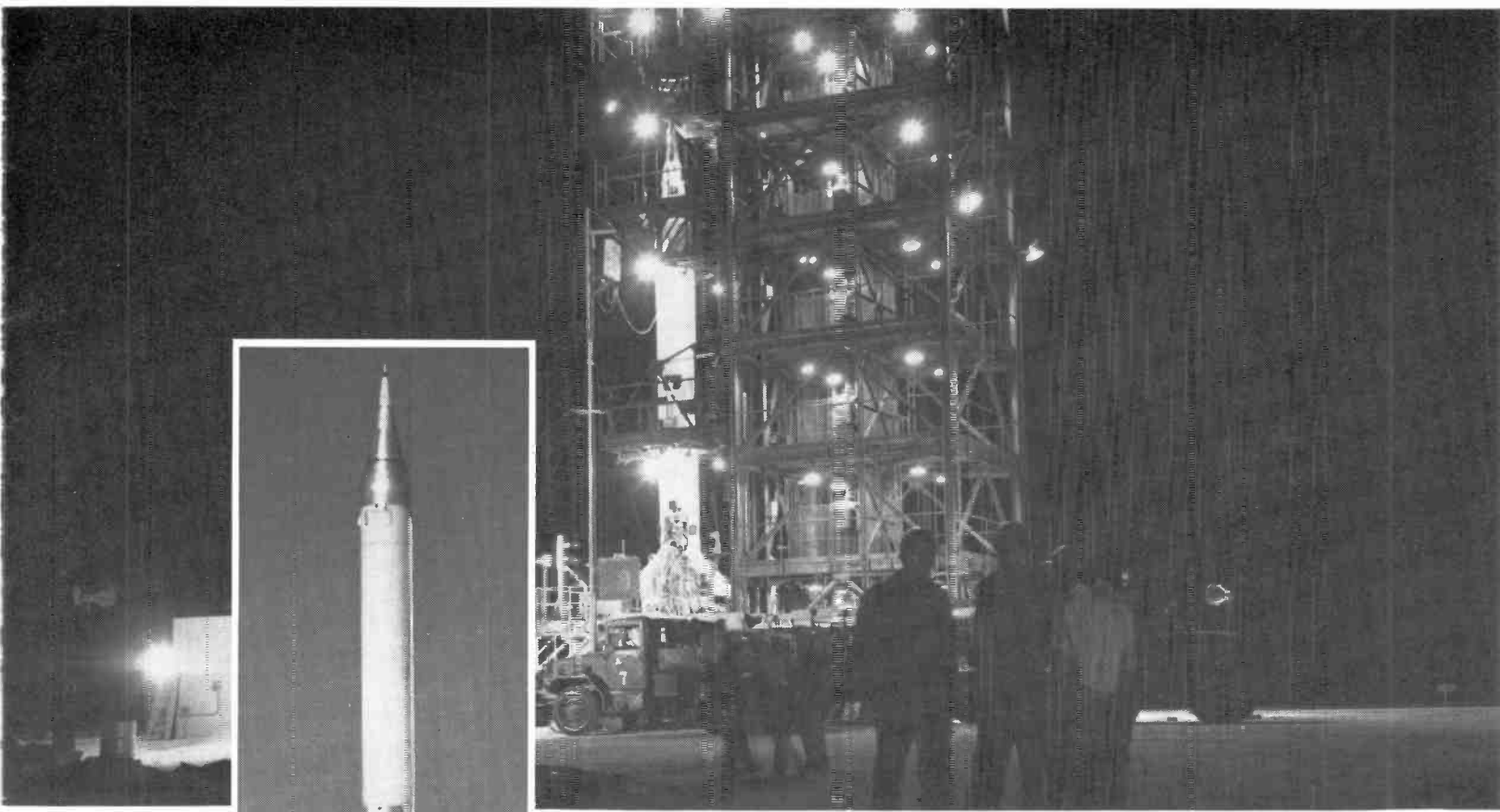
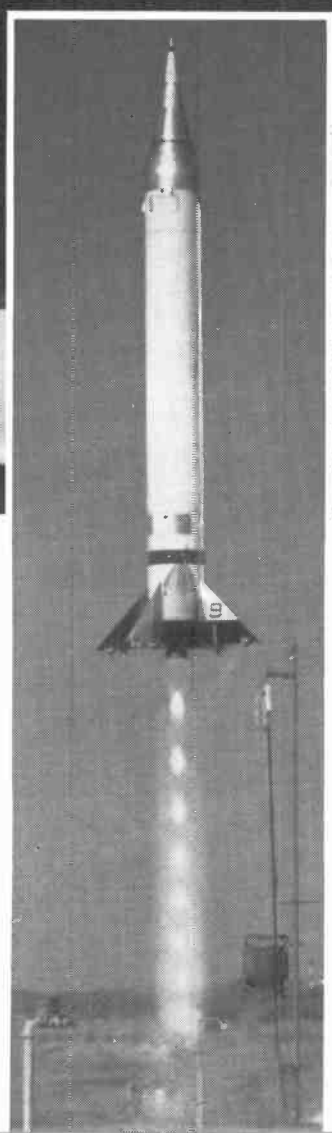
world scientists prepare to watch the circling ball

PROJECT VANGUARD

BELOW: A Viking 13 Rocket ready for launching at Patrick Air Force Base in Florida. BOTTOM PHOTO: A Navy Viking leaves New Mexico.





SOMETIME after July 1 within an 18-month period to be known as the International Geophysical Year—a group of scientists and technicians will gather beside a rocket-launching platform at an air base in Florida and, with a mammoth blast, "shoot" a golden ball into the air.

Traveling at 18,000 miles an hour in the final missile of a three-stage rocket, the ball will be tossed about 200 to 300 miles out into space and then will begin circling the earth as man-made moon. Reports of flying saucers will no doubt flood the newspapers of the world as the large economy-size

