

International

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CHOOSING FREQUENCIES

By Roger Stubbe

The frequencies used in HCJB's 172 1/2 hours per day of shortwave transmitter broadcast time are selected four times a year when we change our schedules. These changes occur at 0030 UTC on the first Sunday in March, May, September and November.

PROPAGATION

Different frequencies are needed each season because the shortwave radio propagation conditions change from winter to spring, to summer to fall, and finally back to winter. For example, in the summer months higher bands can normally be used than in the winter months, and intermediate bands in spring and fall.

Within the seasonal changes and complicating the selection process are the large variations in propagation conditions between day and night. Higher bands propagate during the day and lower bands at night. This change occurs because of the angle of the sun which ionizes the various layers of upper atmosphere which makes long-distance, shortwave propagation possible. In addition, there is the effect of the 11-year sunspot cycle on shortwave propagation. When sunspot activity is high, the higher bands propagate better; and when the sun is quiet, only the lower bands will propagate well.

FREQUENCY SELECTION

With all these complex variations in propagation, I, as HCJB's frequency manager try to select the very best bands, and clearest frequencies within these bands, to provide the strongest, most interference-free signal possible. We also try to use the same frequencies each schedule change for your convenience, or to come back to spots on the band you are familiar with when we have had to change for awhile. However, that isn't always possible. Some other station may have taken over the frequency we had been using or even moved in on a frequency we have been using continually.

In these days when more and more stations are appearing on the bands, frequency selection becomes more difficult. At the same time, with the minimum of the sunspot cycle approaching--it will occur during the summer of 1986--these stations are forced to use fewer bands and the crowding is increased.

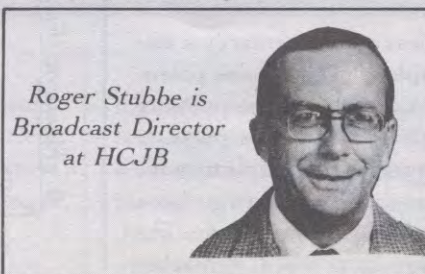
OUT-OF-BAND FREQUENCIES

As a result, HCJB has had to make some special attempts to get its signal through. After I and the local authorities thoroughly examined the problems, and guided by international radio regulations, it was decided to permit a limited amount of "out-of-band" operation for HCJB.

These "out-of-band" frequencies have provided much clearer transmissions. While reception has improved considerably, we have to be very careful not to interfere with any legitimate user of the frequency. In the case of the frequencies in the 9800-kHz area this is not a real problem since it is part of the band expansion already planned. Some governments have already begun using this band segment and interference is already occurring in ever-increasing amounts. The problem is more critical in the 6200 kHz area. This segment of the band is assigned to maritime mobile service. If interference is caused to a legitimate station operating in this segment of the spectrum, we must seek an alternate frequency immediately. We are sensitive to their needs and must respect them.

CRYSTAL FREQUENCY CONTROL

One of the complicating factors we face is that, with the exception of the 500-kW transmitter, all our transmitters are crystal controlled with separate crystals for each of their frequencies. We have on hand crystals for all the frequencies within the previously-assigned bands. Moving outside these bands means that new crystals must be obtained. The time-lapse between placing an order for a new crystal and its arrival here in Ecuador is from three to five weeks. This is one of the reasons we have been slow in making some of the required changes. Our technicians are working on a synthesizer for speeding up the changes.



Roger Stubbe is
Broadcast Director
at HCJB



ANTENNA CORNER:

ANTENNA CONCEPTS MADE SIMPLE

By Don Hastings
HCJB Staff Engineer

It may seem mysterious how radio programs broadcast from a station such as HCJB travel (propagate) thousands of miles to be picked up by your radio. Actually, the concepts are not hard to understand.

Energy

The thing which propagates (travels) through space is energy. Energy comes in two basic forms, potential energy which is stored energy at rest, and kinetic energy which is energy in motion or active. An example of potential energy is a ball on a shelf. If it drops from the shelf it moves down to the floor releasing some of its stored energy. A ball hit by a bat flies through the air exhibiting kinetic energy, but this is still not propagation of energy.

For propagation to occur both potential and kinetic energy must exist and in fact change back and forth from the one form to the other. This changing back and forth is called oscillation, and it happens in many ways around us all the time. Sound, light, plucked strings and waves on water are some examples.

