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AMATEUR RADIO--AN AMERICAN PHENOMENON

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AMATEUR RADIO--AN AMERICAN PHENOMENON

A DISSERTATION SUBMITTED TO THE GRADUATE DIVISION OF THE UNIVERSITY OF HAWAII IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

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IN AMERICAN STUDIES

MAY 1981

By

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ABSTRACT

Amateur Radio as a scientific hobby in America has been almost exactly contemporary with the twentieth century. First embraced by amateur wire telegraph operators, who saw in radio the means to extend communications beyond the limits of their neighborhood telegraph lines, amateur radio was found in and around the port cities of America, where ship and shore radio installations were first made. The first amateur stations, unregulated until the U.S. law of 1912 came into effect, communicated not only with other amateurs in the vicinity, but also with any Government or Commercial stations nearby that would answer them.

Unlike European radio experimenters of those early days prior to the First World War, American hams were not limited by government monopolies on all types of electrical communications, and had a whole continent to cover.

With the establishment of the American Radio Relay (a non-profit Connecticut corporation) by hams in 1914, an organization was ready to span the U.S., and routes and stations were selected and printed in QST (ARRL's journal) in December 1915 and later--too late to become very effective prior to World War I.

In 1934, Raymond V. Bowers, in his doctoral dissertation, "A Genetic Study of Institutional Growth (Amateur
Radio)" has shown how ham radio developed up to 1930, principally from a demographic viewpoint. Subsequent publications have been issued, including Clinton B. deSoto's Two Hundred Meters and Down (1936) a history of amateur radio up to that year; and Fifty Years of A.R.R.L. in 1964. Much has occurred since these publications, and a study of the field, with some attention to motivation and American uniqueness due to our way of life, political orientation, and heritage of free speech was something that needed to be done.

It is hoped that this work will help to fill a lack of assembled information on amateur radio's philosophy and practice at this time.
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PREFACE

This dissertation on Amateur Radio is an up-to-date overview of the art. It will give the reader some history, and will state the benefits rendered the nation by the grant of radio frequencies for radio amateur use. It will also mention some of the failings of the amateurs, and how community relations can be improved between the amateur and his neighbors as they have been in the past. Especially will it be brought out how the amateurs have been able to overcome interference to nearby radio/TV sets and other modern electronic devices. This involved high states of personal patience and cooperation, as will be shown.

Although the bibliography shows fifty books and magazines used for my background material, three main sources have provided most of my information. QST, the monthly journal of the American Radio Relay League, Inc. (ARRL—the American amateur's national organization since 1914). QST was first published in December, 1915, and except for twenty months during World War I, has been published ever since. Its sixty-five volumes now occupy a shelf space of 17 feet. Dr. Raymond V. Bowers' doctoral dissertation on amateur radio, presented in June, 1934 at the University of Minnesota, and covering the period 1901-30 was another main source consulted. Dr. Bowers, not himself an amateur radio operator, used a multitude of
records to present the growth of an American institution in the first part of the twentieth century. His demographic study presents a wealth of information about the earlier days of amateur radio. So far as I have been able to determine, it is the only Ph.D. dissertation on amateur radio prior to mine.

Another main source was my own experiences with amateur radio. In February, 1911, and again in March, 1913 and September, 1916, I made the five week crossing of the Pacific on a ship equipped with the old spark-gap wireless. The noisy spark-gap was a great source of interest to me as a young man. During the First World War I learned the International Morse Code on wire telegraph and finally, in October, 1919, obtained my first government amateur permit and have been active ever since. Then in 1921 I joined the ARRL and have been a member of that organization for sixty years.

I have operated my amateur stations in many parts of the United States and abroad, including the Philippines, Europe, Turkey in Asia, and Japan while I was residing in those countries, some of them while serving as an officer in the United States Army Signal Corps.

Now for a little background: The scientific hobby of Amateur Radio in America has been almost exactly contemporary with the twentieth century. First embraced by amateur wire telegraph operators, who saw in radio the means to
extend communication beyond the limits of their neighborhood telegraph lines, Amateur Radio was first found in and around the port cities of America, where ship and shore radio installations were first made. The first amateur stations, unregulated until 1912, communicated with other amateurs in the vicinity and also with any other nearby stations that would answer them.

Unlike European radio experimenters of those early days prior to the First World War, American amateurs were not limited by government monopolies on all types of electrical communications, and had the whole continent to cover.

With the establishment in 1914 of the American Radio Relay League (ARRL), an organization was ready to span the United States, and routes and stations were selected and shown in QST (ARRL's journal) in December, 1915, and later issues, but too late to become very effective before America's entry into World War I.

In June, 1934, Raymond V. Bowers submitted to the University of Minnesota his doctoral dissertation "A Genetic Study of Institutional Growth and Cultural Diffusion in Contemporary American Civilization--An Analysis in Terms of Amateur Radio." His study, written principally from a demographic viewpoint, covered the period 1901-1930. Subsequent publications have been issued, including Clinton B. DeSoto's *Two Hundred Meters and Down* (1936), a history of
Amateur Radio up to that year, and _Fifty Years of ARRL_, a reprint of selected articles from _QST_ up to 1965 (published by ARRL). An up-to-date overview has become necessary, showing changes in the amateurs themselves, their means and methods of communicating, their growth and proficiency in national and international information and their aid in emergencies. There has been a growth in unfriendly and illegal operation, and means for controlling this need analysis.

The amateur's place in his community, and democratic interchange of cooperation and information needed is important. The amateur, by reason of his FCC operator's license earned by passing an examination, often becomes the neighborhood electronics expert.

Now America lives very much in an Electronics Age, where the loss of a popular network news commentator becomes a national disaster. The Radio Amateur, who was at the beginning of broadcasting, has grown along with it, and is very much a part of it still. Social change in America is composed of a number of studies. Not in itself alone, but in its byproducts and effect internationally as well as in America, American Amateur Radio is one of these studies.
When Marconi landed in New York City in 1899 to report the America's Cup yacht races by wireless, he must have been struck by the plethora of wires. Since the invention of the telegraph fifty-five years before, wires had been extended across the U.S. continent for not only Morse telegraphy, but for telephone, stock tickers and American District Telegraph (A.D.T.), wires of shorter lengths. Unlike government wires in Europe, these were privately owned. Inevitably, over the years, amateur (ham) systems had sprung up also. They were erected by two or more telegraphers or would-be telegraphers, and might use fence wires, if lengthy on farms, or use shorter runs in cities. There was always the problem of attaining an insulated wire between stations. Sears, Roebuck, in their 1899 catalog, offered the wire, insulators and instruments as well as batteries. But how and where to string the wire? No wonder that these wire telegraph persons (many women included) were interested in a "wireless" system in England in the closing years of the century!¹

Many clever persons had served their apprenticeship as wire telegraphists, including Edison and Carnegie. Only one person, however, is recorded as sending wireless signals in
America before Marconi came. That person was Dr. Mahlon Loomis of Washington, D.C., who, thirty-six years before Marconi's arrival, had not only obtained a patent on a wireless system, but had actually sent signals over a distance of 18 miles in Virginia. He tried to commercialize his system, but, unlike Marconi, failed to do so.

As a result of the wide publicity given Marconi in 1899 (under the sponsorship of a New York newspaper) and on later visits in the early 1900s, a number of amateur wire telegraphers determined to learn more about the Marconi system. One of these was an eleven year-old boy named Irving Vermilya, then living in Mount Vernon, a suburb of New York City. Through a mutual friend Vermilya received from Marconi blue prints and certain essential instruments to assemble a simple wireless receiving station at his home in Mount Vernon. (This story is related in "Amateur No. 1" in QST, February and March, 1917.) Vermilya goes on to tell how he gave up his wireless experiments for a time until more activity was taking place, then he added transmitting equipment to his station, and at last obtained employment as a shipboard operator and, eventually, became the manager of a Marconi shore station on Cape Cod. He further mentions how, even in this time of a few stations, wireless operators interfered with one another, "jamming" the air waves and competing with each other to secure a ship's message "traffic."
Such was the situation up until 1912--middle-class high school students with their own amateur stations, learning the ropes, getting summer jobs on ships and perhaps sticking with the profession as they grew out of their teens. Partly as a result of Marine disasters (e.g., S.S. Republic [1909] and R.M.S. Titanic [1912]) a radio conference--to which the United States subscribed--was held in London in 1912, and laws subsequently passed by the U.S. Congress that year set up a radio division in the Department of Commerce. The radio division gave examinations and issued licenses to the various classes of operators and types of stations. No specific reference was made to amateurs; they were grouped under other "private" radio stations and limited in power and wave length.

It was soon found that the amateur stations were too numerous to be properly inspected and controlled under the Department's fiscal limitations. This situation has been endemic over the years. Without government control, growth of amateur stations demanded strong action to prevent chaos. For example, in the Chicago area, to prevent antennas from being cut down, amateurs stayed up all night guarding them with guns.³

The diversity of the "hams" is most impressive: they range in age from "9 to 90," of both sexes, and from all walks of life and from all sections of the country. A cartoon in an early QST shows a well-to-do man having his shoes shined by a young bootblack, who is giving him advice
on the kind of antenna that would be best for him to use. In the cartoon, as is often the case in real life, the older man is listening appreciatively.

Now that complete equipments can be bought and installed—right down to the antenna and a special desk to hold the "gear"—there are (as there have been) those amateurs who have managed to pass the FCC examinations and are prone to equate their "status" with the price paid for the equipment. It is true, however, that $200 worth of homemade gear may perform better in the hands of an expert than $2,000 worth in an inexperienced operator's hands. Nevertheless, a few "hams" do find an unreasoning satisfaction in blaming everything but themselves. However, if they remain active, most of them will come to a realization of the true state of things through "peer-pressure" in this democratic society of ours.

Prior to about 1914, amateurs were unorganized; the existing "clubs" were regional rather than national in scope (cf., Radio Club of America, New York and Fresno, California, amateur radio clubs, circa 1908). One of the prime reasons for radio clubs was to insure a cooperative "antenna-raising" effort for the members, since prior to World War I antennas were large and required massive structures to support them. Other early reasons for these clubs were to supply accurate wavemeters and antenna ammeters for adjusting members' apparatus. Neighbors had no electronic apparatus, except
telephones, so interference was not the problem it became with the advent of broadcasting after World War I.

Services provided by the amateurs up to World War I included message handling, emergency or not, and provision of radio operators to the military. It must be remembered that some sections of the country were much more isolated then. The utility of the amateur radio in emergencies was greatly limited by the lack of electricity and the bulkiness of the equipment. Although the scientific nature of the art gave amateurs a certain prestige in the community, the bulky antennas, noisy "spark" transmitters and high voltages alienated casual visitors. In fact, QST reported at least one ham who placed his noisy transmitter in the family pig pen and controlled it from the house. Many hams tended to be loners, especially when on a farm, or otherwise at a distance from a radio club.

Before World War I no formal training for military radio operating and maintenance existed among amateurs. However, most ham stations were modeled on army/navy stations, or on similar ship and shore commercial stations. Thus, there was no great gap in technical knowledge, or in the ability to use the code, so training could be limited to procedures used in the particular service. Since 1925 however, arrangements have been effective to drill hams in military procedure on government frequencies, and to supply them with surplus apparatus for familiarization. This organization since about
the end of World War II, has been a joint Army-Navy-Air Force effort called Military Affiliate Radio System (MARS).

Traffic (message) handling has greatly expanded since the first American Radio Relay League (ARRL) transcontinental relay routes in 1916. Stations handling over a hundred messages per month (originated, relayed or delivered) were quite rare then. Now an outstanding traffic-handler (Mrs. Mae Burke, W3CUL) handles several thousand messages a month, and has done so consistently for thirty years. Note the difference in this message handling between the United States and other countries. In most of the latter, message handling in almost all forms is a government monopoly, hence private "competition" is frowned upon. However, training in handling many messages swiftly and accurately is of tremendous value, especially during emergencies.

World War I marked a turning point in "ham" radio, as it did to a lesser extent in commercial radio. Out of the technical developments bred by the War came the vacuum tube for transmitting, to complement the DeForest "audion" tube already used for receiving, and also the advent of one-way or "broadcast" radio. The juxtaposition of hundreds of thousands of simple receiving sets in the hands of unskilled persons next to amateur spark transmitters created a very difficult problem in techniques and public relations. Fortunately, the ARRL had resumed operations after World
War I, and assumed publication of QST, so a central source of information was available to the harassed hams when the broadcast "deluge" hit. In fact, the issue of QST for September, 1920, bears a cover photo of Dr. Frank Conrad's experimental amateur station that became the pioneer Westinghouse broadcast station KDKA in Pittsburgh. The photo shows that the early 100 watt transmitter was mounted on a wooden soap-box.  

Soon broadcast stations were springing up like mushrooms all over the country and listeners swamped the market for receiving sets, then drained the parts-supply stores to be able to assemble their own. This is another story which has been capably treated elsewhere, but its effects on ham radio were widespread.

Several changes, sponsored by the ARRL, allowed the co-existence of the Broadcast Listeners (BCLs) and the hams. The first of these were "Quiet Hours." This was a voluntary period of silence on the part of the hams during the period when the best programs were broadcast (now called "prime-time"). This arrangement "held the line" until technical improvements were made in broadcast receivers so they were more selective, i.e., more capable of tuning-in one program at a time. It also gave the hams time to afford to install tube (C.W.) transmitters---"state of the art" devices which caused less interference on the simple broadcast receivers of the day.
During this time ARRL and the individual hams were taking steps to develop their own field. In December, 1921, after other attempts to send signals across the Atlantic to Europe had failed, the League (ARRL) arranged with individual British "hams" (lacking a British transmitting Society) to assist an ARRL-financed American ham (Paul Godley) in setting up a receiving station on the ocean's shore in Scotland to listen for Americans on the then-considered "short" wave of 200 meters. The experiment was an unqualified success and confounded engineers, who, relying on the old Austin-Cohen formula, had pointed out how impossible it was for such a thing to be successful. Furthermore, the test proved the superiority of CW over spark transmission, and also showed how well the super-heterodyne receiving circuit worked. This latter was an invention of an amateur (Edwin H. Armstrong) while he was serving in the army Signal Corps in France during World War I. It is now included in all receivers. Armstrong later invented the system of F. M. broadcasting.\(^6\)

The next World Radio Conference (WRC) had been postponed by World War I, and was not held until the fall of 1927 (in Washington, D.C.). In the meantime, due to the tremendous growth of broadcasting, the Department of Commerce, through its Secretary, Herbert Hoover, initiated a series of Washington conferences to temporarily resolve
pressing problems. Amateur representatives also attended and were able to secure temporary "short wave" allocations. In the hands of the amateurs, the new short-wave bands were highly successful, enabling two-way contact across the Atlantic, then the Pacific, and to other parts of the world when amateurs there learned of the American successes and hastened to duplicate them, insofar as their governments allowed. (Some even operated prior to formal government permission, see QST, September 1927.)

Two events in 1925 were of great importance to amateurs. The Army (AARS) and the Navy (NCR) solicited the cooperation of the hams through the ARRL and established amateur training as a forerunner to the current MARS, mentioned above; and, nets were set up and summer training camps and cruises established. In April of 1925, ARRL President, Mr. H. P. Maxim, and amateurs from other countries met in Paris and formed the International Amateur Radio Union (I.A.R.U.). At first the Union consisted of individual members; originally twenty-three countries were represented (QST, June, 1925). Four sections were constituted then; viz: U.S., Canada, Britain and France. Now membership is by country, and over one hundred are represented.