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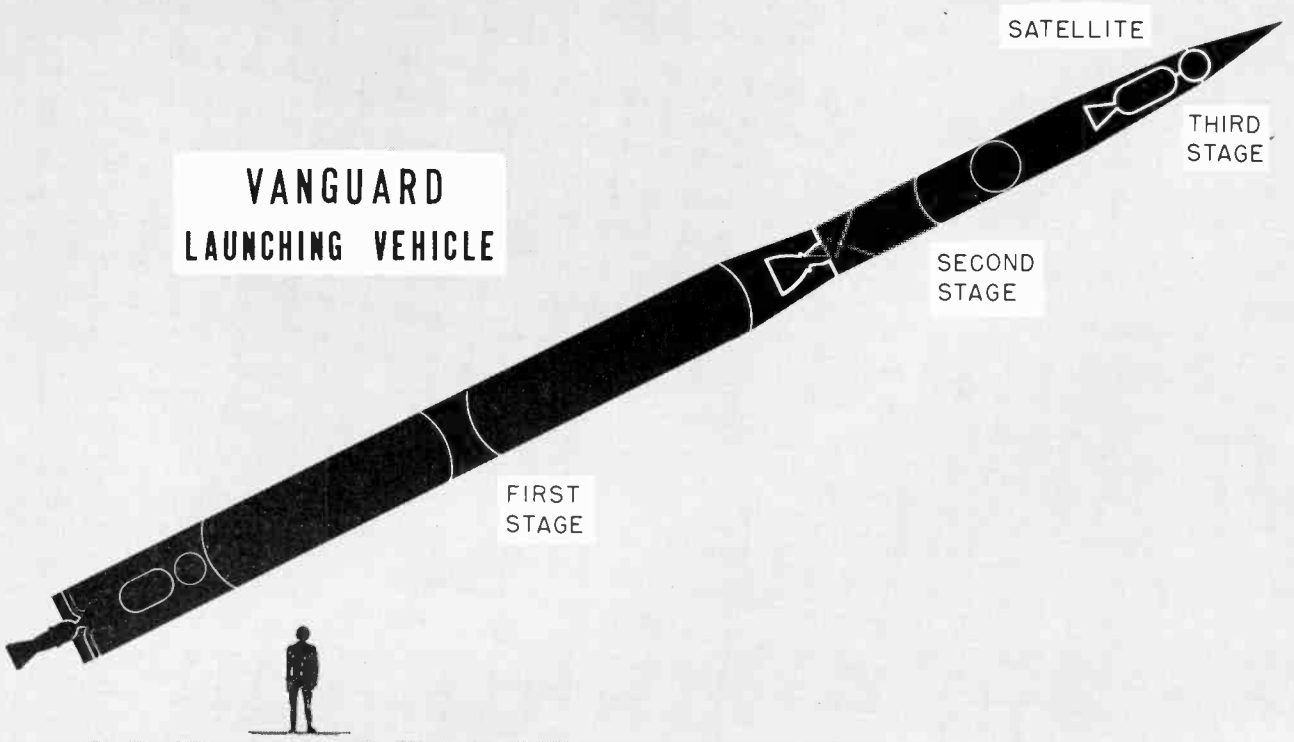
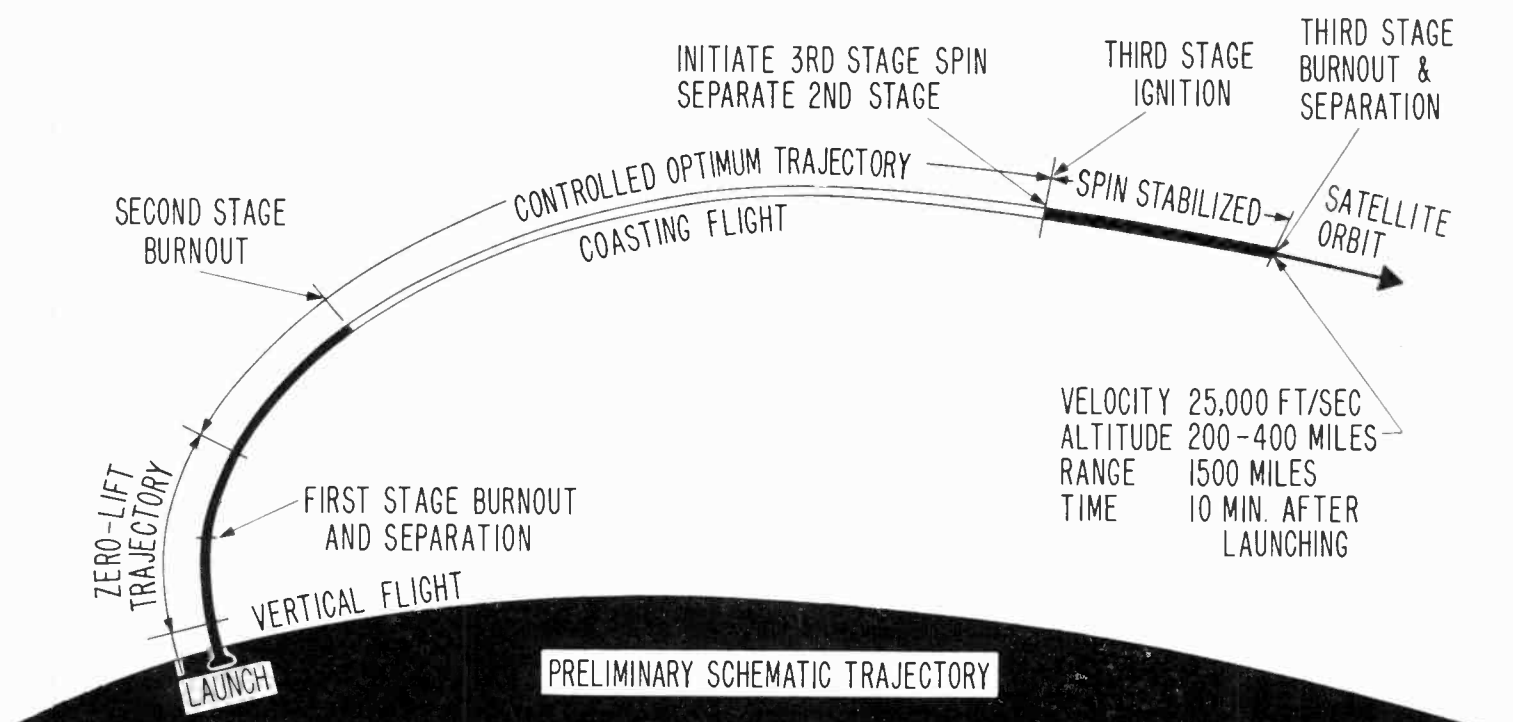


THE LAUNCHING

ABOVE: An artist's concept of the three-stage Vanguard launching vehicle, showing the satellite attached to the third-stage and housed in the nose cone of the second-stage rocket. The three-stage rocket will be 72 feet in length when joined together as shown here. The tiny figure of the man at left gives some idea as to the size of the rocket. The Vanguard launching vehicle was designed by scientists at the U. S. Naval Research Laboratory in Washington, D. C., and is being built by the Glenn L. Martin Company of Baltimore, Maryland.

The thrust of the satellite first stage rocket will be 27,000 pounds, as compared to the experimental Viking's 21,000 pounds (as shown on the front cover). The weight of the three-stage satellite rocket before takeoff will be about 22,000 pounds, while the 45-foot Viking weighs about 15,000 pounds.