Waves

Let us look at the example of waves on water in detail. If a pebble is dropped into a pool of water it generates a wave on the surface which travels outward from the point of impact. What happens is that the moving pebble imparts kinetic energy to the water which moves some of water downward to form a dimple in the surface. At a point in time the downward motion stops, leaving momentarily a stationary dimple which contains potential energy by virtue of the pressure of surrounding water. This pressure causes the water in the dimple to move upward converting the energy back to the kinetic form once more. The water doesn't stop when it reaches level because of the momentum of the

moving water, but rises up to form a bump on the surface at which point in time the energy is potential once more. It is this oscillation of energy between the kinetic and potential forms which generates the wave which propagates outward over the surface of the water. The energy moves outward from the point of impact of the pebble at a velocity (speed) which depends on the properties of the water in which it travels

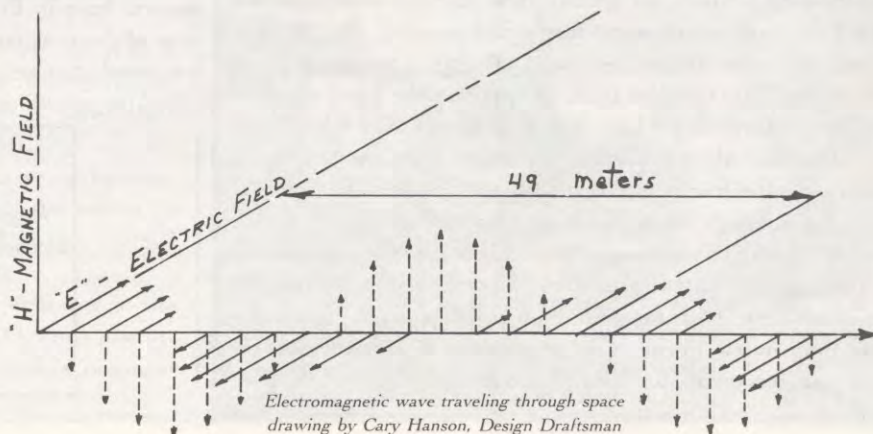
Electric and Magnetic Fields

Radio waves are called electromagnetic waves. Their invisible generation and propagation through space is by means of oscillation of energy similar to the visible waves in water. (The photon theory is beyond the scope of this article.) However the energy resides in very different mediums. In radio waves, the potential energy resides in an electric field rather than in pressure as in the case of water. Anyone who has taken clothes out of a dryer is familiar with electric fields which cause the clothes to cling together and to snap and crackle with sparks. The kinetic energy in radio waves resides in a magnetic field like those we have all seen surrounding magnets. The magnetic field is equivalent to the momentum of the moving water in the above example. Energy of the radio

wave oscillates back and forth between the electric field and the magnetic field (from this comes the term "electromagnetic") and at the same time travels through space at the speed of light.

Let's suppose you are listening to DX PARTYLINE being broadcast on the 49-meter band. As the radio wave travels from the station to your receiver, a point in space could be located where in an instant of time, all the energy of the wave front is contained in an electric field (potential energy) with no magnetic field (kinetic energy) existing at all at that moment. As time passes, this electric field begins to collapse and the energy is transformed into a magnetic field which a moment later in time (which depends on the frequency of the program) will contain all the energy with no electric field existing at all. Next, the magnetic field begins to collapse and the energy is again transformed back into an electric field until a moment still later it again contains all the energy. Interestingly, the direction or polarity of this second electric field is reversed to that of the first in the same way that the bump on the surface of the water followed the dimple. The process continues with the energy passing into a second, reversed-direction magnetic field; then into a third electric field of the same polarity (direction) as the first. As this process proceeds, the wave travels through space toward your radio, taking about one-seventh of a second to travel around the world. If we measure the distance between the first point and the third point described above where the energy is all contained in the electric field, that distance would be 49 meters or about 160 feet. The various meter bands on your radio refer to the

continued on page 3



CHINESE - A FIRST AT HCJB



空地之聲

華語廣播節目

一九八五年十二月廿五日開始
每日由 22:00 UTC (國際標準時間) 播出。
短波週率: 波長 25 M (米), 頻率 11960 KHZ (兆赫)。

聯絡處: CHARLES CHAN 陳泰初
HCJB CASILLA 691. QUITO - ECUADOR. SURAMERICA.

歡迎收聽 敬請指導

On December 25, 1985 HCJB will begin a daily, 30-minute Chinese broadcast in Mandarin and Cantonese at 2200 UTC on 25 meters, 11960 kHz. The broadcasts will consist of Chinese and Latin American music, cultural and educational programs and Bible-teaching programs for all ages. In six months an evaluation will be made to determine if the broadcasts should continue.

