



NASA TRACKING STATION



Cotopaxi, highest active volcano in the world



12-meter dish antenna

Probably one of the most spectacular sites for a radio station anywhere in the world is situated some forty miles south of the city of Quito. Here, at an altitude of nearly 12,000 feet, a very unusual radio station operates around the clock. At this altitude deep breathing is required to make up for the lack of oxygen in the air. To make the scene even more beautiful, Cotopaxi, the world's highest active volcano, rises to a height of 19,437 feet just a few miles away. This station is one of a network operated by NASA, the National Aeronautics and Space Administration, to track the many satellites now orbiting the earth.

The satellite-tracking station was installed well over twenty years ago to track the Vanguard satellites. In 1958 it was taken over by NASA. Since 1975 it has been operated jointly by NASA and the Escuela Politecnica Nacional of Ecuador through an agreement signed by the two countries. The location was chosen not only because of its altitude but also because of its isolation from man-made interference and noise. From the Pan-American Highway, about all that can be seen is

the large 12-meter parabolic dish antenna. Interestingly, the original minitrack receiving equipment is still in daily operation.

Several buildings make up the station complex. The largest is the operations building which houses most of the tracking equipment and is the nerve-center of the installation. Other buildings house the 2,500 kW diesel generators, cafeteria, classrooms, and storage facilities. Several types of antennas are used to receive signals from the satellites as well as to transmit instructions and information to them as they pass overhead. Several radio systems are used to track the satellites. Data is received concerning the direction, range, and velocity of the different orbiting bodies. The data is synchronized with that received by other stations in the network by use of atomic clocks which are accurate to one-hundred-billionth of a second! Some of the data received is analyzed locally, other data is recorded on tape for later use, and much is sent on immediately by radio to the United States or other countries.



Dual transmit/receive dish antenna

The Quito tracking station is the busiest in the NASA network. On the average about 2,000 passes are monitored each month. Included are some thirty different vehicles. Most of these are United States projects, but a few are joint experiments with different European countries. Each satellite has its distinct purpose. Innumerable research projects are possible, so additional satellites are constantly being launched to meet each need. Studies of the earth's atmosphere, the sun, solar particles, and the earth's magnetic field are just a few of the many possibilities.

It takes a large staff to keep this tracking station in operation during the twenty-four hours of each day. Of the 210 people currently working at the station, only six are from the United States. The other 204 are Ecuadorian technicians and engineers. Most of these are graduates of the

Escuela Politecnica Nacional in Quito. Further specialized training is given on the job or at schools in the United States. The high percentage of Ecuadorians employed on the project is a good commentary on the caliber of the training given by the technical school.

The NASA tracking station near Quito is just a short distance off the Pan-American Highway south of Quito. It is open daily to the public, and anyone interested can take a short tour through the facilities. Anyone with a scientific bend of mind would certainly include a visit to this fascinating station in their travel plans to Ecuador. The few hours spent will prove very rewarding. If it should be a clear day, the scenery itself will never be forgotten! It is possible to drive past the tracking station. The road goes almost to the snow line of Cotopaxi where the mountain-climbing clubs have constructed a small refuge. Unless one is fully equipped for serious climbing on snow and ice, however, that is the end of the trip.

SHORTWAVE EMPATHY

By Michael Maghakian

As you begin the shortwave hobby you soon discover that a small part of the radio spectrum can contain a tremendous number of stations. If you hope to become a good DXer, you need to be able to handle this crowded situation. You need to acquire some empathy with the shortwave broadcasting scene. The dictionary defines empathy as an understanding which is so intimate that the feelings, thoughts, and motives of one are readily comprehended by another. What this means to you, the DXer, is that you can learn to recognize many stations by the way they sound. You can develop a feel for them and be very accurate most of the time.

If you are a beginner to the hobby, it will help you to start out the right way. If you are more advanced, you may have to change some of your habits. Here is what you need to do. Convince yourself that it is the right thing to do and then stick to it. Choose what you consider to be the major broadcasters. These may include the BBC, Voice of America, Radio Nederland, HCJB, and others. Listen to some of them for a few hours each day until you become as familiar with them as with your favorite local stations. Listen carefully until you can recognize the announcers by name, personality, and voice quality. Listen until you are familiar with the program formats. When do they broadcast news, music, comment-

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aries, or other special features? Does the station talk a lot about the country where it is located? You should not limit yourself to English-language broadcasts directed to your area. Listen to some of the programming in other languages and beamed to other parts of the world.

When you find that you have developed a real empathy for the major broadcasters they will seem like old friends and you'll be able to identify them just about as easily. Then it is time to tackle some of the less-common stations. However, don't bother with the rare stations. To really learn the shortwave bands will take a lot of hard work and it won't come over night. Absorb all the information you can about each station. Then sit back and reflect on what you have learned. Can you remember what the announcers on the BBC sound like? What kind of music does Radio Sweden play between programs? After weeks of working, you will find that the sacrifice has left you with a sense of satisfaction. You'll be able to say that you really know the shortwave bands. While others are wasting their time trying to get an identification for the Voice of America or Radio Nederland, you have already recognized your old friends and moved on down the dial. You have found an unfamiliar voice or sound which turns out to be that rare 1,000-watt station you've been looking for. Your DXing time has been well-spent where it pays off!