BELOW: A diagram showing the planned trajectory of the satellite rocket. Scientists expect the satellite to be in its orbit ten minutes after launching. They are struggling now to keep the weight of the whole unit down in order to definitely place the 20-inch ball in its orbit. If the launching vehicle fails to attain the required initial altitude of approximately 300 miles and a velocity of approximately 25,000 feet per second (about 18,000 miles per hour), the satellite will fail to orbit and spiral to earth.



pawnbroker's ball, with its four projecting antennae, circles the earth from west to east 15 times a day.

Packed with recording devices and a small transmitter, the satellite is expected to open a new era in man's eternal assault on the secrets of Mother Earth, as it beams scientific data to receiving stations and electronic calculators far below.

Vanguard is the name assigned to the satellite project. It will be the most spectacular of many research projects undertaken by the scientists of 55 nations during the International Geophysical Year. Russia expects to launch a satellite, too. Whether it does or not, scientists of the USSR are expected to join other scientists of the world in the unique task of watching the circling ball.

Tracking the Satellite

Sidewalk superintendents will have to watch the moving orb with a good pair of binoculars or astronomical telescopes. The little "moon" will measure only 20 inches across and weight approximately 21½ pounds. Its outer shell will be fabricated of light-weight magnesium, which will be coated with gold or a gold compound. The vital scientific gear inside will weigh approximately 10¾ pounds. Some of the proposed instrumentation may include such things as solar cell mercury batteries, ion chambers, thermistors, erosion gauges, a Minitrack transmitter, meteorite collision memory devices, telemetry coding systems, and Lyman alpha storage units.

Once the satellite begins circling way up yonder it will have a brightness of the order of a fifth or sixth-magnitude star. The best periods for observing it will be about an hour after sunset and an hour before sunrise.

Twelve major astronomical observatories will keep giant eyes on the ball. In addition, there will be 200 secondary stations, 35 of which are presently organized. Many nations and many amateur star gazers are expected to make up the difference.

The most important phase of tracking will be borne by elaborate electronic computers. An IBM 704, most advanced of the high-speed computers manufactured by International Business Machines Corporation, will calculate and predict the satellite's orbit from the Vanguard Computation Center in Washington, D. C., hub of the project. Signals traveling back and forth over the IBM 704 at 186,000 miles per second are harnessed by complex circuitry to memorize and report the vital data.

Designed primarily for engineering and scientific work, the 704 subjects the data fed into it to a vast number of computations at phenomenal speeds. From a minimum of one position report per 90-minute revolutions of the satellite, the 704 will calculate the satellite's imminent passage overhead for the benefit of official and unofficial observers around the world. These detailed predictions will be given, among others, to Vanguard radio tracking stations, IGY optical stations, principal astronomical observatories, and major cities.

Equipment in the instrument-packed satellite will emit a radio signal to be picked up as the satellite passes each of the strategically located tracking stations. Within 20 minutes, three sets of data, each consisting of two angles of measurement plus time of measurement, will be relayed from the Minitrack stations to the Vanguard Communications Center in Washington and thence via teletype to the 704 installation. Immediately, the giant machine will process this data, and the results will go back via teletype to the communications center, where they will be flashed to alert the next Minitrack station in the path of the satellite.

Mathematicians are now busily devising new programs for the electronic machinery to ponder upon. The U. S. Navy and other agenices which are guiding the project are, meanwhile, recruiting and training men to man the tracking stations, which is a sizeable job itself.

The lightweight Minitrack batteries in the satellite will last only a relatively short time. When the radio signal stops, IGY scientists will have to rely on optical observations alone. For this reason, an exact satellite timetable becomes even more important as the artificial moon continues in its orbit. Without the 704, it is possible that the satellite would be lost in space in short time.

Knowledge to be Gained

There are many experiments that can be conducted in the upper atmosphere, but the small size and weight of the satellite restricts the experiments to only those which can be done with the use of very small and very light equipment. Remember, the satellite only weighs 21½ pounds, and of this weight roughly half is made up of the satellite skin and the structural features contained in the satellite. This leaves only slightly more than 10 pounds for the instrumentation needed for the experiments. Even with this weight and space limitation, however, there still are many experiments which can be conducted. Yet even if there were no instrumentation in the satellite, there still are many valuable experiments that could be carried on with it.

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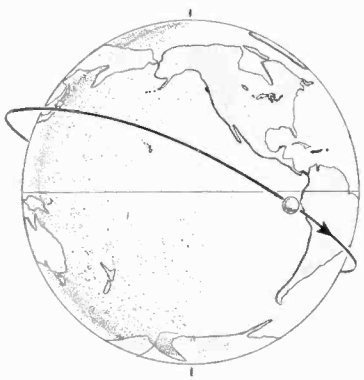
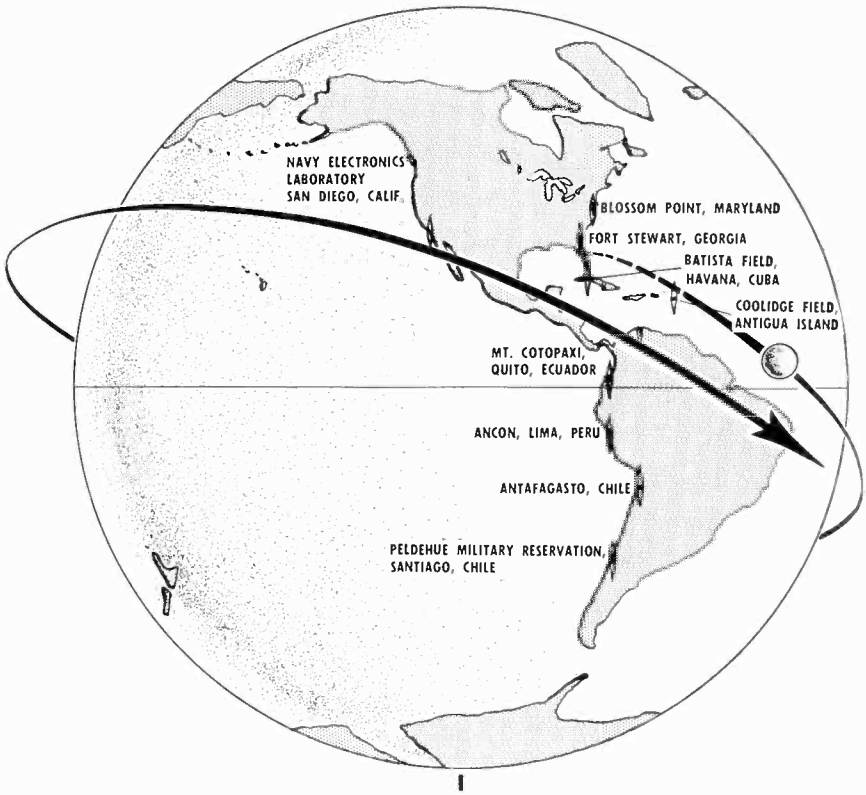
THE ORBIT

BELOW: Four possible orbits of the satellite, 300 miles above the earth. Errors or outside forces could make the orbit elliptical.