IARU has been an essential part of amateur radio, particularly in the field of World Administrative radio conferences. 7 Those that mentioned radio amateurs were held in 1927 (Washington), 1932 (Madrid), 1938 (Cairo),
1947 (Atlantic City, N.J.), 1959 (Geneva) and 1979 (Geneva). IARU played a decisive part in all of these conferences.

Remembering that the United States has been the only country permitting non-governmental communications, it is evident that the ARRL, in initiating IARU in 1925, was doing for itself at the world administrative Radio Conferences (WARCs) as well as for other amateurs throughout the world, what was necessary to establish and maintain amateur radio.

The June 30, 1921 edition of the government amateur call book shows approximately 11,473 licensed amateur stations, with only a few women represented (+18). By 1979 the call book showed a total of 374,487, of whom 22,748 were women. This shows a growth of nearly 33 times in fifty-eight years. However, licensed women radio amateurs in the U.S. were at the very high figure shown, paralleling or surpassing women's gains in other fields. It is interesting to note that for a similar period (1925-1979) foreign radio amateurs grew from approximately 4,000 (in 36 countries) to 295,398 (in over 100 countries). These figures indicate how the number of hams now shows a much higher percentage of the total population than 50-60 years ago.8

Homogenization in ages, incomes and occupations has brought out more examples of both brilliance and anti-social behavior. "Peer-pressure" by fellow amateurs has always lessened anti-social behavior, but during the past few
years, the pages of QST and other amateur publications have
carried instances where FCC and other governmental inter­
vention has been necessary to collect evidence of "jamming,"
profane or obscene language, and even threats against FCC
employees. One feature of ham radio, however, is its
rapidity in spreading the word about violators being caught,
fined, or even sentenced to jail terms.

As a segment of American society, amateur radio today
is fostered and regulated by familiar forces under the
Constitution and Bill of Rights. The guarantee of free
speech operates as freely over the air waves as it does in
person. With regard to the rights of others to the "air­
waves," two-way radio communication between licensed
amateurs can be carried on as freely as any other public
speech in this country. However, when communicating with
amateurs in another country, caution may have to be observed.
"Verb sap!" Free competition in contests sponsored by the
ARRL or others is assured--again with due observance of the
rights of others, and the possibility of differences in the
rules governing stations in other countries. In the heat of
competition individuals sometimes are overcome by an excess
of zeal and may operate in such a manner as to discredit
amateur radio. This very human attribute is not limited to
ham radio and can be lessened by "peer-pressure." The old
English saying, "It's not cricket," can apply here.
Our basic American laws, modified by Congress from recommendations of international telecommunications conferences and codified by the FCC, ensure that no radio amateur in this country has any unfair advantage over any other amateur insofar as technical limitations are concerned. All may build to the maximum power allowed, all may advance—at will and without fee—through the five grades of amateur licenses provided at this time. Since higher grades of licenses allow additional privileges, they confer on the holder a certain status by accomplishment; in the same manner as university degrees, for example. In addition to FCC licenses, ARRL and others have issued a series of certificates for accomplishment, public service or outstanding performance. 9

All of the above are available without regard to class or sex; in fact without any limitation whatever except cost of verification and postage charges. It is interesting to note that other countries have more or less adopted this same system, which was started in this country by ARRL with its Rag Chewers Club (RCC) in 1925 and the Worked All Continents (WAC) in 1926. It is now possible to spend all one's time "certificate hunting," and some years ago QST noted that a young man confined in an iron lung had operated his amateur station so as to bring in over a hundred different certificates. Besides the federal rules "pre-empting use of the ether" as interstate commerce, there are
state and municipal laws and ordinances affecting the amateur. These are exercised by the cognizant authorities under their building codes and police powers to abate "nuisances." Instances of their application are often found in cities where proximity of neighbors may cause complaints about amateur antennas or where electronic gear may pick up nearby amateur signals. \textit{QST} has cited cases caused by such unexpected things as defective plumbing joints or nearby hearing aids. In general, the nearby amateur and the FCC investigator have been very cooperative. Laws are now pending in the Congress which would require manufacturers of electronic gear to add an inexpensive filter unit at the factory to minimize this problem.

In general, it can be stated that foreign "hams" are, in many respects, following the lead of the Americans. Although the only amateurs in England and France, for example, originally were older and more technically qualified than those in the United States, this has changed to a point where age difference is not so great. However, many countries have a smaller percentage of women as amateurs than the United States. Although a number of European countries employ women as ship radio operators, they seem not to adopt ham radio as a hobby to any great extent. The United States does employ women ship radio operators in wartime (on hospital ships, for example) but possibly due to our small merchant marine, few are so employed now.
While U.S. amateurs were being examined, licensed and controlled by the radio division of the Department of Commerce as early as 1912, foreign amateurs were not being licensed by their governments as late as the mid-twenties, after the adoption of the "short-waves" which made international amateur communication possible. Following the lead of the United States, amateurs in other countries formed their own national societies, joined the IARU (see above) and began lobbying for privileges. Of course, after the Washington radio conference of 1927, the amateur was recognized worldwide and issued frequencies whose liberality was regulated by the government concerned. Today, we find the world, for communication purposes, divided into three regions, and frequencies recommended within each region can be assigned "in toto" or not, as the individual government decides.

There is a matter of "third-person" traffic to be considered today. Although in this country free speech is the norm, each licensed radio amateur is held responsible for what is transmitted over his station, by himself or by guests invited by him. It is also true that no interchange or third-person "traffic" can occur between one of our stations and another station in a foreign country, unless a treaty has been negotiated between the United States and the foreign nation permitting this. Such treaties have been negotiated with a number of countries, usually with
the stipulation that the "traffic" handled would be of an unimportant nature, where recourse to the normal (government or commercial) channels of communication would not be had. Here we see the old foreign "communication control" at work. It is of course true that when a real emergency occurs, no obstacles are placed to foreign traffic handling, especially where the amateur channels are the only ones available (e.g., Flight of Double-eagle II, also numerous medical emergencies involving procurement of a rare drug, etc.). For purposes of comparison, the national (and global) ham network can be likened to the "farmers' line" (multiple station) country networks of sixty years ago or more. Each station in a net (on a line) could "listen-in" (monitor) all the other stations on its own line, or be connected to other lines by the central operator. Much time was spent listening to others--in fact, some instruments were even provided with a switch so that the battery would not run down when the subscriber was listening. In the same manner, modern amateur nets are often on one frequency with a Net Control Station (NCS) and often with a system for relaying to nets on other frequencies or even being interconnected with the commercial (rented) telephone circuits by a "phone-patch" device. The same neighborliness often prevails among the amateurs, and many of them, who may not attend club meetings or ham conventions, grow to know each other well and exchange personal or private information with each other.
Clinton DeSoto, in his 1941 book, *Calling CQ*, cites the case of a young cripple, whose life at one time was despaired of, who was encouraged to assemble an amateur station, pass the examination, and eventually "got on the air." In true "best seller" style he contacted sisters who had their station some distance away, courted and married one of them, with subsequent joy for all concerned.

Special networks are established for those with similar interests or to serve a particular need. The "eye-ball" net, for example, exchanges information on the need for, and location of, eyes from deceased donors, and the location of the individuals needing them. "ROAR" (Rotarians of Amateur Radio) is the national Rotary Club net. These are nets binding teenagers, morticians, missionaries stationed overseas, and the like. Some of these were perverted to illegal purposes for a time (as in the case of the Guyana service), but they are closely monitored and soon reported to the authorities if found to be illegal.¹⁰

The ARRL has sponsored message traffic nets throughout the United States and Canada since its inception. These are well developed and in addition emergency nets with appointed emergency coordinators (ECs) also exist. The emergency nets are often called into operation (sometimes by amateurs) at the request of the authorities. A working agreement has been drawn up between the American Red Cross (ARC) and ARRL since World War II, signed for the ARRL then
by its president Herbert Hoover, Jr. Through amateurs operating in the Military Affiliate Radio System (MARS) frequencies, ARC handles urgent personal requests for compassionate reasons and "phone-patches" are often used to complete mainland contacts between military overseas and the "home folks." This was frequently used for isolated groups near the South Pole and for personnel in Vietnam.

Communications are a government monopoly in virtually all other countries; nowhere do we find encouragement of "third-party" communications. This is for purposes of censorship control as well as loss of revenue. Although treaties are now in effect between the United States and certain other countries, they are written to include "only matters of such slight importance that recourse would not be made to the existing [government] facilities." This is a fact that a new ham in this country has to learn, having been used to freely discussing every subject over the air as he would in public. Nets for technical discussion, or for purposes of apparatus improvement are often used, and a casual conversation with a foreign station will often elicit the weather existing, his age, etc. No political discussion is ever fostered. At best, a lack of language facility, or a change in "conditions" will intervene. It should be pointed out, however, that most foreign contacts are shortened because others are waiting (due to the disproportionate imbalance between the ham populations of the United States and other countries) so that "peer-pressure
from his mates in the U.S. soon lets one know that others are waiting.

Although there are numerous foreign-sponsored awards and certificates available now (as a result of the early U.S. awards offered for foreign working) these have proliferated to the extent that a large sector of the ham population in this and most other countries spends most of its time listening for and working "DX" (long distance). In fact, things are now at the point where "rag-chewing" or friendly conversation is at a premium. The Rag Chewers Certificate (RCC), which was the first of the special certificates issued by ARRL (in 1925), is steadily being outnumbered by the Worked all Continents (WAC; 1926), Worked all States (WAS; 1937), and DX Century Club (DXCC; 1937) awards. It is now rare to communicate with a casual contact (QSO) for the RCC minimum time of half an hour before the other finds an excuse to leave. Is this a sign of the times?

While telephones are available in most places now and direct-dialing is commonplace, there is something very satisfying about talking over a toll-free circuit at will, using equipment designed and made wholly or in part by oneself. At any time of the night or day, there are others available to share your own interests, whether they be Morse code, voice, television, satellite, or moon bounce—others who can give you new ideas on construction, design or
operation. Others who know a kink of design or a cheaper source of surplus parts. Others who need your help in emergencies or can come to your aid in hurricane, earthquake, volcano eruption or mudslide. Others who can direct help on land, sea, or in the air. In a short while you can have a friend who will listen to you and expect you to listen to him in turn; "All things to all men" is a good quotation in this respect.

It is these very possibilities of direct individual communication that cause some foreign governments to frown on this communication art as being subversive to their principles of control. America's principle of allowing virtually unrestricted communication by our citizens is deemed by some an unnecessary addition to the basic concept of the amateur service as a mere training school for operators and mechanics, and as desirable in emergencies.

A youth who assembles his first station from parts "scrounged" from friends' "junk boxes" or even from a kit given him at Christmas, has had a basic lesson in electronics which is more palatable and enduring than one learned at school. And if he continues with amateur radio, he will absorb more knowledge of electronics and will also have the unusual experience of contacting his fellow men all over this country and even in others. Amateur radio can give him opportunity, as it has for many in the past (i.e., Zenith, Eimac, etc.).
With FCC limited by appropriations, control over the approximately 375,000 licensed radio amateurs by that Commission is limited as it is over the many other existing transmitting stations. It has been difficult to even find funds to give license examinations. For some years, FCC has been delegating the lower class (Novice) examinations to amateurs of higher grades. Recently, however, a law was found which prohibited unpaid assistance to government agencies and brought this practice to a stop. The law was established to prevent undue growth of government agencies beyond that contemplated when they were established. In addition to licensing, however, there was the problem of "surveillance" of transmissions. Willing and qualified amateurs measure frequencies, observe modulation and mail reports to amateurs believed to be in violation. This has often prevented an amateur from being picked up and cited by an FCC monitoring station. It is a friendly service given freely by amateurs to others to keep them out of trouble. Another friendly, freely given service is the free code and theory training given at radio clubs or by individual amateurs, nicknamed "Elmers" who guide the beginners through the basic principles they need to know.

The summary given in this chapter will be explored and developed more fully in those to come. The ham, as a citizen of the United States has been, and will be, contrasted with those of foreign countries and additional
note will be taken of how much (but not all) of our amateurs have served as a model for International Amateur Radio.
1. Irving Vermilya in his "Amateur Number One" (QST, Vol. 2, No. 3; Vol. II, No. 4, February-March, 1917) mentions sweethearts exchanging messages and sweet goodnights over their neighborhood wire telegraph circuits. The wireless system in England was Marconi's system used only commercially and by the government there.

2. Ibid., pp. 10-11. It will be remembered that there was no radio law in the United States prior to the 1912 Act.

3. QST, Vol. 4, No. 10 (May 1921), p. 23. Station 91K in Chicago was guarded, and eight individuals were chased away.

4. See "Brass Pounders' League," in any recent QST. For example the February, 1981, issue shows a total (for November, 1980) of 3,337 messages handled by Mrs. Burke during that month. These were divided as follows: 670 Originated; 1,109 Received; 1,492 Sent; and 66 Delivered.

5. Close inspection shows that the wooden box originally contained twenty bars of "Old Honest" soap, manufactured in Pittsburgh. Since broadcasting today depends so heavily on soap-operas and soap-box oratory, it should be significant that this pioneer in radio broadcasting was actually built on a soap box! Later that year, of course, the station was rebuilt and moved to the roof of the Westinghouse factory, there to become the famous KDKA.

6. Armstrong (b. December 18, 1890) studied at Columbia University, where he discovered the principle of regeneration, which revolutionized radio reception from 1913 on. He had a number of other patents, including that on super-regeneration. After World War II he pioneered in FM broadcasting, and was perfecting his FM broadcasting station to cover the New York City area at the time of his death.

7. QST, July-August, 1959; 1979/80. The World Administrative Radio Conferences (WARCs) are held by a branch of the United Nations (UN) at irregular intervals--usually about every five or ten years, when changes in the technique demand review of radio frequency spectrum allocations. The latest was held in Geneva in 1979.
and was well covered by IARU, ARRL, and many other amateur organizations. Since WARC have the power to make many changes in amateur frequencies and rules, they are vital to the hams. WARC '79 added some frequencies to the radio spectrum used by hams and refused to do away with the Morse code proficiency requirement for ham operators. Many of the officials at WARC in recent years are themselves hams.

8. E.g., U.S. hams in 1921 were 11,473 strong, and the total U.S. population, as of the 1920 census, was 105,710,620. Thus hams were then about one-hundredth of one percent of the total population. While total U.S. population in 1980 had increased to 223,889,000, U.S. ham population was up to 398,829, or about one-tenth of one percent, a gain of approximately ten times the ratio sixty years before.

9. Among others: Rag Chewers Club (RCC); Worked all Continents (WAC); Worked all States (WAS); and DXCC (DX Century Club). The first one issued was the RCC (1925) which encouraged casual conversation, although WAC came out the next year (1926) and negated that principle. As equipment became more effective and a greater number of hams was active, other more-difficult awards have been offered, such as 5-band DXCC, WAS by moon-bounce, etc. These are all aimed at satisfying the competitive ham spirit.

10. The Guyana service attained considerable publicity when the church members there killed a U.S. Congressman, then committed mass suicide. Some hams made tape recordings of alleged illegal transmissions they had made on the amateur bands, but the government refused to allow them to become public, invoking the secrecy clause of the amateur regulations.

11. This covers so-called "third-party" traffic where persons, not hams, seek to talk over ham stations to other non-hams. Non-commercial greetings and personal (not business) information is allowed to be exchanged. Health and morale matters are often discussed.

12. Cf., "Dollar-a-year" men in government during World War I. Apparently the Office for the Management of the Budget (OMB) and others feel that the practice allowed an agency to become more powerful than if its personnel were limited to that actually approved in the Budget.
CHAPTER II
HIRAM PERCY MAXIM, THE ARRL, AND
THE INTERNATIONAL AMATEUR RADIO UNION

H. P. Maxim

A phenomenal organization requires a phenomenal leader. Such was "HPM," as he was known to his associates.