DXer VISITS HCJB

In August, 1980, we were very happy to receive a visit from John Havránek, of Glen Waverly, Australia. John is ANDEX member No. 3343. On only a few occasions have we been honored by visits from ANDEX members. This is the first time that one of our DXers of the Month has stopped off in Quito to see HCJB. It was in the March, 1980, issue of ANDEX International that John's picture appeared along with his Panasonic DR-22 as our featured DXer.

John has been traveling with his family to various places in South America. They expected the trip to last about three months. Several weeks were spent in Ecuador. Making HCJB and Quito their home base, they traveled throughout many parts of the country and enjoyed the interesting sights and experiences which are by-passed by most tourists. After leaving Ecuador they were planning similar trips in Peru and Bolivia before returning home to Australia.



Havránek family in Quito with Helen Howard

We feel that John and his family are very fortunate to have spent these three months seeing some of the countries in western South America. We thought other ANDEX members would like to see a picture of the Havránek family while visiting in Ecuador. We were happy to meet John and would encourage other ANDEX members to make the trip as well.

ANDEX T-SHIRTS

In recent months a number of ANDEX members have asked if we could supply them with T-shirts bearing the ANDEX logo. We are happy to announce to all of our members that such T-shirts are now available at what we feel is a very reasonable price. We are certain that these shirts will be very popular. They will help you publicize the club as you tell your friends about shortwave listening.

The T-shirts are being made in a light-blue color with the ANDEX logo in black. They come in four sizes: Small (34-36), Medium (38-40), Large (42-44), and Extra large (46-48). The price being asked for these shirts is only \$5.50 each. Postage and handling is extra depending on where you live. In North America add \$.50, or a total of \$6.00. For the rest of the world the additional cost is \$1.25, or a total of \$6.75.

Do not send your order for one or more T-shirts to the ANDEX club address. All sales are being handled by the manufacturer in the United States. Send your order directly to the address given below. Be sure to include in your order the number and sizes of the shirts you desire. Don't forget to enclose the cost of the shirts ordered. Here is the

address to which your orders should be directed:

HSW Enterprises
P.O. Box 72
Blauvelt, NY 10913
U.S.A.

Members living outside the United States must send an international money order or bank check in U.S. dollars. These can be obtained from any large bank in most countries. No personal checks can be accepted from foreign countries, nor can IRCs be used.

DXer OF THE MONTH



Jan tunes in HCJB on his portable

The Netherlands is famous for many things including its tulips, windmills, and wooden shoes. It is a beautiful country and exports much of this beauty in the form of flower bulbs which are in great demand around the world. It is also famous for its dikes which hold back the ocean and have made it possible to reclaim hundreds of thousands of acres of valuable farming land. The country's largest cities and most productive farms are located on the reclaimed land. There are plans to reclaim even more land in the coming years. The people of the Netherlands enjoy a high standard of living and level of education. The majority earn their living in service and manufacturing industries. Some of the world's leading manufacturers of electronic and radio equipment are in the Netherlands. Radio Nederland always rates very high in popularity among shortwave listeners as they transmit many interesting programs from their transmitters in Hilversum and other relay stations.

The city of Boskoop is world-famous for its tree nursery. Just a few miles away lives our DXer for this month, Jan Harkes. Jan is our real reason for telling you a little about the Netherlands. Jan lives in Hazerswoude and it is not surprising that his occupation is working in the tree nursery. In addition to shortwave listening, Jan's hobbies include 16 mm movie making.

Jan became interested in shortwave listening more than six years ago. The first time he heard HCJB was on May 4, 1975. He uses a German-made Grundig Satellit receiver and finds time to listen to the shortwave bands for about three hours a day. Most of his listening is done between the hours of 1830 and 2130 GMT. He uses the built-in telescopic antenna which gives him good results. He finds his Philips stereo cassette recorder very helpful in making out reception reports to send to the stations he hears. One of his first QSL cards was the special 15th anniversary card for HCJB's DX Party Line. A world map and 24-hour clock set to GMT are also very helpful in the pursuit of his DXing hobby.

Jan joined ANDEX in early 1976 and is member No. 2038. ANDEX was his first and only shortwave club. In the picture we note a kerosene lantern and a coffee mug. The lantern may be for decoration, or does Jan do some of his DXing by lantern light as he sips his steaming coffee? We are glad to have Jan Harkes as a continuing member of ANDEX and are pleased to introduce him to our many members. Congratulations, Jan, and good success for the future!

POINTS TO PONDER

Love for God shines forth in love for others!

Christ will receive you if you only believe in Him!

To win is not always success; to lose is not always failure!

No man can wrong his neighbor and be right with God!

A wise man gears his earthly goals to heavenly gains!

To rest in God's care is to realize God's peace!

The disciplined life is the useful life!