ABOVE: Primary radio tracking stations will be located at the spots shown here. Each will have Minitrack Receivers such as you see in the photo below. In addition to these, 12 major astronomical observatories and 200 "secondary" stations will follow the ball optically. Launching site for the three-stage rocket will be the Air Force Missile Test Center at Patrick Air Force Base, Cocoa, Florida. Seven of the tracking stations will be built and operated by the Army, two by the Navy, and one will be the joint responsibility of the Navy and Air Force. The Navy supplies the components of the Minitrack system and trains the operating crews.

ABOVE: Part of the Minitrack antenna layout at the U. S. Naval Research Laboratory's satellite tracking station at Blossom Point, Maryland, about 40 miles south of Washington, D. C. The Navy has been testing an abbreviated version of this set-up which would be suitable for radio amateurs construction and operation. Called the Mark II Minitrack System, the abbreviated version will permit amateur radio clubs of limited means to establish tracking stations.

• By just tracking the satellite scientists could improve the accuracy of geodetic measurements over those now based on observations of the natural Moon.

• A careful measurement of the period of the nodal regression may afford an improvement in the measured oblateness of the Earth.

• A second output of the tracking program will be the drag experienced by the satellite at orbital altitude. From this it should be possible to deduce the density of the atmosphere.

• Temperatures on and within the satellite should be measured. By monitoring the interior pressure it may be possible to determine whether or not the shell is punctured by a meteor. There also is the possibility that the surface may be eroded by impact with dust particles. Such erosion would adversely affect the visibility of the satellite. In any event, erosion should be measured.

• Photon counters could be used to measure the light from the Sun in the ultraviolet and x-ray wavelengths. It would be of particular interest to correlate such observations with weather and ionospheric behavior.

• If the Sun could be observed in the Lyman alpha region, and simultaneously the same radiation from outer space recorded, then it might be possible to determine the density of hydrogen atoms and ions in space. For that part of the space radiation which varied directly with the Lyman alpha, radiation from the Sun could be attributed to hydrogen atoms fluorescing under illumination by the Sun. That part of the space radiation which formed a steady background could be attributed to hydrogen ions recapturing electrons and eventually emitting the Lyman alpha line.

• A magnetometer flown in the satellite could provide a time record of the earth's magnetic field above the ionosphere. With a similar record obtained simultaneously on the ground, it may be possible to separate the magnetic variation due to current flows in the ionosphere itself and those effects due to current rings far out beyond the atmosphere. This information might be helpful in determining the cause of magnetic storms, and information on this current ring may prove to be important in the field of radio communications.

• With Geiger counters, scintillation counters, and Cerenkov detectors in a satellite, it should be possible to study the lower energy cosmic rays which do not penetrate the earth's atmosphere. There is particular interest in studying this portion of the cosmic ray spectrum since it shows the greatest variation correlated with solar and magnetic phenomena. Because the cosmic rays are charged particles, the earth's magnetic field influences their motion as they approach the earth. This influence varies with geomagnetic latitude. In order to make use of this varying influence in analyzing the cosmic ray spectrum, it is desirable to have a satellite orbit passing over the geomagnetic poles.

• Another interesting experiment could be done by inserting a tiny microphone behind a sounding diaphragm on the surface of the satellite and listening for the sound of the impacts of dust and meteorites as they pepper the skin of the satellite sailing around in interplanetary space. Also, a thin resistive coating might be applied to a portion of the outer surface of the vehicle and its resistance monitored. As the coating wears away from dust erosion, its resistance will increase. The rate of increase will give the rate of erosion. It also is possible that fast-moving meteorites might generate enough light in a scintillation counter to be observable with a photocell.

The satellite will be launched from Patrick Air Force Base in Florida, and so the inclination of the orbit to the equator will be at least the latitude of Cocoa, Fla., 28°28′. Actually, the inclination will be somewhat greater than this and will be around 35°. It is desired to have the inclination as large as possible so that the satellite will be observable in the temperate latitudes where the density of scientific population and equipment is high.

Once the satellite leaves the stand it becomes a separate entity and exists in space with an orbit of its own, freed of the rotation of the earth about its axis. The orbit is, however, a part of the earth system in its revolution around the sun. The period of the satellite in its orbit will be about 90 minutes. As the earth rotates on its axis the satellite orbit will be displaced overhead some twenty-odd degrees to the west during each revolution. In this way, in time, it covers a latitude band equal to twice the inclination of the orbit and evenly spaced about the equator.

Probably an Elliptical Orbit

The chosen orbit is a nominal circle 300 miles above the surface of the earth. If one could control perfectly the angle and velocity of firing, the orbit could indeed be circular. In fact the intended height of launching is 300 miles, but errors in this height, in angle, and in velocity will result in an elliptical orbit. In the elliptical orbit it is intended that the nearest approach be not less than 200 miles and the furthest extension not greater than 1500. While the atmosphere at these heights is extremely tenuous, drag is sufficient to take