Born in Brooklyn, New York on September 2, 1869 in an old American family of French extraction, HPM had for father a famous inventor, knighted by Queen Victoria. His uncle, Hudson, was the inventor of smokeless powder.

HPM was a graduate of MIT at sixteen and a practicing engineer at seventeen, according to Mrs. Schumacher, his biographer. Although he was first engaged in the development of automobiles for Westinghouse and later for the Pope Bicycle Company in Hartford, Connecticut, his lifelong vocation was in the field of silencers, at first for guns, and later for huge diesel engines and the like.

In her foreword to Mrs. Schumacher's biography, Maxim's daughter Percy, had this to say about HPM and amateur radio:

Undoubtedly the activity which gave HPM the greatest satisfaction was his work in amateur radio. The ingredients that challenged him were the association with young men of modest or no means; their ingenuity and determination; their sense of high adventure. He once wrote: "the hardest working among us are those who work with their brains. The driving force seems to be our own incurable ambition to be somebody, to accomplish something." Amateur radio, though a hobby for him, gave him a chance to help others in this
forward movement and provided him with associations which he valued above all others. And, as he said on so many occasions: "73 to my fellow amateurs!"1

Percy Maxim Lee, HPM's beloved daughter, wrote the above on January 19, 1970, almost thirty-four years after HPM's death on February 17, 1936, at the age of sixty-six. He had been President of ARRL from its beginning in May, 1914, or for nearly twenty-two years.

A contributor to QST from its first issue (December 1915) HPM won greatest attention under his nom-de-plume of "The Old Man" (T.O.M.) whereby he laid bare and attacked the foibles in amateur operating of the day. The connection was a secret known only by a handful, until his death.

Quoting Mrs. Schumacher:

To fully appreciate the personality of Hiram Percy Maxim, one must comprehend the scope of the amateur. Hams are in ages 8 to 80. In educational attainments they range from grade school status to that of doctorates. Their occupations run from that of coal miners to major executives of large corporations. They include impecunious schoolboys, and men of great wealth. Their number includes a dedicated variety from nuns to politicians. The ham's predominant characteristic is his altruism, where he rates among the highest in the world. The amateur wants all the other hams to share in his discoveries and accomplishments, and is not competitive. He guards only his spot on the air. As soon as an amateur does something of note, he wants to show his fellow hams not only how he did it, but further, how they can do it, too.2

As all organizations have their creeds, formalized or otherwise, the amateurs have their code . . . which has six points, and incorporates ideals of being loyal, polite, progressive, friendly, well-balanced, and patriotic. That fifth point, of balance, is as unique as it is important. Most organizations promote themselves first and foremost, and all the time. Not so with amateur radio. The ham code makes it clear that
radio is a hobby, and as such it must never be allowed to interfere with duties owed to home, school or community. In this we see the guiding hand of HPM, who believed that the amateur must never become a slave to his rig but always its master.\(^3\)

Maxim's "philosophy" of amateur radio was well expressed by an article of his, printed in \textit{QST} for September, 1927.

\textit{Titled: "The Reason Why," it reads:}

Sitting back in the old armchair, with the last issue of \textit{QST} read from cover to cover and with everybody else in the house asleep hours ago, I fell to thinking of amateur radio today and amateur radio of other days. As the blue smoke curls slowly upward from the old pipe, visions of early ARRL Directors' meetings float before me. I see those oldtimers grappling with problems of organization, with QRM (frequency noise and interference), with trunk-line traffic and rival amateur leagues. I see sinister commercial and government interests at work seeking to exterminate amateur radio. They were dark days, those early ones. Today I see amateur radio an institution, recognized by our American government, and on the road to recognition by the other great governments of the world--I see a rapidly-developing world-wide amateur radio brotherhood taking shape, in the form of our I.A.R.U.

And, as the last embers of the old pipe slowly turn to grey ash, I ask how it all came about. That the ARRL should have succeeded and all its opponents failed. The reason is clear. It is because with our opponents there was always some kind of a selfish motive to be served for someone, whereas in our ARRL we insisted from the beginning that no selfish motive for anybody or anything should ever prevail. Everything that our ARRL undertakes must be one hundred percent for the general good. That policy bred loyalty and confidence. With those two things an organization can prosper forever.\(^4\)

And K. B. Warner writes (in part: \textit{QST}, April, 1936):

"One of Mr. Maxim's major services to ARRL was his constant insistence, down through the years, upon the highest ethics and standards in our organization. The organization must not
be selfish; it must have orderly government in terms of
majority opinion; it must work for the greatest good to the
greatest number; it must not lend itself to personal axe-
grinding." And again quoting Warner:

The first instance of ARRL influence at Washington
was his [Maxim's] before the Commissioner of
Navigation in late 1914, as our President . . . He
directed our fight . . . in late 1918 when we were
having an awful battle with the Navy, which wanted
control of all radio.5

In an appendix to her biography, Mrs. Schumacher notes
highlights of statements made by HPM on January 31, 1930,
before the U.S. Interstate Commerce Commission. One was:

Amateur radio is unique in history. Nothing quite
like it has ever before existed. It is as old as
radio, the great Marconi himself having started as
an amateur and being truly typical of one. From the
darkest days there has been something about com-
municating across space that has fascinated those of
us who are technically inclined. There is a scientific
romance to it that profoundly moves certain of us re-
gardless of the social or financial status to which
we happen to have been born. Rich and poor, educated
and uneducated, old and young, with the product of
our hands and our own brains, we are able to reach
out into the empty ether and make contact with another
intelligence.6

And Mrs. Schumacher refers to an editorial in December,
1931 QST. This was on the origin of the word "ham." Accord-
ing to the editorial, this had nothing to do with a similar
word in an old song, nor had it any reference to the theater's
Hamlet. Rather, it was derived, according to the account,
from the British Cockney version of amateur (h'amateur),
abbreviated into "ham." "And," the editorial concluded, "Hams
we are, and proud of it."7
In the spring of 1914, at the newly-formed Radio Club of Hartford, HPM proposed an organization, country-wide, that would have, as its main purpose, the establishment of relay routes across the nation, manned by competent members of ARRL, an "American Radio Relay League," to cover all parts of the United States (and, later (1920) Canada). The idea was Maxim's who had been one of the founders of the radio Club.

Soon the "baby" became too large for the Club, and struck out on its own, being incorporated in the state of Connecticut in January 1914. Incorporators were HPM, C. D. Tuska and a Mr. Howard, an attorney.

According to the League's publication, Fifty Years of A.R.R.L. (1965):

Early records are sketchy, to say the least, but it appears that the original (relay) committee, with the addition of Howard, formed a self-perpetuating Board of Directors which managed the League until the adoption of a formal constitution in 1917. True, there was a bulletin to members in early 1915 which proposed the formation of a board of control with one to four representatives from each state (depending on the number of members in each); but no evidence can now be found that this plan ever developed, and later references to decisions of the League always mentioned the "directors at Hartford."8

From Fifty Years of A.R.R.L.:

QST (then meaning "General call to all stations") first appeared in December, 1915, a private publishing venture by Maxim and Tuska, although it in effect became the voice of the League. It had an immediate beneficial effect. Membership jumped from 625 on December 1, 1915 to 961 on January 10, 1916. It also served, more effectively than before, to inform members--and posterity--of what the League was doing.9
It may be noted that the only other large-scale radio publications devoted to amateurs at this time were those of the Gernsback brothers (Hugo and Sidney) who from New York published the monthly *Modern Electrics*, *Radio News* and others, until the time of the Great Depression, and World War II.

On page 16 of *Fifty Years* . . . there appears a photograph with the following caption:

At this organizational meeting of ARRL in 1917 there were present (l. to r.) C. D. Tuska, Secretary; H. L. Stanley; Victor F. Camp; T. E. Gaty; Hiram Percy Maxim, President; A. A. Hebert, Vice-President; and J. O. Smith. Unable to be present for this photo were Directors R.H.G. Mathews, J. C. Cooper, Jr., F. M. Corlett, W. H. Smith, H. C. Seefred, W. T. Fraser, and W. T. Gravely.

On page 25 of the same publication the following note is made:

At a meeting at the Engineers' Club in New York City on November 30, 1918, the old Board of Direction of the ARRL authorized HPM to attend the [Congessional] hearing of these bills, H.R. 13159 and S.5038 (of vital interest to "ham" radio).

Also, at page 26: "On the first of March (1919) the Board again met, and voted to reorganize the League and to purchase QST from Tuska [the owner]." 10

**Growth reflected in ARRL Board**

*From Fifty Years* . . .

Almost immediately after reopening [September 26, 1919], the League, at the request of Canadian operators, expanded its operations to include Canada. Four operating divisions were created, and soon after a fifth was added. A Canadian was named to the Board of Directors.
In 1922, a new Board of Directors was elected. Like its predecessors since 1917, this election was held "at large," with all members voting for 17 of the 22 on the ballot. This 1922 Board goes down in history as the one to put itself out of business, for during their term, the directors drew up a new democratic constitution, under which each of twelve U.S. divisions chose a director to represent it on the Board. Any ten members could nominate a member not engaged in commercial radio as a candidate. The then-new Constitution, differing only in detail from the League's present Articles of Association, was adopted in December 1923, and the new Directors were elected in 1924. Thus was it insured that the Board would be truly representative of hams throughout the nation.

Not only was corporate change a measure of achievement in those days, individual growth and record-making (and breaking) was very much a part of the "ham-scene" during the twenties. One measure of this was the number of contests and award of prizes. An outstanding one was the Hoover Cup. During Herbert Hoover's administration of the Department of Commerce (which included the radio division) four cups were awarded, one a year, to the "ham" adjudged having the best station principally built by himself. Louis Falconi, 5ZA, took the cup for 1921. In 1922 the winner was F. B. Ostman, 20M. Donald C. Wallace, 9ZT/9XAX (not unheard of today as W6AM!), won the award in 1923, and finally, 1924's winner was Bart Molinari, 6AWT. (A "Mars-Earth" cup was offered in 1929!)

Fifty Years . . . makes the following cogent statement as to the twenties:
More than any other, perhaps, this was the period during which amateur radio as we know it today assumed its basic shape. Yes, it was a great period to be an amateur. Serious problems and challenges abounded, but so did excitement, learning and accomplishment.13

During this period the challenge of interference to broadcasting was met by voluntary time-sharing; technical developments (e.g., CW and short waves).

After World War I, QST resumed publication (June, 1919) as the official journal of ARRL. Commercial publications for the "hams," already represented by the Gernsbacks, were augmented by such as Pacific Radio News (1919) from San Francisco—which became "Radio" in the early twenties, when broadcast receiver advertising revenue became, for several years, a major part of a magazine's income. Even QST succumbed to this lure for a few years of the early twenties decade, calling itself an exponent of "citizen radio" and running a column "With the Radio-phone Folks," which was nothing more or less than "chit-chat" about the broadcasters and their stations.

The coming of the Great Depression, and the concomitant reduction in broadcast advertising allocations, soon put an end to favorable treatment of broadcasters--completed by the onset of World War II and its advertising limitations.

One of the first amateur-type "commercial" magazines to get back into circulation after World War II (1945) was CQ then published by the Cowans, but recently taken over by
part of the old staff from a location on Long Island, N.Y. not far from the original site. Other subsequent new "starts" have been 73 and Ham Radio from locations in New England, and a tabloid style monthly, Worldradio, published from Sacramento, California. Each has a slightly different style or emphasis, that of CQ being on operating activities and contests; Ham Radio on construction or "build-your-own" projects; Worldradio on individual achievement or "Ham P-R", while 73 is a more-or-less general coverage publication.

QST, of course, basically prints SCM's reports from the 74 Sections in the United States and Canada, and Club notes, as well as a mix of "Washington notes," relay networks, emergency news, together with technical articles and a few fictional stories. Once a year, in April, an "April Fool" story is usually published, masquerading as a serious article, for the greater enjoyment by readers who are not fooled!

The commercial magazines have all been founded since World War II. In addition to these are a number of specialized publications, such as the bi-monthlies like Orbit (published by the Amateur Satellite Corp. "AMSAT"), Spark Gap Times (published by the Old Old Timers' Club, "OOTC"). In addition, there are dozens of special publications, handbooks, code courses and training pamphlets and literature, as well as club bulletins, all of which add up to a very respectable total, giving an idea of the strong financial position of the radio amateur market at this time. What a change from the
days of the Great Depression when QST, the only real amateur publication of national scope then, was faced with cancellation of ads to the extent that nine full pages (out of a total of eighty) in the April, 1933, issue were devoted to an "April fool section."

Today, in contrast, out of a total of 164 pages in the July, 1980, issue of QST, about half are devoted to advertising, many in color. In addition to the advertising placed by U.S. firms, there are a number of pages devoted to foreign imports—something not seen before World War II.

Although prices (in current dollars) of gear are not greatly elevated today (an excellent receiver advertised in QST for December, 1919, cost between $400 and $500 then, not much below the equivalent receiver today) in spite of inflation, the market has grown so that it represents a desirable goal for many manufacturers and sales outlets.

There are more hams now, more manufactured equipment, and sellers, and buyers with money to buy gear, rather than being constrained to make sets themselves. When trade-in time comes, the manufactured equipment, with its printed handbooks, commands a fair percentage of its cost—homemade equipment practically nothing.

Modern hams have both inclination and money, and modern manufacturers know how to fill their needs. They also have the money and the organization to continue and enhance Amateur Radio.
QST has changed over the years, conforming to amateur radio itself. The price has gone up from 10 cents to $2.50 per copy, in line with costs in general. The ads tend to be full-page and in color, but the content is still devoted to ham radio with technical construction articles, news from the sections with special sections for female operators, experimenters and records made--in a word, a larger edition of the first issues, with emphasis placed on international news and nothing about the commercial broadcasting industry.

Every so often, ARRL announces in QST a résumé of what is planned or "in the works." The times of announcement are usually keyed to other events, such as the end of World War I and World War II, and are often tied in with technical advances that have come about during the years the "hams" were off the air.

But technical progress is not the only change inherent in the hobby. In fact, to take care of future planning in an orderly fashion, the ARRL Board of Directors has established the Long Range Planning Committee (LRPC) to serve as a clearing house for ideas and recommendations. QST for June, 1980 gives the names of eight well-known League members appointed by President Dannals (W2HD) to serve with him as committee members.

The June article mentioned seven critical areas perceived at that time:
1. Ways to better control the use of amateur frequencies and discipline offenders.

2. Need for stronger/more effective relationship with government (e.g., FCC).

3. Need for strengthening international cooperative relationships.

4. Emphasizing quality rather than quantity in ranks of future "hams."

5. Greater participation in public service and experimental aspects.

6. Increased membership involvement in ARRL affairs.

7. Stabilization of ARRL HQ staff and financial stability.

Elmer—a "guide to his footsteps"

Early hams were more often to be found in the suburbs than in the city itself. This was primarily because of the space needed for the antennas then on the low amateur frequency of 1,500 kilocycles per second. Since a ham station using the power allowed by law also needed a-c power, it had to be established where such was available, again, in the suburbs not the country itself. As Vermilya shows (QST, February/March, 1917) early amateur stations were apt to be located near seaports where Marconi wireless telegraph stations on ship and shore were available for visiting, inspection, and copying.