The 2 million Chinese in North, Central and South America are the target of the releases. In recent years there has been a wave of Chinese immigrating to these areas from Taiwan, Hong Kong and mainland China. The Chinese communist government (People's Republic of China) now allows her people to leave the country. The fear of Hong Kong coming under Red China's rule in 1997 motivates many to leave that country. With relaxed immigration laws in the Americas many Chinese people seek to find new homes there. In addition there are some 33,000 Chinese students in the United States.

The director of the new Chinese

Language Service and producer of the programs is Charles Chan. He came to HCJB in 1982 to work as a photographer. Many of the photos used in HCJB literature were taken by Charles.

In 1979 Sonia Barba, whose home was in Quito, started her medical internship in HCJB's Hospital Vozandes-Quito. Sonia and Charles' romance resulted in marriage and they are the proud parents of nine-month-old Priscilla.

Quito is probably typical of the Chinese immigrant situation throughout the Americas. A few years ago Charles began to notice a marked increase in the Chinese population of Quito by the growing number of "Chifa" signs appearing on the busy Quito streets. Many of these immigrants do not speak Spanish and with the little money they brought or borrowed, they would rent a house, buy some tables and chairs, and open a Chinese family restaurant. Only the few who are wealthier go into other businesses, farming and small industry. There is a lack of Chinese litera-

ture, newspapers, music, etc. Although their religion is traditional Chinese they are grateful to receive the Christian literature that Charles brings to them as he visits.

As Charles' concern for his fellow Chinese increased he thought of using radio as a means for contact with them and approached HCJB's broadcast director, Roger Stubbe. At the same time Charles started a weekly Bible study class with two retired Chinese men and a woman. They have volunteered their time and talents and now the Bible studies have expanded to include planning and preparing programs for the new Chinese broadcasts.

A great hurdle that must be overcome is the difficulty of notifying the vast potential Chinese audience. If you know any Chinese, let them know about HCJB's new Chinese release.

A special QSL will be sent to any who hear the Chinese programs and send in a report. Charles says he will not require specific details about the programs from those who do not understand Chinese. He would like to know the quality of reception so please include the SINPO.



Left to right - Mrs. Liu, Mr. and Mrs. Antonio Chang, the Chans.

ANTENNA CONCEPTS MADE SIMPLE CONTINUED

length of the radio waves in space.

The radio waves sent out by HCJB are of the type called "transverse electromagnetic radiation." In our case the electric field is horizontal and the magnetic field is at right angles

to it, or vertical in direction. The wave travels at right angles to both the electric and magnetic fields in an almost horizontal direction toward the target area.

All This Related to Antennas

How does all this relate to anten-

nas? The antenna is the device which is used to generate the oscillating electromagnetic fields which propagate through space. The concepts we have dealt with here form the basis for understanding future articles about how antennas function.

SPECIAL DXERS



Thomas Ross

ANDEX and HCJB play a significant role in the lives of Thomas V. Ross (ANDEX 4895) and his family. His son, Thomas W., who uses his grandfather's Zenith Trans-Oceanic radio, is also an ANDEX member (4947). Both son and daughter Stephanie have numerous pen pals whom they found through the pen pals column of *ANDEX International*. Furthermore, Thomas says he and his family have appreciated the prayers and personal concern of the HCJB staff.

Thomas is 37 years old and lives at 8225 West 43rd Place, Lyons, IL. 60534 U.S.A. He has been a police officer for 15 years in this Chicago suburb where he lives. His hobbies fit in well with his vocation--weight training (he can bench press 260 pounds), photography, motorcycle riding and ammunition reloading. As a CB enthusiast he is called "Eldorado" and his wife Micki is "Unykorn."

Thomas has a long list of equipment. First, an ICOM IC-R71A communications receiver with an Eavesdropper trapped all-band dipole mounted on his roof and a Sony AN-1 active antenna (59-inch whip) mounted on his chimney. He also has an external Hustler DCX discone antenna. In addition he has a SBE Console II SSB/CB transceiver which he just purchased, and he will soon be placing a 5/8 wave vertical antenna on his roof for that.

No doubt officer Ross gives out many citations in the course of his work, but we're happy to give this one just for him -- that of ANDEX Special DXer of the month! Congratulations, Thomas.

Canadian George Coppen (ANDEX 4253) writes, "I am 49 years old, married with four children and one grandchild. I sell shoes for a living and my wife Laverne is a nurse....I got my first radio, a DX 160, by mistake. I thought it was a CB radio. Oh well, I've received countless hours of enjoyment from it."