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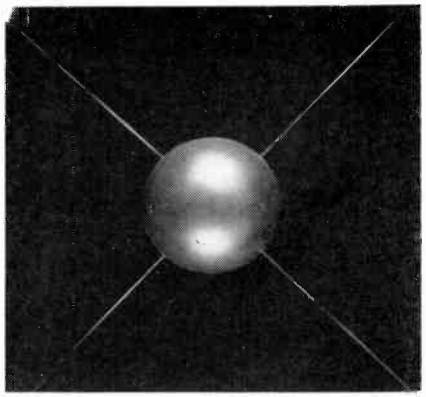
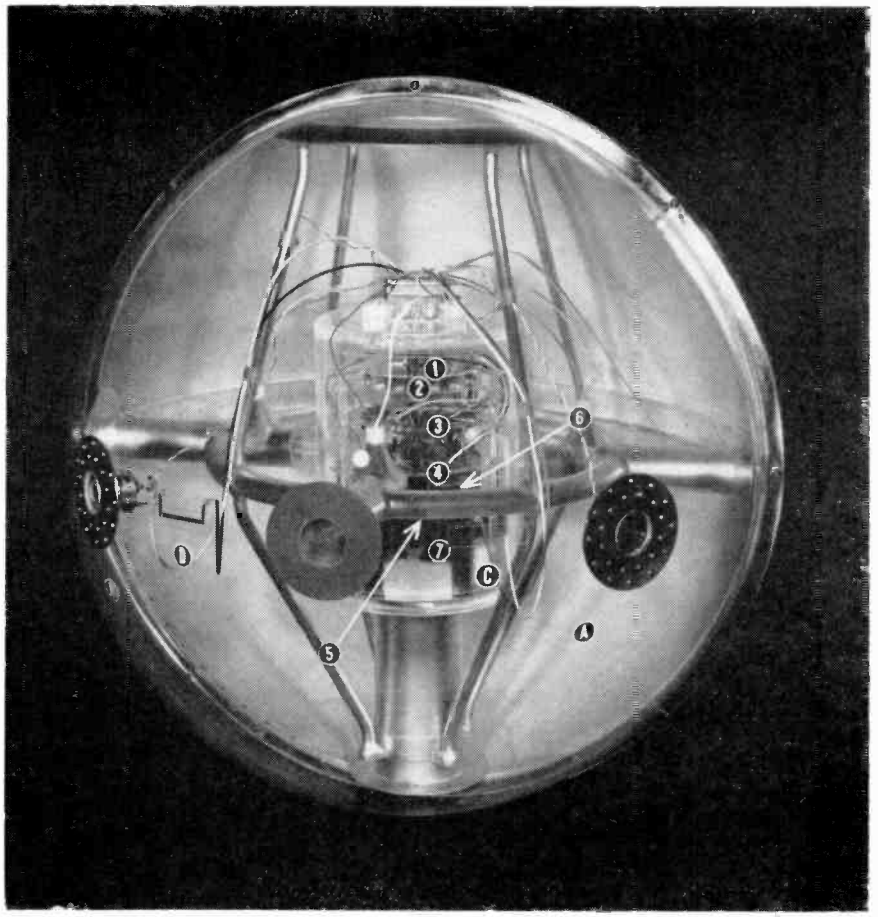
THE SATELLITE

The first-stage rocket, which launches the entire assembly, will burn out between 30-40 miles above the earth and drop off. At this point, the second-stage rocket will fire and jettison its nose streamlining, leaving the satellite exposed. The satellite is attached to the nose of the third-stage rocket, which is carried within the second stage. The second-stage rocket will tilt in the direction of the satellite's intended flight path. Then it will coast upward into the satellite's intended orbit and impart a spinning motion to insure directional stability to the third rocket which will have set upon its course. Then the second stage will drop off. The small third-stage rocket's sole task is to boost the satellite's speed to approximately 18,000 miles per hour, which is necessary to counteract the effects of the earth's gravitation. The satellite itself will be separated some distance from the third-stage rocket to give ground observers an unobstructed view. Then the 21-inch ball will begin circling the Earth from west to east, completing the circle once every 90 minutes.

BELOW you see what the satellite will look like with its four antennae extended for radio transmission. The little moon will measure only 20 inches across and weigh approximately 21½ pounds. The vital scientific gear inside will weigh approximately 10¾ pounds.





THE INSTRUMENTS indicated by the lettering and numbers on the satellite are:

A. Solar cell—Peak Memory Reset. Solar cell operating on energy from the sun will reset peak memory storage unit once each orbit on transition from darkness to daylight.

B. Ion chamber—Narrow band for ultra-violet detector. Peak Ultra-violet sensitivity at the Hydron Lyman-alpha line (1215.7 Ang.).

C. Thermistors—Semi-conductor. Made of various metal alloys— used for temperature measurement. The resistance changes with temperature. Range from + 1500° C to — 40° C. Resistance change from 150 ohms to to 100,000 ohms.

D. Erosion Gauge—Nichrome ribbon evaporated on glass. Measures surface erosion caused by impact of micro-meteorites. Resistance of Nichrome ribbon increases as film becomes pitted by Meteor particles. Thickness of Nichrome film about $100A_0 = \frac{1}{10{,}000}$ mm.

1. Minitrack transmitter. Supplies the r. f. link for continuously telemetering the data from the satellite to the ground. Operating life about two weeks with batteries indicated.

2. Meteor Storage. Meteorite Collision Memory. Magnetic cores are used to store the number of "counts" from the meteoritic collision detector and transmit signals representing four decimal digits on four telemetering channels.

3. Telemetry Coding System. Successively samples various signal input channels and appropriately modulates the "minitrack" radio tracking transmitter for transmitting scientific data to a ground recording station.

4. Lyman alpha storage. Peak Memory Unit. Magnetic cores are used to store and code the telemetering system with a signal representing the maximum input valve reached during one satellite orbit for subsequent read-out when passing over recording stations.

5. Meteoritic Collision Amplifier. Amplifier output signal from a sensitive microphone used to detect collision with micro-meteorites and provides input to meteoritic storage counter.

6. Lyman alpha. Current amplifier for measuring the ionization produced by far ultra-violet solar flare radiation.

7. Mercury batteries power supply.

energy out of the orbit and cause the satellite to spiral to earth. Based on present estimate of densities, it is calculated that the satellite would exist in a circular orbit of 300 miles height for about one year. If the height were 200 miles the lifetime would be only 15 days, and were it 100 miles then the lifetime would be less than one hour.

If the resulting satellite orbit lies within a perigee (nearest point to the earth) or 200 miles and an apogee (farthest point from the earth) of 1500 miles, then the launching vehicle will have accomplished its mission.

The Minitrack system makes use of established radio interferometric principles. It utilizes a transmitter of minimum size and weight within the satellite to send a beam of radio energy to receiving antennas at ground stations. By comparing the path length from the transmitter to one antenna with the path length from the transmitter to a second antenna, it is possible to locate the satellite in its orbit, determining its angular position by radio phase-comparison methods. Similar measurements with another set of antennas, at right angles to the first set, help to fix the satellite accurately. In the actual ground tracking stations, seven antennas will be used. Six separate items of data will be obtained in this manner, sent to a central computing facility within 20 minutes of receipt, and used there for determining the orbit of the satellite.

All-Weather System

This system, which utilizes radio methods, is independent of essentially all-weather conditions, visibility conditions, and time of day, so that operation is assured whenever the satellite is within the ground-station pattern. An operating frequency in the VHF band, 108 megacycles, permits good efficiency with minimum-weight components in the satellite, while at the same time provides reasonable antenna beamwidths at the ground stations, with large collecting areas.