By the time of the first amateur government regulation (by Department of Commerce in November 1912), hams had grown in numbers, and clubs were being formed by them. These were
in the cities as a rule (Fresno, California, 1908; New York, Boston, etc.). In these clubs, then, there were usually at least one or two members who, by reason of greater experience and interest, were looked upon as purveyors of truth and wisdom by the other members. In many cases these persons were not officers of the club nor interested in amateur organization politics. But when a member had a problem, those were the persons to whom he instinctively turned. Especially in the case of members trying to pass their first license examinations, these knowledgeable members were a tower of strength. Code and theory classes were instituted at intervals to instruct beginners, and the experienced members nearly always had someone to instruct, from their group. In smaller towns, and in the country, a ham with a successful station took the place of a club's classes.

Years ago, one of these self-abnegating instructors was named "Elmer." For some reason the name stuck and has come to signify a knowledgeable ham who is willing to give his time and pass on his knowledge to new hams. The place of these "Elmers" in the American radio amateur world today is an important one, as they constitute not only a teaching source but, very importantly, also a screening point in ham radio.

By experience in "sizing-up" the beginner, Elmers can encourage the worthwhile neophyte and discourage others. That this is a very pertinent object has been shown most clearly because of the great number of hams now active.
Instances of misuse of the ham privileges granted by the government (intentional interference, profanity, etc.) appear more clearly now with the greater geographical range of amateur radio which has taken place.

Although, for many years, hams holding the higher classes of licenses were permitted to give examinations, this is not being done at present. Although few cases of cheating or even charging for the service were ever uncovered among the thousands of tests administered, the reason for the change was in a law covering all government departments. The law does not allow unpaid volunteers to work for a department. Its stated purpose is to discourage undue growth of a department by reason of its use of numbers of unpaid volunteers, beyond a size contemplated by Congress. It is hoped that those friendly to amateur radio on "the Hill" will be able to modify the law. Many young, physically infirm or impecunious candidates are prevented from travelling to one of the few FCC examining points. Abuses of the examination and call-issuing process were even found among FCC employees, but were rectified on being uncovered.¹⁵

LRPC, with the aid of Florida State University, is making a survey of 10,000 amateurs to establish a profile and assess attitudes toward ARRL and its performance. It will also acquire information as to possible changes in League services and activities, and attempt to plot future directions for the Amateur Radio Service. Results of this "basic survey" will
be awaited with great interest by all amateurs, the ARRL, and FCC.

The LRPC has also received, direct from some "hams," comments on certain practices thought worthy of consideration by the Committee. A few selected comments relate to:

The "PR" image presented by some "ham" antennas.

The place of the "American amateur radio phenomenon" in enhancing International technical cooperation.

More discretion to be shown in amateur recruitment. Quality not quantity.

"Ham radio" isn't a single hobby--it is now about 50 hobbies flying in loose formation. All should be encouraged.

Morse code capability should not be changed. (An exam stumbling block, of great use under poor conditions.)

Membership (ARRL) should stress quality, but quantity should be enough to be effective politically.

A hard-won license is seldom risked.16

QST, as the official organ of the IARU, as well as ARRL, finds itself in a unique position vis-à-vis the other major monthly ham publications. It is the only one which presents an international viewpoint (except for certain contests and awards). It will divide its coverage as ordered by the Board, but this has shown itself well cognizant of the truism: "what is good for them is good for us." Through Regional meetings and International conferences, editorial comment is shaped to a degree never before achieved and the cooperation of the ham publication world is now much greater--especially
if one remembers the twenties when a "dog-fight" atmosphere was then existent due to the editorial policy of commercial competitors.
NOTES--CHAPTER II

1. Alice Clink Schumacher, Hiram Percy Maxim, Father of Amateur Radio, Car Builder and Inventor (Great Falls, Montana, 1970), p. v. "73" = "Best regards" in Phillips telegraphic code. Voice was not widely used on the ham bands until the twenties.

2. Schumacher, p. 145. Written by Paul M. Segal, first Rocky Mountain Division ARRL Director and later General Counsel for the League, it has been published each year in the ARRL's Handbook since 1927. The "Ham's Code" embodies all that is considered best in the individual operator, whether "on the air" or in person in his daily living.

3. Written in the twenties when short waves were just beginning to make international conversation possible, the spirit of the code was passed on beyond the limits of the United States.


5. QST, ibid. It is said that the Navy Department, having a taste of control over radio during World War I wanted to continue it in peacetime. Since this would have destroyed the "old" ham radio, the hams strongly opposed the bills introduced in Congress, and though not strongly organized, saw their defeat.

6. Schumacher, appendix. This "one-to-one" contact feature of radio was always a favorite of Maxim's.

7. QST, December 1931, cited in Schumacher. A number of theories for the word "ham" have been propounded, the least flattering being "he has a fist like a ham," i.e., heavy-handed.


9. Ibid. Without QST, the League would have remained the 600-member parochial organization it was in December, 1915, when QST was first published.
10. Ibid., pp. 25, 26. QST's original owner, C. D. Tuska, was forced, mainly by debts to his printer, to discontinue publication with the September, 1917 issue. A.R.R.L. sold bonds to buy the magazine from him.

11. Ibid., p. 37. The new directors were elected from divisions, i.e., definite geographical areas. They had previously been elected "at large."

12. Certificates, plaques, and cups have been an essential part of ham radio since World War I. The Mars cup, donated by Elser and Mathes was for the first two-way amateur communication between Earth and Mars. While now technically possible, the stumbling block is getting a ham up to Mars!

13. Fifty Years . . . , p. 39. Hams now have solved the problems of TV interference, pick-up on stereos and other electronic gadgets, and communication by more and more hams in the same frequency space.

14. QST, June 1980. This is the first time the Board of Directors has established a permanent Long Range Planning Committee (LRPC) to recommend key problems and attitudes they should concentrate on. Since the Board does change membership, this is an important step toward continuity of purpose.

15. These were granting of licenses without examinations, and issuance of "preferred" call-signs. The Commission states it has taken steps to prevent recurrences.

16. Where licenses are issued with little or no examinations, there is a tendency to hold them cheap. Particularly, when Morse Code is mastered, the candidate has a real feeling of accomplishment.
CHAPTER III

WHO ARE THE RADIO AMATEURS? THE TWO BASIC TYPES

CHARACTERISTICS OF THE AMERICAN HAM

HOW DO FOREIGN HAMS DIFFER?

As was pointed out by Clinton DeSoto in his 1936 publication *Two Hundred Meters and Down*, Marconi's arrival to transmit the New York America's Cup races for the *Herald Tribune* found two types of amateur experimenters on the U.S. scene. The first of these was the electric laboratory type, with work benches covered by electric power cells and batteries, wet and dry, Wimshurst type electro-static high voltage generators, small motors, and other electrical equipment of the day. Their goal was to find more efficient methods of making, and connecting-up, the instruments. The other type of amateur electrician was the telegraph operator who, aping the instruments in the local railroad, Western Union or Postal telegraph office, had his "gravity cells" for battery, and such "main-line" or local-battery telegraph instruments as he could build or acquire. A problem was the line connecting the members of the local telegraph club. Usually a "wire-chief" was appointed by the local club to maintain the line after easements were obtained from the pertinent property owners, or the line installed on a "moonlighting" basis. At this time, most of the commercial lines on poles outside
of cities were for telephone/telegraph or street railway, as no electric power was used in the suburbs and small towns.

An important point to remember is that the commercial telegraph system was on a non-government basis, unlike other countries (although Morse erected his first line--Baltimore to Washington--on a grant from Congress in 1844).

It was precisely the trouble in securing routes for their wire lines that caused the two-way telegrapher "hams" to take to wireless. The lack of necessity for wire lines allowed them to operate, first, over city-wide areas, then to larger and larger areas as the experimenters discovered more efficient "gear."

Remember, it was an amateur spirit that motivated all these persons--they might wish for self-improvement, but that was a spin-off from the joys of making something that worked, and then communicating with it.

As the school vacations allowed many of the early "hams," particularly those near the coast, to seek temporary employment as ship wireless operators, so did the coming of the first radio law in November, 1912, bestow government cachet on their activites. Calls were granted and permission to operate on a wavelength of 200 meters (1500 KHz) with an input power of not greater than 1,000 watts, (reduced to 500 watts if within 5 miles of a government installation) standardized what had been "every man for himself."
The goal of many "hams" was to have a station designed like one aboard ship, and to handle (originate, relay and deliver) messages. Some were so active that in a few years they were able to relay to all points of the compass through like-minded operators they contacted. Messages were solicited from relatives and friends, and the general public, and the boast of many was that none of these free messages stayed "on the hook" for over 24 hours, much less died there.¹

Genesis of the message-handlers

One of the first publications of the new ARRL (which had been founded just one and a half years after the Radio Act of 1912) was a list of radio stations, and a map showing established "traffic" routes all over the nation. Limited by the 200 meter wavelength, and the spark equipment, reliable ranges, at night, were seldom more than a scant few hundred miles. Thus it was before World War I that interest was largely channeled into message-handling, keeping reliable schedules, and improving the equipment for those purposes.

The advent of war closed all amateur stations for a period of two and one-half years and QST suspended publication. In the words of the government order closing the stations: "All antennas must be lowered to the ground." No experiments involving use of transmitting gear were allowed.²

Before QST suspended publication in September, 1917, several interesting and humorous incidents were recorded. One had to do with local police, who, at the instance of an
over-patriotic neighbor, confiscated key, buzzer and copy of the International Morse Code, on the pretext that the owner was using a "wireless key, with an open copy of a code book lying beside him."³

Another, and far more serious item had to do with the effective copying, by a ham in New Jersey near the large German-owned Sayville transmitting station, of the high speed signals sent out before war came. The ham, Apgar by name, had built an ingenious device involving two "Dictograph" copying machines in series, by means of which high-speed sending could be rendered copyable by an operator. As a result, Apgar and his gear made many hours of recordings of suspected transmissions from Sayville for the U.S. Secret Service. Based on this evidence, it was shown that the German-owned station was illegally sending reports of ship sailings which could be used by German U-boats cruising off the coast.⁴

Foreign Amateurs--The coming of international ham radio

Prior to World War I, QST shows little or no information regarding overseas amateurs. The only exceptions were U.S. amateurs who were employed as ship operators sailing to foreign ports, who in their spare time "listened-in" on amateur receivers brought on board, and reported any reception, with locations at which heard, to QST.

The improvement in amateur gear engendered by service in World War I led the U.S. amateurs to greater and greater
success with their transcontinental relays, and they began to wonder if there might be "hams" overseas.

A test across the Atlantic was sponsored by a magazine in the winter of 1920-1921, but failed, and the sponsors turned the plans over to ARRL for tests to be run. The first test was set for December, 1921.

To improve chances of success of the one-way test (U.S. to Europe), ARRL, through QST, arranged for quiet hours during the tests and designated qualified amateurs periods during which they would send their assigned code words. ARRL also sponsored sending an expert "ham," Paul Godley, to England with special receiving gear made by him, to listen from a selected location in Scotland. Although the British "hams" in London were most hospitable to Godley, their surroundings, with much electrical noise, were entirely unsuited to the reception of weak signals. In fact, professional radio engineers, using old-established formulae, deduced that the whole thing was impossible, based on the "short" wavelength of 200 meters and the maximum allowable transmitter input power of one kilowatt.

In mid-December, during night between the U.S. and Scotland, the best time for radio signal propagation, weather was anything but kind to Godley and his checking operator, Pearson (loaned by the British Marconi company). On a beach slippery with seaweed near Ardrossan, Scotland, Godley erected a tent to protect his apparatus, Pearson, and himself.
A long "Beverage" wire was run on short poles, down the beach, pointing toward the U.S.A. In spite of howling gales from an unusually severe storm on the Atlantic which blew the tent away at least once, the two operators, during several nights in mid-December of 1921, were able to copy a total of twenty-six North American stations (six on spark, twenty on CW). One was as far west as Cleveland, Ohio, and one was in Ontario, Canada. Of the CW stations heard, powers as low as 30 watts are mentioned—a resounding success for this newer form of transmission.

The "hams" in both the U.S. and Europe went wild with enthusiasm for this successful experiment. They had abided by the rules, kept quiet except when it was their assigned turn, and established the worth of the frequency and power assigned them. A number of British "hams" also reported reception, especially of the "star" transmitter 1BCG, specifically established for the tests by a team of six famous U.S. amateurs, including E. H. Armstrong. QST had time to do nothing more in its January, 1922, issue than to run a front cover "billboard" listing the successful twenty-six stations heard by Godley and Pearson, together with the locations of the stations.

During 1922 plans were laid by many more "hams" on both sides of the Atlantic, and again (at the third transatlantic tests during December of that year), more Europeans listened for, and heard, more Americans.
During 1923, interest turned to two goals: use of short waves (i.e., below 200 meters) and two-way communication. Plans went ahead for the fourth series of "TransAtlantics."

During World War I, a French amateur, 8AB from Nice, was stationed in the United States and met some of our leading "hams." In 1923 he attended an ARRL convention, and returned home to Nice with American "ham" equipment, notably a "Grebe" amateur short-wave receiver.

In November 1923, prior to the tests, and having assembled a transmitter and antenna to operate on a wavelength of 110 meters, together with his Grebe receiver, the French ham, Leon Deloy, cabled ARRL that he was ready for two-way tests. Fred Schnell, 1MO, Traffic Manager of the League, and John Reinartz 1XAM/1QP replied (also by cable) that they, too, were ready. So it was on November 27, 1923, as QST (January 1924) describes it: "At 10:30 (8AB) signed off,--1MO gave him a long call on 110 meters, and European and American amateurs were working each other for the first time, for Deloy came right back! It brought the thrill that comes but once in a lifetime. Deloy's first words were:

R R QRK UR SIGS QSA VY ONE FOOT FROM PHONES ON GREBE FB OM HEARTY CONGRATULATIONS THIS IS FINE DAY MIM PSE QSL NR 1 2

"Then Schnell asked him if he would take some messages and greetings were sent to General Ferrie, director of French military radio, and to Dr. Pierre Corret, President of the
French Joint TransAtlantic Committee. Meantime 1XAM--called 8AB--and Deloy acknowledged receipt. 6

Effect of Short Waves

In the U.S., Reinartz, Schnell, and others were exploring waves shorter than 100 meters and found that there was unexpected propagation on them by means of the ionized layers of air surrounding the earth. This had been shown theoretically by the British mathematician Oliver Heaviside some years before. Therefore, these bands of ionized material surrounding the earth at various altitudes have been named "Heaviside Layers." 7

Mathematics or not, when the U.S. (and a few European) "hams" found the relative ease with which they could communicate using these (short) waves, they besought the Radio Division of the Department of Commerce to assign them for their use. So in 1925 bands were assigned on a temporary basis, around wavelengths of 80, 40, 20, 10 and 5 meters (3.5, 7, 14, 28 & 56 MHz.), a harmonic relation so the amateurs could "swallow" the interference caused by those using lower (frequency) bands.

The International Radio Union (IARU)

In April of 1925, in Paris, representatives of a few nations met with President Maxim of ARRL and formed IARU.
Quoting from June, 1925, QST:
Late on the afternoon of 18th April the closing plenary session--convened, and ratified all the actions taken. At this point late arrivals were present from Russia and Indo-China, raising the total of countries to 25.

Membership at that time was on an individual basis and

QST (June 1925) adds:

--at this writing we already have 112 paid members.  

Now (1980) membership is by national societies, and membership is well over 100 such societies (e.g., ARRL is one such society with its near 200,000 members).

It is of interest to quote from QST for October, 1974. There follows the conclusion of an address by Armin H. Meyer, W3ACE, entitled "Amateur Radio in our Interdependent Civilization," delivered at the ARRL National Convention of that year. Ambassador Meyer, a "ham" of long standing, has held the foreign calls of Y12AM, YA1AM, OD5AX, EP3AM, and JH1YDR, and served as U.S. Ambassador to Lebanon, Iran, and Japan.