George now uses a Yaesu FRG 7 with the DX 160 as a backup. He says his antenna is a "big laugh" - he wound 30 feet of copper wire around a broomstick and tied it to a balcony railing facing south. Even so, he has verified 22 countries and received 51 QSLs to prove it works.

George says he has enjoyed target shooting since he was nine years old, and also likes to hunt, fish and grow flowers. He plans to get a ham license and has an Eico 753 transceiver to use.

December 10, 1981 was the first day George heard HCJB and he sends "a big thank you for all the spiritual happiness HCJB has brought into my life." He goes on to say, "in 1983 I was told I had cancer and had about a year or two to live. Well, I am here to tell you I think it was just God's way of waking me up....I never prayed so hard in my life and here I am today not feeling too bad at all. With God's help and your prayers I am going to be around for many years come."

Congratulations, George, on being chosen ANDEX Special DXer and ANDEX members, why not write your congratulations to him at 815-555 River Avenue, Winnipeg, Man., Canada R3L 0E3.

George Coppen



andexing

DIFUSIONES INTERAMERICANAS (DIA) is an organization dedicated to promote the development, interaction and capabilities of evangelical broadcasters. About 160 representatives of DIA-affiliated Christian radio stations met for six days in Quito to consider the theme, "Complete Communication in a Continent in Crisis." Of that number, almost half were from Ecuador and half from other Latin American countries. Most represented medium-wave stations, but ANDEX staffer Marian Houghton talked with Steve Sywulka, production manager for shortwave station Radio Cultural TGNA located in Guatemala City.

TGNA uses two transmitters for shortwave releases, one using 250 Watts on 49 meters at 5955 kHz, and the other using 10 kW on 90 meters at 3300 kHz. With a staff of 22, they broadcast in Spanish, English and Indian languages from 5 a.m. until midnight with English beginning at 6:30 p.m. on Sundays and 9 p.m. the rest of the week.

QSLs and tourist brochures are sent upon request. Their address is as follows: 4a. Av. 30-09, Zona 3, Guatemala, C.A.

THANK YOU FOR RESPONDING. We've received about 500 ANDEX questionnaires back. HCJB's director of research, Phill Sandahl, is coding the data on computer and as soon as possible we'll have the results in *ANDEX International*.

REMEMBER THESE ANDEX OFFERS.....

- ANDEX patch for use on blazer, jacket or cap . \$1.25
- ANDEX rubber stamp
 - with ANDEX logo only \$2.00
 - with ANDEX logo and your ANDEX number \$3.00
 - with ANDEX logo, your ANDEX number and your name . \$4.00
- ANDEX T-shirt, light blue with black logo
 - in the Americas \$6.50
 - in other countries \$7.60
 (Specify small, medium, large or extra large size.)

These prices are listed in U.S.A. dollars. Check with your local office to see if they will handle the payment for these items in your local currency or send a dollar check or postal order to ANDEX, Box 553000, Opa Locka, Florida 33055, U.S.A. PLEASE BE PATIENT. PROCESSING THESE ORDERS MAY TAKE UP TO SIX MONTHS.

OUR CONGRATULATIONS TO LARRY LUNDBERG, ANDEX 251, from Minnesota, U.S.A., who received the ANARC North American DXer of the Year award in July 1985.

HCJB'S GERMAN SERVICE took first place in the First International Contest for Religious Radio Programs in Ger-

man. Shortwave listeners from several countries in Europe participated and chose HCJB as their favorite. Congratulations to our German Service personnel.

HCJB'S NEW SERIES OF SIX QSL CARDS for 1986 will be in full color and will feature birds found in Ecuador, painted by HCJB staff artist J.D. Thompson.

TOPICAL SPECIALS to be offered on HCJB's PASSPORT magazine program:

DATE	TOPIC	HOST
Jan. 3	Auca Encounter	Jan Anderson
Jan. 10	Auca Encounter	Jan Anderson
Jan. 17	Vacation gleanings	Jan Anderson
Jan. 24 & 31	undesignated at publication time.	

HCJB'S OPEN LINE INTERNATIONAL CALL-IN PROGRAM SCHEDULE:

- Jan. 18 - The MUSICAL MAILBAG gang (this is an update and different than announced in the last bulletin.)
- Feb. 22 - DX PARTYLINE with John Beck.

CHOOSING FREQUENCIES CONTINUED

required changes. Our technicians are working on a synthesizer for speeding up the changes.