The satellites transmitter, according to present plans, will be a simple, minimum-weight (three pounds or less!) oscillator with a power output of 20-50 milliwatts at an operating frequency of 108 Mc. Two developments for this application are currently being conducted, one using subminiature low-filament-current vacuum tubes and the other using transistors. Both units are crystal-controlled for frequency stability and are designed for a minimum operating life of 350 hours, or slightly over two weeks of continuous operation. The transistor unit would provide the lighter and smaller package, an estimated two pounds complete, including antenna, antenna phasing system, oscillator, and batteries for 20-milliwatts output, although at the possible cost of an additional temperature requirement.

Battery Power Studies

Battery power for the Minitrack transmitter may be of several types, again depending on the outcome of comparison environmental tests. Because of the vacuum ambient in which the satellite moves (comparable to an evacuated electron tube), all batteries will probably require pressurization. Of the common battery types that are being considered, the zinc-silver-oxide cell, the zinc-mercury cell, and the indium-mercuric-oxide cell appear to be able to meet the satellite requirements for temperatures, pressurization, weight, and size. Of the nonstandard types, the so-called solar cells appear to hold some interest but are to be considered only after intensive tests to determine their reliability under the severe surface conditions to be met by the satellite.

The pattern of the Minitrack antennas will be fan shaped, with the axis of the beam pointed to the zenith and the plane of the fan along the north-south plane. At satellite heights the beam will be several hundred miles wide. In this way a chain of stations distributed roughly along the 75th meridian and stretching from latitude 40° North and 40° South could intercept the satellite at each passage.

TURN THE PAGE
For Pictures of the
MINITRACK TRANSMITTER

THE TRANSMITTER

AT RIGHT: Project Vanguard scientists discuss the design and performance of the tiny transmitter which will send signals to the ground from the earth satellite. Joseph Y. Yuen, one of the developers of the small transmitting unit, and Martin J. Votaw discuss the relative merits of the various circuits and components being tested for use in the Minitrack oscillator.

CENTER: Minitrack Transmitter to send signals from the satellite to tracking stations on the ground. This 10 milliwatt transmitter was designed by Project Vanguard scientists at the Naval Research Laboratory. The circuit is a single-stage, crystal-controlled, transistorized oscillator. The transmitter uses Philco transistors, Type SBDT 12. The battery pack consists of seven mercury cells, Mallory Type RM 12 and will power the transmitter for a period of two weeks. The thin aluminum container which houses the oscillator is gold plated to improve its properties as a heat shield. Total weight of the unit is 13 ounces.

BELOW: John T. Mengel, head of the tracking and guidance branch of Project Vanguard, examines the assembled transmitter pack and an exhibition model that was constructed on a clear plastic sheet so that the components are clearly visible after assembly. The transmitter goes into a gold-plated aluminum container.

Official U. S. Navy Photos

Unionists warned not to use 5th Amendment

AFL-CIO Spells Out Its Ban on Rackets and Reds

THE 29-member AFL-CIO Executive Council, which held its regular winter meeting during the closing days of January, took decisive action on some thorny problems which threatened to disrupt the year-old merged AFL-CIO.

It adopted a trio of Ethical Practices Codes designed to supplement and clarify the AFL-CIO's constitutional barriers against communism and corruption, to establish health and welfare funds on a clear administrative basis, and to define what the Federation considers "conflict of interests" in labor-management relations.

The big topic for discussion was the coming Senate investigation of malpractice and corruption in the labor movement. The Council stated that trade union officials and members have a responsibility to cooperate with government and public agencies seeking "fairly and objectively" to root out corruption in America.

A union official "has no right to hold office in his union," if he resorts to use of the 5th Amendment on all relevant questions "for his personal protection and to avoid scrutiny by proper legislative committees, law enforcement agencies or other public bodies into alleged corruption on his part," the Council said. The policy statement was adopted with one dissenting vote.

Highlights of the trio of codes adopted include:

• A recommendation that union officials receiving full-time pay should receive no fees or salaries of any kind from a health, welfare, or retirement program fund.

• A clause banning union officials, employes, or their agents from "compromising personal ties, direct or indirect, with agencies such as insurance carriers, brokers or consultants doing business with the welfare plan."

• The code on conflicts of interest asserted that "no responsible trade union official should have a personal financial interest which conflicts with the full performance of his fiduciary duty as a workers' representative."

• In general, the code provides that no trade union official should own or have substantial interest in any business enterprise "with which his union bargains collectively, or in any business enterprise which is in competition with any business enterprise with which his union bargains collectively."

• The code declares that no person should hold or retain union office or position "who has been convicted of any crime involving moral turpitude offenses to trade union morality."

• The code bars from gaining or holding union office a member or "consistent supporter, or a person who actively participates in the activities of the Communist Party, or any Fascist or totalitarian group, which opposes the democratic principles to which our country and the American trade union movement are dedicated."

AFL-CIO President George Meany listens to a reporter's question at a press conference in the Monte Carlo Hotel in Miami. (Delegates to our division progress meeting last year will recognize the wall mural.) Besides Meany, from left, are Norman Walker of the Associated Press and William Schnitzler, AFL-CIO secretary-treasurer. Meany issued a blunt warning to three unions—Laundry, Allied Industrial, and Distillery—that they have 90 days to clean house or stand suspension and face ultimate expulsion from the AFL-CIO.

Brother Sullivan signs his first official papers as International Treasurer, as International President Freeman and International Secretary Keenan welcome him to Washington.

Assumes Duties This Month

Sullivan Elected International Treasurer

Jeremiah P. Sullivan, president of Local 3, New York City, has been selected International Treasurer of the Brotherhood. Jere, as he is known to a wide circle of friends in the Brotherhood, was installed in ceremonies this month at the International Office in Washington.

Brother Sullivan fills the vacancy left by the death of another Local 3 member, William A. Hogan, on November 15, 1955. Hogan had served as International Treasurer for 47 years.

Fred B. Irwin of Local 48, Portland, Oregon, a special assistant to President Gordon Freeman, who had served as International Treasurer during the interim period until a permanent treasurer was selected, now goes back to full-time duties as a Presidential assistant.

The new International Treasurer was born on October 12, 1890. He was initiated into the IBEW on August 1, 1912, and served as Recording Secretary of Local 3 from 1940 to 1943, when he became President of the local. He served in office of Local 3 until his International appointment this month.

Members of the International staff and a number of officials of Local 3 attended the installation ceremony held in the International Executive Council Room at the International office.

Melee Over Miami

NLRB Charge Against Local 349 Employer

Unfair labor practice charges have been brought by Local 349, IBEW, of Miami, Fla., against the Southern Radio and Television Equipment Company, owners and operators of Television Station WTVJ. Local 349 represents employes and discharged employes of WTVJ and had previously filed a petition with the National Labor Relations Board for determination of the representation question.