Concluding remarks of his speech were:

What does all this have to do with Amateur Radio? Obviously I am a partisan, but I believe that in its modest way, this great avocation of ours is assisting the caravan of civilization to travel in the right direction.

Ambassador Meyer then enumerated five human characteristics worldwide, enhanced by Amateur Radio. Paraphrased, they are:

1. **Personal Identity**--Man's age-old desire to have an identity of his own is richly rewarded in the world of Amateur Radio.

2. **Social Equality**--Nothing more warms the cockles of my heart than to hear JY1, the King of Jordan, who is normally addressed as 'your Majesty', tell
another amateur with whom he is in communication that his "handle" is simply 'Hussein'.

3. World Community. In Japan, an amateur said to me—'it was like the opening of this country to the outer world'.

4. Transnational collaboration. Whether perfecting circuitry and antenna systems, bouncing signals off heavenly bodies, or merely improving operating skills, Amateur Radio is playing an indispensable technological role.

5. World Citizenship. In our field of radio, men, and nations, in order to avoid chaos, are abiding by rules, if not laws, for the utilization of the frequency spectrum.

It is not likely that a Paradise will ever be fully achieved on this planet. But human satisfaction is derived by striving for it. That, in my view, is what Amateur Radio is all about.9

Ambassador Meyer, under the heading of transnational collaboration, mentioned radio amateurs "bouncing signals off heavenly bodies." These have included in past years the moon, and a series of earth-launched passive or active satellites. Broadly, the term can be enlarged to include amateur placed and maintained, mountain-top repeaters.

In a series of actions, across the American continent, local amateur clubs have sponsored acquisition, siting and maintenance, of automatic repeater stations according to a plan matured by ARRL and its repeater Committee. This group, like other advisory committees, consists of unpaid ARRL members, who, by reason of their special expertise in a particular specialty, can contribute real help in practical advice and state-of-the-art technology. During the past ten years, the repeater system has grown from a few experimental
mountain-top installations to hundreds all over the nation (and also abroad) so that a motorist travelling long distances knows what frequencies (600 KHz apart) to use for "accessing" the nearest repeater's receiver and transmitter. Useful for such a traveller is ARRL's yearly repeater guide, which summarizes the repeaters on a geographical basis.

Soon after Lt. Colonel DeWitt, a "ham" temporarily in the Signal Corps at the end of World War II (1946) (before returning to his prewar job at WSM Nashville, Kentucky) had bounced signals off the moon using a powerful transmitter and a selective and sensitive receiver, other hams found that they were able to do the same thing, using their limited power of 1 KW. Now, a number of "hams" have communicated with each other using "moon-bounce."

**Echo-Satellites**

Balloons with radio-reflective coatings have been sent to great heights and used as passive reflectors, with greater or lesser success, in parts of the world to which the balloon drifted before breaking up.

**Advent of "active" repeaters**

About ten years ago, several experimenters found that it was possible, using the two meter (144 MHz.) amateur frequency band, to build a transmitter-receiver (transceiver) combination tuned to frequencies 600 KHz. apart in that band.
This was achieved without degrading the sensitivity of the repeater's receiver by using filter units of great efficiency (High 'Q'), resulting in a unit which, by its commanding elevation (on building or mountain top) was able to receive weak signals from mobile or fixed stations with poorly sited antennas, and repeat them at greater power from its transmitter portion (600 KHz. away), making a "pygmy with the voice of Stentor" out of the original station! Improvements on the basic principle were quickly made over the past decade, and lower and higher amateur frequency bands were used in addition to the 2-meter band; "simplex" operation was used in some cases (single frequency used alternatively for sending and receiving). In some cases, provision has been made for the distant "ham" to dial in to the telephone system at the repeater station's location. This last option, of course, is carefully monitored by the agency operating the repeater.

In Hawaii, with its separated islands, a special system has been set up, so that repeaters are available not only on Oahu, but also on other major islands, so that signals on the Oahu repeater are also available to them, and vice-versa. This, together with emergency power facilities, plus monitoring of the stations, gives a flexible system well adapted to service in inter-island work and for disasters.

A number of key facilities are supported by an Amateur Emergency Club, whose dues and donations go far toward covering the cost of installation and maintenance of the
respective facilities. However, during normal working (e.g., when there is no emergency) non-members of the emergency club are allowed access to, and use of, the facilities on a non-priority basis.

**Amateur Satellites (AMSATs)**

The International amateur organization supporting OSCARs (Orbiting Satellites Carrying Amateur Radio) is the Radio Amateur Satellite Corporation (AMSAT), with headquarters in Washington, D.C. AMSAT is supported by ARRL and other national organizations as well as by a great many amateurs worldwide.

Essentially, OSCARs operate as follows: In orbit, the receiver portion of the satellite picks up signals over a band of frequencies (e.g., on the amateur 2-meter 144 MHz. band). These signals are sent out (repeated) by the transmitter portion of the satellite on another amateur band (e.g., the 10-meter-28 MHz. band). Batteries in the power section of the satellite are kept charged by solar panels. Due to the superior altitude of the antennas on the satellite, outgoing signals from it are much stronger than the signals coming in from the earth station. Thus, the amateur on earth, in effect, is operating a more powerful station, covering a large portion of the earth's surface at any one time as the satellite orbits. It would be possible to cover much of any desired surface of the earth with only two or three orbiting satellites.
The OSCARs are replaced, as necessary, by new satellites, with state-of-the-art improvements. These are lifted on launch vehicles as arranged, on a no-cost basis. The cost of making the amateur satellite stations, although much less than commercial ones (because of donations of time, labor, and money by the world's "hams"), is borne by AMSAT through donations.

In May of 1980, the latest of nearly a dozen OSCARs, AMSAT-Phase III-A satellite, was ready to launch aboard the Ariane LO-2 rocket (in South America). As ORBIT magazine for June/July, 1980 describes it:

... the rocket majestically rose from the launch pad. A few moments later, the first stage malfunctioned and the vehicle exploded. ... more than 30 man-years have gone into the [amateur] program ... $150,000 plus countless donations.

The writer continues:

What we gained over those same [5] years was knowledge ... that we could work as a team ... that from within the ranks of Amateur Radio we could draw upon enough resources to attempt a project with a complexity rivaling commercial satellite endeavors funded at levels of tens of millions of dollars.

The failure of the rocket at Kourou (French Guiana) is "the first time that a satellite in the OSCAR series failed to reach orbit." Plans are already in train to replace it.

We have seen that a source of amateur wireless operators, in the early days, was from jobs aboard ships that began to be equipped with wireless in large numbers after the Radio
Act of 1912 became law. One such operator was Irving Vermilya, whose "Amateur number one" in QST for February and March of 1917 tells the story of a boy in Mount Vernon, New York, who built a receiver at the age of eleven in 1901. He then, after learning the code on private telegraph lines, became an enthusiastic amateur and commercial ship operator, and at age twenty-seven was in charge of a large Marconi shore station. Vermilya devoted the remainder of his life to radio.

Although Vermilya apparently had no formal education beyond high school, the reverse was true in the case of Lee DeForest, who earned his doctorate at Yale's Sheffield Scientific School in physics at the turn of the century. DeForest specialized in radio, and except for a short period with the telephone company, headed his own companies and engaged in research. The most famous of his many inventions was, of course, the "Audion" or three-electrode vacuum tube.

A third type of "amateur" was Hiram Percy Maxim, founder of the American Radio Relay League in 1914. Maxim was a graduate of M.I.T. who had his own business in the manufacture of silencers. He was forty when he became an amateur, and always treated amateur radio as a hobby, not a profession.

In the early days, wireless telegraphy attracted few women as a hobby. More became ship or shore station operators, especially at the time of World War I when insufficient
male operators were available. Mary Texanna Loomis (a distant relative of Dr. Mahlon Loomis, who obtained a patent on a wireless system in 1863) received her training from the government during World War I, and after the war opened her own school for commercial operators in Washington, D.C. The Loomis Publishing Company produced a book on radio operating that was a "standard" up until World War II.13

During these times, i.e., prior to World War II, and in the period between 1919 to 1941, similar recruitment of radio operators for commercial stations had been taking place in foreign countries. The fact that amateur operation was illegal in most foreign countries until the Washington Radio Conference of 1927 went into effect (1/1/29) curtailed this source.

The only operating "hams" in many European countries were "boot-legging." Furthermore, because practically all foreign wireless communications was operated by government agencies, a stultifying effect prevented the give-and-take relation that had been in effect in the U.S. for some time. Thus the foreign ham tended to be more inhibited in the free and easy exchange of informal communications, more experimentally inclined (because of a larger background of technical training) and more rigid in concept. Even one-way communications, i.e., Broadcasting (e.g., BBC) were operated by the government and supported by a fee or "Wireless tax."
Compared with the average foreign ham, the average American "ham" appears to have been less inhibited, more of a club joiner and used equipment that was oriented more toward message-handling and rag-chewing, than towards experimentation. Probably younger, the American then had perhaps less formal schooling and was less developed from a socio-economic standpoint. There were many more of him, and the American was peerless in public service—specifically message-handling (forbidden by foreign governments) and emergency communications.

Women amateurs in foreign countries were even fewer than in America. However, probably many more were employed as ship operators in foreign countries. One reason for the paucity of female American hams in the early days was the nature of the apparatus employed then: noisy spark transmitters that were cumbersome, heavy, dirty and dangerous. Also the large antennas with their tall masts were difficult to erect and maintain. However, a few women were active hams as far back as World War I and even before. Some operated their husband's stations, and a few built and operated their own stations more or less singlehanded.

The institution of the Young Ladies' Radio League (YLRL) in 1939 did a great deal to bring the women together and unite them in common projects, such as supplying communications across the country for the women's aircraft races sponsored by the "99's" (women fliers club). Before too long
girls not yet in their teens were passing the government examinations and operating stations in the ham-bands. There are now many foreign female radio amateurs, and they also proliferated in the late thirties, starting from the ranks of wives married to hams, and spreading to the young and/or unmarried women.

Early issues of QST show very few indeed of the foreign women "hams." One of the first was a Mexican female telegraph operator, said to have been the personal telegraphist of a Mexican revolutionary leader.

Of course, World War I encouraged women operators because of the scarcity of male personnel. This was again the case in World War II where the entire radio-operating staff of a hospital ship was composed of women operators.

In addition to the operating methods used, the women have tended to leaven the day-to-day chit-chat on the bands with humor, good sense, and familial relations, that had never before been heard. Wives continued "joint" stations after their husbands' deaths (e.g., the station W5ZA in New Mexico thus perpetuates the memory and call-sign of the first (1921) winner of four annual silver cups awarded by the Department of Commerce (Hoover cups) to the amateur stations adjudged "best" for those years (1921, 1922, 1923 and 1924) by selected judges. The original holder of 5ZA died many years ago. 14

There is no doubt that the present "candy-box" size and appearance of apparatus units have been affected by (and have
the influx of women into amateur radio. Today as good results may be obtained with a "shoebox" transceiver as was with a whole "shack" full of noisy, dirty and dangerous apparatus some sixty years ago.

While the writer saw a family station of two brothers, each with his own apparatus in half of a partitioned backyard shack, sharing a single antenna intermittently, in 1921, this was then unusual. (6EA/6EB). Family stations now are small enough (even with each member possessing his own transceiver), to fit into the corner of a room (and "couth" enough for that to be the living room). They often start with the father being a ham before marriage, the wife taking it up, and finally one or more children getting licenses before moving away from home. QST mentions several cases of the whole family being licensed and ARRL gives a special family rate, so widespread has the practice become.

The neighborhood clubs (usually one per city or equivalent county unit) are the ones that hams attend personally. They meet usually once a month, affiliate with ARRL, elect officers and have a "banquet" once a year, and, in general, operate like many organizations not connected with amateur radio.

Clubs began when one or two other hams met at some amateur station. They were originally "loose" organizations without rules, officers, and procedures. They satisfied the need for fellowship, and especially to discuss problems.
"Two heads are better than one" is an old but true saying and such was the case then. When the numbers became cumbersome, and it was found that a formal organization carried more weight with power companies and political organizations, the members looked for a bigger meeting place and elected officers. They affiliated with ARRL, deriving certain benefits therefrom, including reduced membership rates in the national association. A club has to have a membership which is composed of over 50 percent ARRL members to be eligible for affiliation. Foreign clubs were more formal, and in the case of England, sponsored by nobility. Their members tended to be older.

In spite of ARRL, local clubs and "Elmers" all is not "sweetness and light" on the hambands. Apparently there are certain individuals who operate amateur stations and possess a psychological "kink" which causes them to interfere, knowingly and maliciously, even when emergency messages are being handled by their fellow hams.

The "Psychology of jamming" (Worldradio, July, 1980) quotes from Dr. Roberta Trieschmann, a clinical psychologist. "Dr. Trieschmann started out [at a meeting of the Fullerton CA Radio Club] by commenting that interference problems on Amateur Radio seem to parallel our entire society's 'me first' attitudes, where etiquette and consideration for others is on the wane. Also, the anonymity of being a jammer provides a
convenient way for frustrated hams to react to the sense of powerlessness they may feel about other areas of their lives. 15

She had the following suggestions for counteracting jamming:

(1) Don't respond! Even if only one person responds in some way, reinforcement and encouragement are provided to the jammer. Remember, what he/she wants is attention. You won't hear jamming on un-busy repeaters. No audience, no jamming.

(2) Reduce anonymity. Unless he/she has a specific vendetta, jammers usually don't jam people they know. Your repeater club or other local ham group should reach out to encompass all users and active hams. Who knows, you may turn a jammer into a productive ARES (Amateur Radio Emergency Service) member!

(3) Support the FCC: Letter writing at the National level may help the FCC to get the funding they need to combat interference successfully.

(4) Set an example. Put articles in your club newsletter on proper procedure and common courtesy. Make sure your own operating procedure is beyond reproach. 16

Although not an amateur herself, Dr. Trieschmann received a thorough introduction to our hobby before her presentation, including hearing many examples of jamming on both HF (High frequency) and VHF (Very high frequency). Many persons in the twice-normal-size crowd attending the meeting commented that the "fresh views of a non-ham were quite useful." 17

In its Radio Amateur's Handbook (1979 edition) the League devotes an entire chapter (Chapter 15) to "Interference with other services" (e.g., TV, AM, FM, etc.) but does not,
apparently, deem it necessary to devote much space to deliberate jamming by one amateur of other amateurs.

Standards in the matter are set forth in Chapter 22: "Operating a station." Pertinent items include: "Amateur radio through the years has developed a number of operating standards and procedures." "We hams are a service; we aren't just a bunch of licensed operators randomly pursuing a 'hobby'. We have standard procedures, and those procedures are recommended by ARRL, but based on our particular needs." "Let's be a single, organized, operating service."\(^{18}\)

Also in "Repeater Tips": "Keep all transmissions short--identify properly--be courteous--Don't forget that Amateur Radio is allocated frequencies because it is a service--Don't monopolize."

And, in actual emergencies: "Don't transmit unless you are specifically requested to, or are certain you can be of assistance. The Amateur Radio Service has been a vital part of emergency communications for more than fifty years, and whether it be relaying medical traffic into an earthquake-ravaged village in South America, answering a 'Mayday' (SOS) from a ship in the Pacific Ocean, or finding out if a neighbor's relative survived a blizzard in the Midwest, each is an emergency."\(^{19}\)

Writing in *CQ* magazine (August, 1980), Ted Cohen (N4XX) reports from Washington, D.C. that "Nets" which had been operating in past years with little or no interference from other
amateurs are now reporting an increasing number of such instances, and that FCC is contemplating the possibility of further government control. This action by FCC would doubtless take the form of regulation. At present, much of the "regulation" in ham radio is done by means of self-regulation, understandings, "Gentlemen's agreements": call it what you will. These understandings, grown through the years and adhered to by most U.S. and foreign hams are a great strength so long as they are adhered to. They can be a great weakness if not supported. Surely FCC or any other government agency would require excessive personnel and funds to accomplish what hams have been doing, free of charge, literally for generations. Sharing of frequencies on an equitable basis in an understanding manner is the keystone that holds the arch of amateur radio strong and inviolate.