HELP NEEDED

We are grateful for those few who have written in suggesting clear frequencies we might change to. We do have some monitors who help in this area, but it would be helpful in times of reception difficulties to see more positive input from the general listener. We have many limitations--in the number of "out-of-band" frequencies we can use, our transmitters, antenna systems, band capabilities, staff and funds. Within these limitations we continue to try to give our audience the best signal possible. During these days of overcrowded bands and low sunspot numbers, even this may not be enough. Bear with us, we are trying.

NEXT ISSUE

Next issue I will describe the function of the International Telecommunications Union which coordinates and controls frequency usage.

Pen Pals



BILL GELLER - R.D.3, Box 169, Mayslanding, NJ 08330 U.S.A. - ANDEX 5105 - likes soccer, volleyball and football - hobbies are amateur radio, antennas, DXing and computers - wants to hear from Apple Computer users and members from Asia, Africa, Europe and Scandinavia - will answer all letters.

CHARLES GEORGE - 6407 Howard, Dallas, TX 75227 U.S.A. - ANDEX 1067 - would like to correspond with other Christians.

TOM PAILLOZ - 2021 Highridge Drive, 17-G, Huntsville, AL 35802 U.S.A. - ANDEX 5452 - 39 years old hobbies are SWLing, collecting stamps, writing to pen pals and ceramics - editor of a medium - wave column and an SWL pen pal column in an SWL club publication - will answer all letters.

LINDA STODDARD - Rt.2 Box 155, Sulphur Springs, TX 75482 U.S.A. - ANDEX 5465 - interests include SWL, DXing, photography,

history, cultures, music and collecting albums, stamps, post cards and QSL cards - would like to correspond with people from all countries - knows a little German and would also like to hear from German-speaking people.

NOVIE YOUNGER - Buckingham Sch. Hopeton P.O., St. James, Jamaica, W.I. - ANDEX 5208 - 15 years old - hobbies are reading, listening to music, stamp collecting, crocheting and writing letters - wants pen pals regardless of age, sex or nationality - willing to correspond in Spanish also.



THE OLD AND THE NEW



Excitement, festivities, busy days and evenings--all this characterizes the month of December at HCJB in Quito, Ecuador. This December 6, Quito celebrates its 451st birthday. Each year HCJB participates in the festivities by presenting a series of concerts which include songs of Quito, some of the great musical classics and Christmas music. Thousands of Ecuadorians attend these concerts.

December 25 is HCJB's birthday. Our founders chose this day in 1931 to coincide with the celebration on the birth of Jesus Christ, since the one purpose of founding the station was to broadcast the good news of Christ. Through 54 years of broadcasting countless numbers of people around the world have found eternal life through Him.

The end of December 1985 completes 12 years of our ANDEX club. Clayton Howard wrote in the first issue: "Our purpose is to serve each of our members in every way possible." Some responses on the recent ANDEX questionnaire express how some members feel about it: "Keep up the good work" and "Thanks for a special ministry. I really enjoy ANDEX."

The founding of a city, a missionary radio station, and a DX club has made a positive impact on many, many people. Nevertheless, throughout the history of man there has been much destruction and evil. The people of Ecuador have an interesting custom that symbolically deals with this. On December 31 they make life-sized dummies, dress them to look

like old men, and put them in front of homes and stores, often in chairs inside a shelter made of tree branches. These "old men" represent the old year with all the wrong and evil it contained. At midnight this effigy is burned. Symbolically nothing of the old is left, and the new year can be started afresh with the hope for better things in the future.

This tradition is an excellent illustration of what Scripture teaches Jesus Christ did for us when He died on the cross. Here is how *The Living Bible* states it in 2 Corinthians 5:15, 17-21:

"He died for all so that all who live--having received eternal life from Him--might live no longer for themselves...but to spend their lives pleasing Christ... When someone becomes a Christian he becomes a brand new person inside. He is not the same anymore. A new life has begun!...For God was in Christ, restoring the world to Himself, no longer counting men's sins against them but blotting them out...we beg you, as though Christ Himself were here pleading with you, receive the love He offers you--be reconciled to God. For God took the sinless Christ and poured into Him our sins. Then, in exchange, He poured God's goodness into us!"

Trusting Christ to take away your sin, becoming a brand new person inside--what a way to begin the new year!

ANDEX International



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DX Party Line Host - John Beck

ANDEX Director - Doris Hastings

ADDRESS MAIL (with funds) to: HCJB-ANDEX, P.O. Box 553000, Opa Locka (Miami), Florida, 33055-0401, USA

ADDRESS MAIL (NO funds) to: ANDEX International, Casilla 691, Quito, Ecuador

Write for a list of ANDEX offices in other countries for your payment convenience.

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