It is charged, according to the filing with the Board, that the station engaged in unfair labor practices within the meaning of Section 8(a), subsections (1), (3), and (5) of the National Labor Relations Act.

The basis of the charges reads as follows:

"On or about January 23, 1957, and various dates thereafter, the company did discharge Joe DeSimone, George H. Schwartz, and Lloyd Gaynes, and on or about February 4, the company did discharge Dimitry N. Alexander and Wilson P. Griffith, because of their membership in and activities on behalf of the International Brotherhood of Electrical Workers, Local Union 349, AFL-CIO.

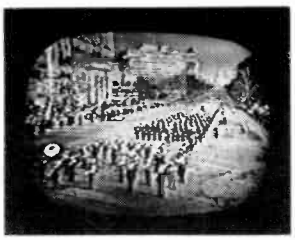
"On or about January 17, 1957, and various times thereafter, the employer interfered with, restrained or coerced its employees in the exercise of rights guaranteed them in Section 7 of the Act by causing various employees to withdraw their authorization and/or membership cards which they had signed on behalf of the IBEW Local 349, AFL-CIO.

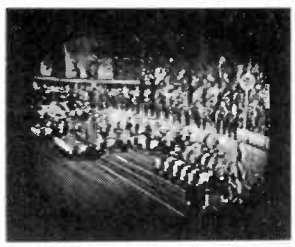
"On or about January 17, 1957, and thereafter, the employer refused to bargain collectively with the undersigned union, a labor organization chosen by the majority of its employees in the production department.

"By these and other acts and other conduct, within the past 6 months the employer interfered with, restrained and coerced its employees in the exercise of their rights guaranteed in Section 7, of the Act."

WTVJ is licensed to operate on Channel 4 and is the local affiliate of the CBS-TV network.

Investigative procedures are in process, being conducted by the Regional NLRB office for the Miami area. As is usual in such cases, no action will be taken by the Board on the representation petition previously filed until disposition is made of the unfair labor practice charges.





Highlights of the Inaugural Coverage

Video tape covers the event for the first time

THE 43rd inauguration of a United States President, January 21, was thoroughly covered by the networks, as any broadcasting engineer on duty that day can tell you.

CBS-TV programmed for six hours and 45 minutes. NBC-TV ran for five hours and 45 minutes. ABC kept its cameras trained on the event for almost five hours. Radio time for all three networks was equally as long.

Coverage included the swearing in, the parade, and the inaugural balls that night. These are some highlights of the busy day:

• Both CBS-TV and NBC-TV recorded President Eisenhower's swearing-in ceremony on Ampex video tape and then both nets played it back later. CBS-TV was on the air with its recorded version in 30 minutes, and then 30 minutes after that it replayed it again. Observers report that the picture quality of the taped record was good. This was the first time videotape was used to cover such a major event.

• CBS-TV scored another first by making commercial use of a new and small, portable, high-quality film processing machine. CBS News reportedly shot and distributed 10,000 feet of film to more than 100 domestic and foreign subscribers, using the machine for quick processing.

The machine, which measures 29 x 20 x 36 inches, can be shipped by air to any point in the United States or abroad. It requires no special darkroom since it is a magazine-load type processor and can operate on a normal 110-volt power line.

The machine can process 45 feet of film per minute, says CBS. It uses standard photographic developing solutions and produces film of quality comparable to that produced by large commercial laboratories.

President Eisenhower, hat in hand, watches an honor guard pass in review from his front-and-center position in the White House reviewing stand. The small photos at upper left show the parade down Pennsylvania Avenue.

• The complete series of inaugural events required a lot of work by the Chesapeake and Potomac Telephone Company. The four inaugural balls, the swearing in, and the parade required 50 TV circuits and the installation of about 28 miles of special cable. Approximately 60 microwave dishes were set up at key points around the capital to beam the TV signals. The C & P borrowed about 25 microwave systems and 25 amplifiers from associated telephone companies as far away as Los Angeles, Calif. To complete the set-up, 150 radio channels were made available to the broadcasting companies.

• The coverage at the reviewing stand before the White House caused on unexpected hassle. An innocent white dog trotted past the stand with the paraders, and millions of people took note. Two Washington owners of white dogs almost came to blows as to whose dog had paraded for the President.

Technical NOTES

Atomic Storage Battery

Development of a tiny nuclear-powered battery that will deliver current for five years has been announced by the Elgin National Watch Co., Elgin, Ill.

Scientists said it is the first device made to safely harness radioactive materials for every day personal use without the inconvenience of special precautions.

They said the little battery, although not yet ready for the commercial market, will soon be used in such products as hearing aids, small portable radios and civil defense warnings receivers for the home that will operate around the clock "For Years."

The cell, which is about the diameter of a thumb tack, was developed by the Elgin Company in conjunction with the Walter Kidde Nuclear Laboratories, Inc., Garden City, N. J.

Transmitting Warhead

A tiny radio transmitter small enough to fit in the nose of a 20-millimeter projectile and so rugged that it can withstand acceleration shocks over 30,000 times the pull of gravity has been put to work on ballistic ranges. Developed by the Naval Ordnance Laboratory, the 20mm spin sonde is powered by a mercury battery which has an operating life of 200 hours. When used on the range, a 20mm projectile, fitted with the transmitter, is fired, and the transmitter sends a signal to receivers along the path of flight.

Pocket-Size TV Camera

Details of a pocket-size TV camera, weighing less than a pound and measuring $1\frac{7}{8}$ by $2\frac{3}{8}$ by $4\frac{1}{2}$ inches, were disclosed recently by RCA. Theodore A. Smith, executive vice president, RCA Defense Electronic Products, said the camera will be for military airborne, mobile and field closed-circuit uses.

The camera was developed by RCA Surface Communications Dept. engineers, and combines transistors, specially developed transistor circuitry and a new RCA half-inch, vidicon camera tube. It is said to surpass the standard vidicon-type industrial TV cameras in sensitivity—with the use of an F-1.9 lens, the camera requires only 10 foot candles of scene illumination for "clear, contrasty pictures."

RCA noted that its small camera can be operated in the palm of the hand, or with an attachable pistol-grip handle, bolted to wall or floor or mounted on tripod. It incorporates a photoelectric iris control, operates from a 115-v, 60-cycle AC source drawing less than 350 w, has a high level of resistance to shock and vibration and can be operated by non-technical personnel, rarely requiring control adjustment once optical and electrical focus are fixed.