The first certificate issued by the ARRL was that of the "Rag Chewers Club" (RCC). Initiated in 1925, probably to help restore more of the friendly chit-chat found on the amateur bands before the discovery of short waves with their DX potentialities, the RCC was awarded to hams who showed they had worked another for at least half-an-hour.

However, the institution of WAC (Worked all continents) by ARRL in the spring of 1926 at the behest of two California members (Wentworth and Foster) had an entirely opposite effect, and soon the high-frequency (short-wave) bands were clamoring with eager amateurs trying to work the six
continents (Africa, Asia, Europe, North America, South America, and Oceania). So bad did the competition become that two years after WAC was founded, TOM "The Old Man (Hiram Percy Maxim's pseudonym) was moved to deliver himself of his most profane expletive: "Well, Garb Bish his Zork," in his article "Rotten DX" appearing in QST (May, 1928). However, in spite of TOM's fervent pleas, certificate awards proliferated and there is a large group of amateurs, referred to as "DX-hounds," who spend most of their time trying to work a new "country," zone, prefix, county (or whatever) using different modes (CW telegraphy, 'phone, teletype, satellite-bounce, moon-bounce, TV, or whatever). They seek to work DX hams on five different amateur bands, with very low power, and above all, want that precious QSL card that certifies the contact, from the distant ham.

An unfortunate aspect of the DX-competition spirit among hams is that it tends to bring out the worst in some of them. Just as athletes in other sports competitions will do practically anything to win the award--be it in golf, tennis or high-jumping--so it is with some of the ham DX aficionados. Unfortunate practices include calling the DX station out of turn, jamming the DX station's frequency, and resorting to illegal power to gain an edge in signal strength. There has even grown up a practice of sending the DX station what have come to be known as "Green Stamps" (folding money).
It is true that competition has increased facility on the part of the American amateurs (good code reception and transmission), also a strong desire to emit a strong and easily readable signal. It also promotes an understanding of the vagaries of the ionosphere which carries high frequency (HF) signals (e.g., what time of day and what frequency is best for working a certain part of the world). These customs have changed little in intent since 1925/26 when the first HF signals were sent out by hams. Although some prophets predict a change to satellite DX-ing, it is probable that we will have HF ionosphere type propagation with us for many more years to come. At any rate, the "good old American competitive spirit" will find an outlet on the ham-bands as it has before. This is good where it improves the art--bad where it degrades the individual--at least no one can say it is passive!

Since World War II, special frequency limits have been established for different grades of amateurs, giving use of wider and wider sub-bands (within the maximum limits set by WARCs) as the amateur achieves higher grades of licenses. Various groups of amateurs, having similar interests, or for the purpose of special service, voluntarily limit themselves to special frequencies. Thus women amateurs meet at certain times on certain frequencies--there are "Old Timer" spots where the wireless pioneers gather, and even a net for such information as concerns the Eyeball bank (need and
availability). Chess nets strive for a clear frequency with message traffic nets, and W1AW, the ARRL's station at Newington, Connecticut transmits information on well-publicized frequencies by modes of CW (Morse code), voice, and teleprinter, hoping that no malicious or careless ham will jam its transmissions.

The fact of frequency-partitioning, practiced on a voluntary basis over the years has held up remarkably well, due, no doubt, to the fact that the great majority of American hams believe in fair play and equal opportunity for all. Certainly ham radio is a rather anonymous hobby, since personalities over the air are usually not felt to the same extent as in person.

The introduction of TV to the hambands is reinforcing what individual personality identification existed in different voices, and to a lesser degree what was evident on some CW code transmissions. This last has been weakened still further by the use of electronic and "keyboard" keyers which have homogenized CW code in the last few years. We may well ask, in this respect at least: "Is monotonous perfection the ultimate desideratum?"

The newest amateur bands, approved at 1979 WARC, and due to be open to hams in the next few years, have already become the focus of arguments as to what modes shall be used, and what classes of amateurs should operate on them. This reminds one of the vigorous arguments about the use of voice on the
forty meter amateur band, finally approved too late for use before the hambands were closed by the attack on Pearl Harbor. Many and ingenious were the arguments pro and con the use of voice on what had then-to-fore been exclusively a CW-code band. Now virtually all ham bands are available (at least in part) for both those modes and others.

What is outstanding has been the voluntary partitioning of the bands on a worldwide basis—not only between CW-code and "voice," but also between foreign and American amateurs. What was at first entirely voluntary went from a "custom" among hams to a legal basis, as FCC set up frequency limits that had been hallowed by ham usage. As Ambassador Meyer (III-9) stated: "... the multiplication of nations has been traced by most observers to the potent political concepts unleashed by the American and the French revolutions." A yearning exists "... for all men to live with personal dignity as members of one human family." "... the U.S. cannot build a wall around itself." Crossing that wall every day are the individual to individual of the radio amateurs.21

Chronology of a "ham"

It has seemed that there are certain periods in the life of a ham when he/she will be attracted toward passing the FCC amateur license exams (of whatever grade) and/or coming back into the ranks after dropping out.

The first period is as a school-person, who is attracted by the example of an instructor, or older student who is a
ham, or who is studying to become one. The next period, if the ham has fallen out, is after the individual gets his start in the world, perhaps has married and has children, when time and finances afford opportunity to resume or take up the hobby. These people are influenced by previous experience or perhaps some new acquaintance who has his own ham-shack or takes the prospect to a meeting of the local radio club.

After retirement a third class seeks a hobby that is diverting and can be practiced from one's own home, yet affords conversation with like-minded individuals all over the world.

In this country, no evidence on the air is given as to what age, sex, or financial standing appertain to any signal picked up. The possession of a "two-letter" call, indicating that the holder has an "extra" class, or other high class operator's license does not necessarily mean anything other than that the holder has studied, taken an interest, and passed the FCC examinations for that particular license class. Truly a democratic situation! HPM envisaged our present situation when he started the national organization we know as ARRL in 1914 and the international organization known as IARU (1925). Nation and world spanning, with (approximately) equal rights for all--at least within each of the three regions--as the governments saw the local situation.
NOTES--CHAPTER III

1. Messages received at a ham station were either relayed, or delivered if destined for a nearby addresses. Relaying was often accomplished by scheduling, on a regular basis, other hams to the North, East, South and West. Delivery could be by local telephone, mail, or in person.

2. In fact, even no receiving was permitted, which was not the case during World War II.

3. Such a code-practice set-up, was of course not wireless per se, and did not carry beyond aural hearing distance.

4. The German-owned Sayville, N.Y. coastal station, under the direction of Dr. Zenneck, was one of the most advanced at that time.

5. The other five were: E. V. Amy, John F. Grinan, Walker Inman, Minton Cronkhite, and G. E. Burghard. The station was built in Greenwich, Connecticut on the site of Cronkhite's station lBCG. See "Station lBCG," QST, Vol. 5, No. 7 (February 1922).

6. It will be noted that Schnell was an ARRL employee, and Reinartz an ardent League member and contributor to QST. Deloy, on the other hand, was going it alone, the French "Reseau Emetteurs Francaises" (REF) not yet functioning at that time. QST, January, 1924.

7. A pioneer discussion of the "Heaviside Layers" and their effect on short-wave propagation was given by John L. Reinartz, lXAM, in his article "The Reflection of Short Waves," QST, Vol. 9, No. 4 (April 1925).

8. QST, June, 1925. I remember that I paid $1.00 for my individual membership in 1925. Considerable money was raised for WARC '79, much of it by individual gift.

9. QST, October, 1974. Meyer makes several good points about ham radio and the fellowship of man. There is no doubt that free exchange is necessary. However, most international contacts today are extremely limited.

10. Most repeaters are owned and maintained by local clubs. They provide a local meeting place on the air, and enable use of small, compact, or hand-held rigs to be effective.
11. AMSAT assembles the technical know-how, and funds necessary for each OSCAR repeater in the sky. With necessary basic expenses of an OSCAR running into the hundreds of thousands of dollars, it takes worldwide cooperation to be successful.

12. Apparently the OSCAR repeater (ham-built) was operating successfully when the rocket plunged into the water. See ORBIT, Vol. 1, No. 1, 1980.


14. Eunice Falconi (Louis' widow) is still listed in the 1981 Call Book at Roswell, New Mexico.

15. Roberta Trieschmann, "Psychology of Jamming," Worldradio, July, 1980. Dr. Trieschmann has selected two of Society's attitudes that are faithfully reflected by some hams.

16. Her four points, especially numbers one and four, are very well taken for ham radio.

17. The locale of the meeting (Southern California) is one besieged by "jamming" problems.


19. All the items mentioned, and others, are examples of actual emergencies occurring monthly or oftener.

20. Maxim's trenchant "Old Man" articles were written anonymously in QST from its beginning right up to his death in 1936. They put over the idea of good operating far better than "preaching" would have.

21. Ambassador Meyer here reiterates a point made earlier. When free and lengthy discussion takes place on the international ham bands it will overcome language and ideological barriers in one-to-one exchanges.
A LANGUAGE OF THEIR OWN: HAM CLUBS

Every organization has certain words and phrases which have a meaning unique to it. For example, the expression "old man," abbreviated OM may usually bring to mind a bearded old timer. Not so in ham radio--it is merely the inherited expression from nineteenth century telegraphy and encompasses any operator, no matter what his age. (The expression Old Timer, abbreviated "OT" is another matter altogether.)

But what about the lady operator, now becoming so much more numerous? The natural complement to "OM" should be "OW." So it was during the last century on the telegraph wires, and in radiotelegraphy, up until the coming of amateur radiophone after World War I. When operators began to talk by radiophone, however, the expression "Old Woman" gave rise to horror on the distaff side and even the shortened "OW" was no longer bearable. What to call the ever-increasing ranks of lady ops? Since "young lady" was used to designate the unmarried women, it was found possible to introduce a further distinction, and now a married lady of whatever age is simply called an ex-YL (XYL). Custom has honored the usage. Voila tout!

One of the earliest problems in the nineteen-twenties when short waves first made possible the linking of U.S. amateurs with the evolving hams in other countries, was identification:
station "lAA" in the U.S. might sound the same as "lAA" in Canada, or England or France, or Australia, for that matter. Originally, all stations used the French word "DE" (from) between their own call and that of the other station—no nationality was thus indicated. When U.S. and Canadian stations started "working" (operating with) each other, a change in the "DE" was introduced, using "DE" for US/US working, "V" for Canadian/Canadian working and "AA" with "FM" in combination for the relatively rare (at that time) U.S./Canadian working.¹

The clumsy system used for the infrequent U.S./Canadian contacts of those early days was soon outmoded by the coming of short waves, and in the December 1922 QST there appeared an article by Lloyd Jacquet (US 2KT) titled "Comment les appeler?" (How shall we call them?). Jacquet's article was published at about the time of the third transatlantic listening tests, and about a year before the first actual two-way transatlantic amateur communication (November, 1923). His suggestion: essentially issuing single letters to countries to be used between calls—remained in limbo until the December, 1923, issue of QST, when it was adopted and used for the next five years, until the Washington Conference of 1927. That was when our present system of combining a "country prefix" into each amateur call started. This system (effective January 1, 1929) has operated successfully until now, when a shortage of funds for the F.C.C. forced them to issue permanent calls, used in any part of the country including Hawaii, Alaska,
Puerto Rico, Virgin Islands, Guam, etc. This arrangement has changed the old system so that it is no longer possible to tell from the call just what part of the country the amateur is operating from. Although it is still evident that one is hearing an American station, in a large country such as ours, this is not very specific.

Amateur radio lingo is a combination of telegraphese, international "Q" signals, phonetics and other aids to understanding. As medicine uses Latinized terminology for writing prescriptions for the pharmacist, so ham radio uses a variation of the "Phillips" code, a phonetic system first organized by the Western Union superintendent whose name it bears. Use of the Phillips code thus covered the country and was used by all the telegraph operators after the turn of the century, when some of them were employed by the new wireless telegraph stations that were springing up on land and sea. Note that the Phillips code was a private affair, not sponsored by the government. The Phillips code was merely a phoneticized word list, with the letter "x" substituted for the remaining letter/letters of the word or phrase. A form of shorthand called "speed-writing" still exists, based on the same principles.

Examples of Phillips code are: "DX"-long distance; "WX"-weather; "TX"-Time; and the variants: "POTS"-President of the United States; "73"-Best regards. An international system: "Q" signals, is also used. Examples are: "QRM"- I am
being interfered with; and the variants: "CQ"-General call to all stations, and "SOS"-Distress call. (NB: The distress call is one combination of dots and dashes, not actually the separate letters S O S). These "telegraphic" abbreviations have their counterparts in expressions to be used by voice: e.g., "M'aider" (pronounced "Mayday"-Distress call). Phonetic alphabets are also used—the one in vogue at this time having been adopted for international aviation use (e.g., A-Alpha, B-Bravo, etc.). The hams have adopted all these and others, to a certain extent, viz. who has not heard the abbreviation "10-4," lifted from the police "10-code," meaning: I have received the message—I understand you.

In addition to these, the ARRL has compiled an "ARL" message code, where two numbers indicate a complete "canned" message. These are especially useful during emergencies. An example is: ARL seventy-one: "Have not heard from you in some time. Please write or answer by amateur radio, through the station delivering this message."

The military have their own system of (unclassified) abbreviations, or "Z" codes to cover special operational needs. The Navy even had its own "Morse" telegraph code at one time. Up to about the time of World War I, things were so confusing as to which code was intended that the special signal "PRB" was used, signifying "Let us communicate by means of the International Morse Code."
The International Morse Code has eleven letters different from the American Morse (wire telegraph) code and is a "heavier" code without spaces within the letters, and is better suited for wireless communication. The adaptable ham of those early days may have learned on an American Morse telegraph line, but found when switching to wireless that he had to learn essentially a new code.

A query which is often made of an amateur wireless operator is: Why use code? Why not use voice or other types of transmission (tele-printer, TV, etc.)? The answer is that many prefer code transmission, which, in the hands of an expert operator and using abbreviations, can be handled at quite high speeds. A radio transmitter using code (CW) is significantly smaller in size, less complicated, and less costly than other forms of transmission, and has fewer parts to cause trouble. It does not, of course, convey the personality of the operator in the same way speech or television does, but neither does it take up as much of the frequency spectrum as other forms do. It will get through interference (static; other "jamming" signals) better than speech or vision do.

On the negative side, good operators at each end of the circuit are a "sine qua non." The U.S. Air Force notes that the added weight of an operator is often worthwhile in "getting the message through."
When two code operators speaking different languages meet, if they are radio amateurs, they can overcome that language handicap. By whistling the code or other methods (e.g., tapping spoons) the code signals for various letters and phonetic words can be understood by both. As an example, it has been stated that a foreigner being entertained at dinner by an American understood and replied to messages such as: "GE OM 73 HW R U?" (Good evening, old man, best regards to you and how are you?).

Because of the larger number of American amateurs, contact with them by foreigners has resulted in what has been called "QST English." This is knowledge gained when QST was practically the only ham magazine of worldwide circulation and its phrases were used generally by foreign radio amateurs. In the 1920s, when international amateur radio communication got its start, a few articles were published in QST about Esperanto. Some hams became proficient in it, but the great majority got along well enough with "QST English" mentioned above.

This is not to say that there are not a great many foreign hams who speak English fluently, and a much smaller number of American hams who speak or understand foreign languages. It is too bad with such a universal communication system available, linguistic ability is not also common in our country. However, for various reasons, Americans have not (nor have they been forced to) communicated in foreign languages to
anywhere near the extent of many poly-linguists, in Europe, for instance.

Fifty-seven years have now passed since the first American/European amateur communications was established two-way across the Atlantic Ocean (November 1923, with France). During these fifty-seven years many two-way contacts have been made with every country on the globe. Always, means have been found to communicate technical and personal information. This could never have been accomplished if the hams had merely followed the examples of the commercial and government stations. The hams cut their pattern "according to the cloth," overcoming one problem at a time and usually without outside initiative or assistance.

When communication by wire telegraph or early wireless was limited to a few friends, they could be identified by the "fists" (styles of sending). One operator might drag-out his dashes, another use a special way of spacing his letters. When early wireless stations were limited in power to a battery supply, and used ignition type spark coils, the pitch of the vibrator-interrupter was another means of identification. Even in the cities, d-c electric current was distributed under the old Edison system, and an interrupter was still required. A-c current was not widespread in the country until the coming of the Rural Electrification Agency (REA) in the thirties. By that time, hams had progressed to continuous wave (CW) tube transmission, which was not as
distinctive in tone as many of the older spark stations. With transmissions becoming indistinguishable on the air, the new (after January 1, 1929) call signs legalized by the 1927 Washington Conference were necessary to distinguish stations.

Call letters the world over are composed of three parts, sent as a single word. Consider the call sign "KH6CZ."

The three parts are: (1) "K," (2) "H6," and (3) "CZ."

Part #1 ("K") identifies the country, in this case the United States ("A," "N" and "W" are also U.S. indicators.) Part #2 ("H6") identifies the state of Hawaii, and Part #3 ("CZ") identifies the individual amateur. (Issued in rotation by F.C.C.) It should also be noted: at this time the hams with higher grade (e.g., "Extra Class") licenses may obtain calls with fewer letters, which are desirable.

Formerly, if a ham moved he could obtain another call indicating the change. As mentioned above, this is no longer possible, and a ham who wishes to have his new location shown by his call must add a suffix to it to show the new location. This can become involved.

The U.S. and some foreign nations have made treaties allowing the hams of one to operate in the other country. This usually involves a new call-sign, but Canada and the U.S. now do not require this.

Since most special abbreviations spring from use of the telegraph code, a natural question is: "why not do away with the code and use voice?" Hams have strenuously resisted this
proposal. Some of the opposition springs from the reasons given above (e.g., simplicity, effectiveness, etc.), but there can be little doubt that some of it (like the rituals of a secret society, or the Latinized form of medical writings, for instance) is the skill and mysticism inherent in adeptness in code operation, and the abbreviations associated with it.

The simplicity of voice operation can be compared with the American Telephone and Telegraph Co. (A.T. & T.) where telegraphy has long since been given up, even intra-company for "order-wire" circuits, etc.

Whether we will soon see one or more classes of amateur licenses issued without a code examination or not is a moot question. "Signs of the times" are the lessening of restrictions on passing F.C.C. code tests to merely "understanding the sense" of a code message, from the former letter-by-letter requirement. Also indicative has been F.C.C.'s recent actions to have international requirements for all operators to know some code, lowered.

A no-code license may be more truly democratic than the present system, but it would no doubt (as claimed by many) dilute the worth of the amateur license to something just a step ahead of the long-distance telephone.

In its editorial for June, 1980, QST makes the following statement (in part): "Could a new digital license be an acceptable substitute for an entry-level no-code license?"
The quotation above is a contrast with a statement made in the QST editorial for November, 1979: "There are bound to be proponents of making the illegal operators into radio amateurs—not by raising their technical and operation qualifications to the standards of the Amateur Service, but by lowering those standards." A "raison d'être" for the no-code proposal might be found in a quotation from the "correspondence" section of QST (June, 1980): "The proposal to authorize additional frequencies—is solely to promote industry to make more money in the production of rigs.

We are living in an interesting period, electronically.

The signal emitted by a radio amateur transmitting station is perhaps the first, and most important, identification of the individual amateur. It may be weak or loud, depending on conditions. A good signal will not have undesirable defects: clicks and chirps if a code station—poor speech quality, or power supply hum, or over-modulation, if on voice. A clear, crisp signal is an indication of a ham "who cares." The equipment may be homemade or purchased—the signal may be good or bad with either.

"QSL cards," the "final courtesy of a QSO" (contact) are individualistic. Some hams make their own from linoleum block cut out and printed. Some are printed with a picture of the ham and his station, or use a postcard of the surrounding area to give them individuality. First started at the time of World War I, all have, as their main purpose, the confirming
of a contact made by radio. First used to show how well a station was radiating in various directions and to give a memento of the QSO, the QSL card has become the much-prized proof of contact with all countries, all states, all continents, zones, or a hundred countries. The list goes on and on and considerable effort is made to insure that the cards arrive safely, if not expeditiously—​at least cheaply. The Russian Central radio club has a special P.O. box in Moscow for incoming QSL's and relays them from there. In cases of "DX-peditions" (expeditions to rare places) International Reply Coupons (IRC's) are sent to prepay postage from foreign countries. Since some DX-peditions, as well as active foreign stations, make thousands of QSO's (contacts), they find that SAE's (self-addressed envelopes) accompanying the QSL's and IRC's are very helpful. U.S. volunteer "QSL managers" also help.

It is an indication of the worldwide growth and activity of amateur radio that such means, costing many thousands of dollars per year, are taken today to "flesh-out" and amplify the average U.S. contact with foreign stations. Since most foreign amateurs, by reason of their scarcity, are in very great demand, the contact often, perforce, contains only an exchange of call-signs, signal reports, "handles" (name, or 2-letter "sine"), and city. The QSL gives further information, including full names, equipment used and personal information
which is of interest or can be used in direct (mail) correspondence, or for setting up further "skeds" (schedules) by radio when conditions are better.

Like a Rotary Club button, the radio amateur also has a pin with his call, "handle" and possibly name of his radio club shown.

Ham radio operating is nearer military field operating than commercial operating. In this respect, hams are constrained by operating locations, and free hours which may not be the best for the circuit path desired. Where commercial stations are set up in desirable (quiet, good antenna sites) locations and are adaptable to twenty-four hour operation, hams are not. It is thus helpful, in order to be understood over poor, or marginal paths, to not only have operating skill to read signals over the paths casually encountered in DX operating, but to have another factor. This is the use of customary phrases, words or sequences. That is, an operator can often safely anticipate what his contact will say next. This is of great help on marginal circuits, and also with foreign contacts.

The QST-English mentioned above—a sort of "lingua franca" of communications, is well understood by active radio amateurs all over the world, and is often carried over to commercial and military operating. Many commercial ship operators, U.S. and foreign, are also licensed as amateur operators, and have their "ham" stations on board ship with
them, as a hobby in their spare time and as a back-up if the commercial apparatus fails.

Many foreign publications require a facility in the particular language, or a translation, to render them intelligible to an American practitioner. This is not always true of foreign ham publications. The reason is, that many articles, if about apparatus, use photographs or schematic diagrams which are self-explanatory to most hams, together with common QST-English phrases and symbols. This was a great help to newly-emerging foreign "short-wave" hams in the twenties and thirties, up to World War II, and supplementary to the many excellent foreign publications on amateur radio today. The use of standard international symbols even extends to the diamond-shaped pin of almost all amateur national societies

**Favorite expressions**

Some favorite expressions used by ham operators are:

"CQ"—Somebody please answer me.

"CQ DX"—Somebody at a distance please answer me.

"FB OM"—That's really great, old man!

"73"—Best regards (unisex).

"33"—Regards with love (women operators to each other).

"88"—Love and kisses (heterosexual).

"PSE QSL"—I need your QSL card, please.

"VIA BURO"—Via International QSL Bureau.

"FOR DXCC"—Need card for DXCC credit.
"ND OM"—Won't touch it with a ten foot pole.

"TEN FOUR"—Police code expression, not used by true ham.

"NG"—It stinks.

"I WON'T HC'D YOU"—I'm getting bored, let's quit.

"TNX AGN FOR QSO, 73 AND C U AGN"—A doorknob polisher, or: I want your QSL card.

"I RECEIVED YOU ONE HUNDRED PERCENT"—I barely understood your message.

"HAD SOME INTERFERENCE AND FADING"—I give up—please repeat your last transmission.

"MY RIG WAS BUILT JUST AS SHOWN IN QST"—I used up all the parts in my junk box, but still had to buy some parts, as per QST specifications.

"YOU ARE ARM-CHAIR COPY HERE"—Can understand you OK with my ear·near speaker.

And so on. It is important to remember that many amateur expressions are weighted. For example, a better report is usually given to a foreign station (especially if his QSL card is needed) than to a "local," even when their signal strength is the same. It is the custom for DX-pedition stations to give the same report to all stations in order to speed up operation.

These practices are based on two desires: (1) to avoid offense, and (2) to make operation easier. What ham has not had the experience of having his report "raised" after telling the other that he is running maximum legal power? Or who has not become more friendly when he finds the other station is female-operated? Or has not slowed down his code speed on finding his correspondent is a beginner?
Like any profession, secret society, or esoteric cult, ham radio has its own special language, not originally composed to achieve secrecy, but to facilitate communication, speed message handling, and avoid errors. As time has passed, however, the use of some of this language has persisted beyond reasonable need. It is often used to imply experience or knowledge by beginners, then continued in use when not needed (e.g., use of phonetic alphabet when circuit conditions and understanding are excellent).

Despite articles in QST and other publications (e.g., "Say it with words" by K. B. Warner in QST, June 1940) special ham verbiage persists over the years. It must be concluded that special "lingos" are desirable for amateur radio due to some basic need of mankind. Perhaps like the awards and certificates of ham radio, to be taken up later, there is a certain pride or satisfaction in these evidences of achievement--an assurance that the individual is indeed an experienced member of "the gang."

Club Origin

Many amateur clubs had their beginnings before World War I, in a need for cooperative effort in raising supports for the relatively high antennas of that time. Although one couple (The Murphys [cf. QST, May, 1923, "The antenna issue"])) have confessed to raising their masts unaided, this was indeed the exception and was confined to those amateurs who, living in
the country or away from other hams, yet possessed family but no nearby amateur friends to help.

When a club was available, it was usually found that one or more members were old hands at the job and work was assigned, a date set, and the amateur whose antenna was being raised merely chewed his fingernails until the job was done. Liquid and other refreshment was then provided by the happy ham.

Closely linked by tradition and accomplishment with barn-raising and so-called "balloon" houses, the ham "antenna-raising bee" has its roots deep in American folklore and, together with dissemination of technical and other information, has been a reason for clubs being started and continued in existence. Buying expensive test equipment was another.

With higher and higher frequencies coming into use, antennas have become smaller and smaller, lessening the need for such massive supports, and coincidentally, need for much aid in raising them. In effect, the antennas of modern "repeater" stations, placed on high mountains or on satellites whirling in space, are supplanting if not replacing the high masts of the individual amateur station. These repeaters require a cooperative effort to acquire, operate and maintain, so that radio clubs are still needed to continue this modern technology.

The club is also very useful on Field Days, when amateurs take the field all over America to test their emergency
gear and in Simulated Emergency Tests (SETs) for the same purpose. SETs are usually set up by ARRL personnel and operate from a "scenario," adapted to the probable emergency to be encountered (e.g., fire, flood, volcano eruption, etc.). Of course, the real test of amateur and club cooperation is the emergency itself and here no script is necessary. Emergencies, large or small, are going on somewhere nearly all the time. All these operations benefit from club and individual amateur preparation.

The dues paid ARRL and the local clubs by amateurs, and money obtained from sale of advertising in QST and other ARRL publications is insufficient for special projects. One of the first things the ARRL Board of Directors authorized after World War I was the sale of bonds in the total amount of $7,500.00 at 5 percent interest for two years to get ARRL going again and to purchase QST from the QST Publishing Co. (Maxim and Tuska). The bonds were paid off (with interest) in two years.  

In the 1960s donations totalling $100,000 were made to help build a new headquarters for ARRL, and a smaller sum in 1979 was donated to cover the expenses of "lobbying" at the World Administrative Radio Conference (WARC) held in Geneva that year.

With inflation over the years, costs have risen so that a World War I QST costing 10 cents has now become a (much larger) QST costing $2.50 per issue. This increase of 2500
percent has not applied to all radio amateur purchases, but it can safely be said that today probably as many amateurs own stations valued at $7,500 or more (the total 1919 ARRL loan) as there were League members then. (Inflation not considered.)

While the ARRL has never, as yet, had a designated lobbyist in Washington, close personal contact between League members and cognizant FCC officials (many of them hams) has been most helpful to amateur radio. The fact that FCC issues questionnaires or "Notices of Inquiry" (NOIs) as they are called, from time to time on amateur matters is very desirable. While comments are solicited from all interested amateurs and others, it often happens that the ARRL and local clubs serve to polarize sentiment on certain issues, so that, as with other political questions, the problems and possible solutions become clearer.

Often, a "ham" fund is channelled toward the education of some young, worthy amateurs, selected by the fund custodian or a designated committee, and suitably publicized in QST or other magazines (cf. Radio Amateur Foundation). Donations are also made to worthy societies, such as some overseas missions (which often use amateur radio) and even to clubs in Third World nations. This last type of donation has frequently given officials of new countries an awareness of amateur radio and its advantages that they would not have had, if their amateurs or clubs had been unable to acquire proper
equipment. Donations of actual equipment in the form of specially designed "kits" for the recipients to assemble, has proven effective in giving neophytes a "hands-on" experience in the actual ham gear. This is to be much desired as a corollary to textbook instruction.

Radio amateur foundations are useful to round-out donations for certain desirable projects. A recent example was the crash of the plane carrying a DX-pedition to a small Pacific island. A member of the party was badly injured and spent months in Tripler Hospital in Honolulu and hospitals on the mainland. Her amateur gear was nearly a total loss but is being replaced through donations from fellow hams.\footnote{6}

Another example was the recent (May, 1980) loss of the ham "Phase III" satellite, destroyed when the rocket carrying it plunged into the ocean on takeoff. In addition to the thousands of hours of work donated by amateurs of several countries in its design and manufacture, there was a cash investment by hams of $150,000 lost. This is now being replaced by further donations from hams.

It is a tribute to Americanism, as well as very heart-warming, that in several cases, matching gifts from well-to-do hams have made up the difference needed to complete large projects, such as the above-mentioned enlargement of ARRL Headquarters. These matching funds have come from amateurs who have done well in the electronics business, as a repayment of what they feel they "owe" ham radio. Again, this is in the
best traditions of the American way of life (cf. Carnegie gifts, \textit{int. alia}).

During the twenty years since the last WARC in Geneva, many changes have been made in the field of electronic communications. The use of higher frequencies and solid-state devices, coupled with more efficient thermal-electric transducers (solar panels) has made practicable the use of satellite relay stations in space.

The plethora of new, emerging, third-world nations, each desiring to share in these electronic marvels, might have handicapped amateur radio merely through ignorance of what it is and what it can do. The IARU, aided and abetted by ARRL and over a hundred member national societies, took early steps to visit the cognizant officials of many of the emerging nations, and not only discuss "ham radio," and distribute printed material, but to design, as a special project, small amateur radio receivers and transmitters. These were distributed to interested parties in the nations concerned and gave them a "hands-on" familiarity with amateur gear. These preparations, instituted at the behest of ARRL (as the Headquarters society of IARU) as much as four years before the opening of WARC-'79, were significant factors in amateur radio's good results there. In fact, one can go back to 1927, when the Washington Conference was held, and note similar factors at each of the periodic conferences over the
fifty-two year period (1927-1979). At each one the amateurs were better prepared, over a longer period preceding the conference. Many more countries have amateurs on their technical staffs, and are more and more in harmony with the IARU and ARRL national positions. Nothing could be more democratic; the only vestiges of autocracy are bureaucratic, often engendered by ignorance.