Service Clinic Session

Among the first of 300 service clinics on the new Sylvania S-110 television chassis is shown above in progress at Springfield, Mass. Warren Davis, standing left, New England service manager for Sylvania Electric Products, Inc., is addressing approximately 75 servicemen from the Springfield-Hartford area. The clinics, scheduled for most major communities throughout the country, will continue until April.

A full story on the service clinics—explaining the scope of their program—appear on Page 15 of the January issue of the TECHNICIAN-ENGINEER.

Portable TV Tubes

Four television picture tubes designed for portable television receivers have been made available to the renewal market by Sylvania Electric Products Inc., it has been announced by H. H. Rainier, manager of the distributor sales department.

Three of the tubes—designated 14RP4A, 14XP4A, and 14SP4—are aluminized. The fourth tube, type 10ABP4B, is non-aluminized.

All four employ 90-degree deflection and are equipped with spherical faceplate and electrostatic focus.

Muntz Goes to Color

Muntz, TV, Inc., Chicago, expects to convert from monochrome to color production by next spring and unveil a new tint model for $299.

Muntz introduced the first of its 21-inch color sets in December and will swing over from black-and-white at a pace dictated by monochrome sales during the coming months.

Muntz is generally credited with a comeback in the set manufacturing industry following bankruptcy proceedings months ago.

Six-Job Camera

General Electric is publicizing its Vidicon TV camera as a hard-working "one man band." It does six jobs as film camera, remote pickup camera, emergency camera, rehearsal camera, experimental operations camera, and closed circuit camera. The camera is 9 inches long, 7 inches high, weighs 10 pounds. It mounts directly on the Optical Multiplexer—handles four film sources that interchange through fixed mirrors and adjustable beam splitters.

Color Tape Prediction

Ampex has made improvements in its videotape recorder since undergoing shakedowns by CBS and NBC, and the company now expects to have recorders ready for purchasers in November. Prototypes of the Ampex Videotape Recorder have been in use for several months by CBS and NBC.

Philip Gundy, Ampex vice president, says, meanwhile, that the possibility of a color recorder is "at least 18 months away."

Five-Year Guarantee

Philco Corporation is now offering a five-year guarantee on its all-transistor "cordless" home radio, the first such guarantee in history, according to the company. The small radio may be returned to the factory for repairs at no cost. The guarantee covers all parts as well as service. In addition, Philco dealers will replace, free of charge, the two ordinary flashlight cells which power the radio if they fail in one year.

Relay Violations

Because of instances wherein equipment salesmen, notably in microwave relay field, have sold apparatus to private users for TV reception in remote areas without notifying purchasers that licenses were required, the FCC recently decided to take action. It is advising all manufacturers in this field of the necessity of notifying prospective purchasers of equipment where licenses may be required. Action was taken after the FCC had absolved a TV viewer in Montana who had unwittingly established microwave relays only to find he was in violation of the Communications Act.

Another Tower Collapses

In the January issue of the TECHNICIAN ENGINEER we told of the toppling of WMT-TV's tower at Cedar Rapids, Iowa. This month, another tower went down before the wind:

A new 1200-foot tower for WSM-TV, Nashville, Tenn., began to snap about 300 feet up and collapsed "like an accordion," carrying four men working on the structure to their deaths. There was only a slight wind, it was reported.

A steel rigger said he had just loosened eight of 12 guy wires which balanced the tower upon a tiny ball base because "the wires had been singing in the wind."

Suggest FCC to Cabinet

Rep. J. Arthur Younger of California, a member of the House Interstate and Foreign Commerce Committee has proposed in Congress that the FCC and several other Federal agencies, boards, and bureaus be combined into a department of the Executive branch of the government and to be known as the Department of Transportation and Communications.

The proposal was introduced as HR 3424. Congressman Younger said in an accompanying statement that many of the agencies were established as "arms of the Congress, but . . . through the issuance of rules and regulations, these independent bodies attempt to circumvent or nullify acts of the Congress."

Station Breaks

Bay Area Pay Raise

Technical employes at KYA, San Francisco, and KLX and KROW, Oakland, represented by IBEW Local 202, with a year more to go on their present contract, have negotiated a $10-a-week pay raise, retroactive to November 1, 1956. The raise came in talks with the Bay Area Independent Broadcasters Association, a recently organized management group.

The raise followed a pattern set in recent management negotiations with AFTRA announcers.

A formula for after-midnight work negotiated by the announcers was also applied to the engineers. They will work six-hour shifts for eight-hour pay and forego mid-shift rest periods which would have necessitated the employment of relief operators at KYA.

Toward Darkest Africa

Arthur Godfrey has received FCC permission to broadcast from his airplane while flying to and from and while over French Equatorial Africa. The special temporary authorization runs for a two-month period this spring.

Call letters assigned to Godfrey's plane are KD-2713. The CBS personality plans to let his morning show listeners in on real "remote" comments on the "darkest continent."

New Montgomery Letters

Members of Local 1299 are sounding new call letters in Montgomery, Ala. WSFA has new owners, Connie I. Holt and Robert N. Robinson, and its call letters have been changed to WHHY. Robinson is new manager.

ANOTHER REMINDER

The 1957 Progress Meeting will be held in New Orleans, La., June 14, 15 and 16.

WKBN Strike Settled

A 112-day strike at WKBN and WKBN-TV, Youngstown, Ohio, ended recently with the signing of contracts between the company and two unions.

IBEW Local 1219 and NABET Local 47 were involved in the dispute, which began October 21 when 16 production employees walked off the job to support demands for union recognition and contract and in protest over the discharge of an announcer. NABET won a subsequent representation election. Thirteen IBEW engineers honored the NABET picket line, and on December 7 they also struck the station when their contract expired.

The new NABET contract calls for a modified union shop, time and a half after a 40-hour week and eight-hour day, job jurisdiction, job security, double time for work on Christmas and New Year's, and time and a half on four other holidays, three-hour callback, sick leave, and grievance procedures.

The wage scale calls for starting pay of $80 a week for announcers and runs to $112 after five years. The newsmen and directors start at $85 and run to $117 after five years of service.

The engineers of Local 1219, meanwhile, signed a contract which runs from $76.25 weekly to $112 after five years.

The contracts are effective as of February 1. The agreement came after prolonged conferences in which three Federal mediators assisted.

Mary Ellen Trottner of Chicago, international representative of NABET's District 4, signed for NABET. Signers for the IBEW were Joseph Maxin, president of the local, and W. A. Smith, IBEW international representative.

Following the contract signing, Warren P. Williamson, Jr., president and general manager of the Youngstown broadcasting company, said, "The company looks forward to continued good relations with its production and engineering staffs."