In the early days of ham radio before and after World War I, the average amateur was younger than he is today. He was still in school, and had little money to devote to his own station, let alone to the hobby and ARRL. In fact, a letter in the correspondence section of an early issue of QST is from a devoted ham, who during the "hard times" following World War I was unable to afford both his daily newspaper and QST. He gave up the former. Now, with the average ham of mature age and financially able to afford the attractive manufactured gear displayed (often in color) on the pages of today's amateur radio magazines, an entirely different state of affairs presents itself. "Old time" amateurs, nostalgic for the simpler days of their youth, spend more for gear, for magazines, for societies, and for donations. Some will make donations based on the number of years they have been licensed in amateur radio. Since there is a large number now who have been active hams for fifty years or more, this amounts to a respectable sum.
In America alone, there are today, no less than five major monthly publications of national distribution devoted entirely to ham radio, including ARRL's official journal QST.

The amateur bands, like huge telephone "party-lines" insured the passage of all pertinent information across the nation in a short time. Discussion between any two amateurs, like chatting over a back fence is quickly picked up and passed on. No commercial communications system has the "gossip" potential or activity of the "ham-bands." One of the important aspects of American amateur radio is the fact that there are amateurs listening, day and night, all over the world. According to Worldradio (July, 1980), when a tornado struck Kalamazoo county, Michigan on Tuesday, May 13, 1980: "Doug. Burke, WB8CFV, was one of the first to use his 2-meter FM mobile to report the twister cloud to County Civil Defense director Tom Lewis, WB8UKZ.—in just a matter of minutes, amateur radio operators were on the scene—emergency power was activated—etc." The above is only one of many such emergency scenarios—all attesting to the availability and alertness of amateur radio operators.

Up to World War II at least, new amateurs required two types of assistance: (1) Code practice and technical tutoring to upgrade their licenses and (2) assistance in the design, operation, and construction of their stations.

Today, when less emphasis is given to home construction, the main emphasis is upon code and theory. As mentioned
above, there are those today (even within FCC) who would like to see code-less exams for radio amateurs. Nevertheless, the prospective amateur today has his choice of code-practice tapes, on-the-air code practice transmissions, and a flood of examination tutoring manuals with practice questions in actual FCC multiple choice form. There are still many club license classes, but the close one-to-one ties of the prospect and his "Elmer" friend are lost in the club atmosphere. The more-or-less sterile club classes can be made as personal as time and instructor-pupil relation warrants. One sees, however, less and less of the old "ham shack"-in-the-back-yard philosophy with its friendly "Elmer" who was always ready to give the prospect his views at will, on most any subject connected with ham radio and clear up doubt and misunderstanding.

One can look into a crystal ball and see home computers, hooked up through the telephone lines, absorbing information from some remote center at high speed, then giving it out to prospective hams on call. Such up-to-date sources would "date" publications. But they would be no real substitute for the Elmer one-to-one system which has withstood the test of seventy years or more of ham radio in this country. At first there were the ship and shore commercial operators, then clubs and also the individual ham shacks throughout the land. Today, when a "ham shack" is often a corner in a crowded apartment, so long as a dedicated ham operates from there, neophytes will gather to gain information about amateur radio.
The American spirit of sharing skills, whether evident in Little Leagues, Boy Scouts, or "Ham" radio is perhaps a modern version of what the old guild or apprentice system used to be some time ago. While that old system had financial implications, the "Elmer" system of training amateurs radio operators is (practically) Simon-pure.
1. QST, December, 1922. Since no two-way international working occurred (except for Canada) until November, 1923, the clumsy arrangement used with Canada was shortly superseded as mentioned below. Now all ham calls embody one or two letters distinguishing the country.

2. QST, June, 1980. Many of today's "experimenter" type individuals see no good reason for them to learn the Morse Code. This attitude is opposed by a strong group.

3. QST, November, 1979. If the ham ranks were flooded with "no code" amateurs, it is argued that the high standards striven for on the ham bands would be washed away.


5. QST, July 1919 and June 1921. This pay-off on time must have given confidence. It was stated that some hams (a minority) never turned in their bonds for redemption, but kept them--perhaps as a souvenir.

6. Worldradio, May, 1980. This altruism clearly goes far beyond the desire of hams to contact a "new" country. They rallied around with expressions of sympathy as well as money. No group could do more for one of its members who had been injured on "group business."

7. Repetition of certain disasters--hurricanes on the East coast, "twisters" in the Midwest, mud slides and earthquakes in California, etc., have given rise to emergency planning and equipment suited to the area. That these have come into use over the years bespeaks the ham's desire to be prepared when the time comes.
CHAPTER V

THE RADIO HAM: HIS BENEFITS AND HIS PROBLEMS

Some of the most evident benefits to the radio ham are achievement, comradeship in person or "over the air," and learning. These are not unlike amateur athletic programs. A new amateur, of whatever age or sex (22,438 women licensed in the U.S. in 1979), now finds a great mass of amateurs (393,353 licensed in the U.S. and 324,939 throughout the rest of the world). These "hams" are of every age from "9 to 90" and have all passed the government examinations for code, theory, and regulations, so have a basic knowledge very similar to his own. There is no pressure being put on any amateur to achieve. But a new "ham," listening on the air, or talking to "ham" neighbors in his town, hears about "ham" achievement awards, and usually becomes interested in earning one or more, if for no other reason than to show that he and his station can perform satisfactorily. He/she thus becomes one of the boys/girls.

Probably the first significant "award" was early recognition in QST and other magazines such as Pacific Radio News by the printing of "Calls Heard." These were lists of calls received at various amateur stations throughout the country and even aboard ship. Probably the quintessential "Calls Heard" list was the one printed on the cover of QST for January, 1922, giving the calls heard by Paul Godley on his
famous listening expedition across the Atlantic to Scotland in December, 1921. By checking the monthly lists of "Calls Heard" that were printed, an amateur could measure the efficiency of his station by the number of stations reporting him, and their distance away. A variation of the above included sending of a "Heard" card by mail to the transmitting station, giving more details. Because "hams" are usually a friendly lot, many "hams" have thus received listener report cards, the senders not begrudging the (then) one cent stamp!

In 1925, something new was instituted by ARRL: "In order to promote friendly conversation between amateurs, and to get away from these momentary contacts which consist only of a request for a QSL card . . ." a "Rag Chewer's" certificate was established. The certificate is still in demand, and the League still issues them, though most contacts on the various bands are still lamentably short, much less than the one-half hour required to qualify for RCC.

This condition has arisen from the proliferation of the second type of certificate issued by the League, still being issued and still in great demand. It is the pioneer "DX" (distance) achievement certificate "Worked all Continents" (WAC). Announcement of it was first made in April, 1926 in QST. Although editor Warner, in the very next issue, deplored the "eternal hollering for QSL cards" (May, 1926), the die had been cast. With a WAC certificate as their goal thousands of amateurs, the world over, now made
their practice to try and get the cards necessary for certification, letting friendly conversation go by the board. This practice has been aided and abetted by other certificates offered by ARRL, CQ magazine, and many others. Although many "hams" still like friendly conversation, a casual "tune" across the bands reveals far more "CQ DXs" (calling any distant station) than "CQ RCCs."

No doubt, all this certificate hunting is, as in athletics, due to the human desire to excel, and the gratification that exists when the exceller is the recipient of some concrete acknowledgment from a recognized authority.

Ample scope for achievement now exists with DXCC (worked 100 countries), and WAS (worked all states) awarded by ARRL, and such other certificates as CQ magazine's WAZ (worked all zones) throughout the world, Worked all U.S. Counties, and a myriad others. Since so many "hams" have such diverse operating habits, it is no wonder that certificates are offered in such quantities. It has been reported that some "hams" have been awarded literally hundreds of them, like the young "ham" in an iron lung was, some years ago. What a communication outlet he had!

In this amateur competition, the desire to excel is laudable because it leads to better equipment and operating skills. Although code speed requirements for the "top" Extra class license are 20 words per minute (WPM), it has been stated by one of our leading "hams" that a top
"contester" should be able to receive at a speed of 60 WPM for best success. Patience, frequency "know-how," how to obtain maximum results from the "rig" (apparatus), courtesy, are all parts of the combined contest "savvy" that an amateur must learn in order to win. These are all virtues that are useful to one in almost any walk of life.

It is also true that out of nearly a million licensed "hams" throughout the world, a small percentage cause trouble to others by impatience, thoughtlessness, and lack of various skills. Many of these are "restored to virtue" by pressure from their peers.

When early amateurs started to receive QSL cards from other hams, they found their way to the bare walls of the shack and told visitors of the ham's exploits. Known as "wallpaper," they are now usually filed so any specific one can be quickly found.

It is worthy of note that such accessories as QSL cards have themselves grown to be fairly "big business." For example, the September, 1980, issue of QST contains no less than twenty-five classified, and one display ad for QSLs. If an estimated 200,000 "hams" in the U.S. order 200 cards each, every two years, this would, at ten cents per card amount to around $2,000,000 per annum, or about $80,000 yearly for each of the above twenty-six printers (if they got all the business).
Since QSLs are only a part of the accessory business (badges, T-shirts, caps, belt buckles, desk nameplates, pole-climber safety belts, rubber stamps, etc.) it can be seen what a tremendous far-reaching effect ham radio has on industries not normally thought to be associated with it. Let us not forget the great amount spent by hams on postage to get the cards to their destination, and for IRCs (International postal Reply Coupons) to insure direct replies (at 42¢ each, presently). It is no wonder that many hams QSL to foreign "hams" in bulk, through Bureaus, and reply only when a SASE (Self-addressed, Stamped Envelope) is sent them, or even refuse to QSL at all.

However, the received QSL is the culmination of a long process—passing the exams and getting the license, establishing the "rig," searching for and contacting the desired distant station, and finally receiving sufficient different QSLs so they can be sent off to ARRL, CQ magazine, or wherever, to get the certificate of the desired award. Patience brings its reward!

A beginning ham usually starts with the lowest grade of license, the Novice. This is easiest to obtain, but grants fewer privileges of power, frequencies, and modes (e.g., Voice or code). Good for five years, this gives the new amateur plenty of time to upgrade. In fact, a few hams are well satisfied to remain Novices, so never upgrade. At this time of being a Novice, a new ham finds many activities
designed for him by the League or others (e.g., "Novice round-ups," Novice nets, etc.). Parallel to the Novice is the Technician license, for VHF hams.

Most new hams want the greater privileges of the General class license, which requires the passing of a stiffer code/theory test. Also good for five years and renewable, the General class is the basic one issued by FCC at this time.

For those especially interested in voice transmission there is the "Advanced" class license, which is stiffer in theory than the General class, but grants additional frequencies.

Finally, for code (CW) specialists there is the "Extra" class license, with its higher speed code requirement (presently 20 WPM), but granting use of all amateur frequencies.

The 1980 edition of the Call Book gives the following breakdown of the different license classes in the U.S.A.:

<table>
<thead>
<tr>
<th>Class</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novice</td>
<td>75,036</td>
</tr>
<tr>
<td>General</td>
<td>125,559</td>
</tr>
<tr>
<td>Advanced</td>
<td>87,127</td>
</tr>
<tr>
<td>Extra</td>
<td>25,506</td>
</tr>
<tr>
<td>Total</td>
<td>385,061</td>
</tr>
</tbody>
</table>

Other countries have similar classes of licenses, obtainable through examinations of various degrees of difficulty. Some foreign countries grant "reciprocity" so that a ham with a valid U.S. license may operate in their territory, and vice-versa.
But what effect does climbing the ladder of success have on the socio-economic status of the amateur? After he has passed all the exams, gained "all" the certificates, is he then at the top of a class system?

His progress, according to DeSoto, is in an entirely new world: 5

First he gets a new name--his radio call letters. Thenceforth he has a new identity--even a new personality and new social status.

He finds amateur radio "the means of communication with others on equal terms, of finding friendship, adventure and prestige, while seated at one's own fireside," according to Dr. Raymond V. Bowers. "In picking his human contacts out of the air, the amateur is not seen by them ... He is not known by the company he keeps nor by the clothes he wears, but by the signals he emits. He enters a new world whose qualifications for success are within his reach. A good homemade set gives him more prestige than a commercially manufactured one. There are no century-old class prejudices to impede his progress. He enters a thoroughly democratic world where he rises or falls by his own efforts. When he is W9XYZ the beginner, the radio elders help him willingly, and when he becomes W9XYZ the record breaker and efficient traffic handler, he willingly helps the younger generation.

Without a pedigree, a chauffeur, or an old master decorating his living room he can become a Prince--of the air. At the close of the day filled with the monotonous routine of the machine age he can find adventure, vicarious travel, prestige, and friendship by throwing in the switch and pounding his signals into the air.

His equipment may be of the most elementary kind, and his complete station may cost less than fifty dollars. Yet with such an outfit--with perhaps ten or twenty watts power--he can accomplish as much as his operating skill will permit.

But the enjoyment of amateur radio is not measured in dollars or even in elaborate equipment. It is rather measured by such gauges as service, self-
expression, a sense of personal accomplishment. Friendship is such a gauge too.6

Certain awards are made for excellence, but if spontaneous and suggested by a ham's peers (such as the "A-l operator" certificate, given by the ARRL upon recommendation) do no more than acknowledge the worthy recipient publicly.

From time to time, some groups arise who use "closed" repeaters, high speed automatic code senders, and other means to distinguish themselves from the "common herd." These are self-defeating in the end, as time attenuates their membership, or peer pressure causes them to discontinue their unusual operation. Certainly, with the diversity of modes and frequency bands now available, amateur radio has travelled far from its beginnings, when there was one mode: spark telegraphy, and one wavelength: 200 meters (1500 KHz.). Without homogeneizing amateur radio, today we are beginning to see the complete whole of the "woods," rather than the "trees" of only individual preferences.

When the amateur "short-wave bands" were first populated (in 1925), hams moved in on them one by one, starting with the 80 meter (3.5 MHz.) band, then, as they developed skill in the construction of transmitters, receivers, and antennas --went on to the higher frequency bands. So 80 gave way to 40 and it, in turn gave way to 20 meters, especially when it was found that "20" made daylight "DX" possible. As the pioneers moved down the wavelength spectrum, many hams were
left behind, happily using and populating the band on which they had started. So it has been over the years as the experimenting type ham shows how to make the gear and use it successfully. All hams were perforce experimenters in early days—now by choice. And it must be remembered that amateurs are not confined to spot frequencies, as are most of the other radio services, but are free to roam at will throughout the "hambands" for which their grade of license entitles them.

When amateur radio was in a development stage in the twenties, nearly every ham was an experimenter, putting together such a facsimile of the published "rigs" as his lean purse and "junkbox" permitted. Since World War II, however, many companies now produce "ham" gear, especially for the popular lower frequency HF bands (within the limits 3-30 MHz.) and for 2 meters (144 MHz.). These sell best, so are catered to. When a ham wishes to sell, or trade-in his old gear, he finds the experimental rigs he has built himself command little or no value as trade-ins at the dealer's store.

Besides this financial consideration, the fact that the higher frequencies are least populated and there may be few contacts over long periods of time has a definite influence in persuading hams to stay with the crowd. It is easy to see that operating on long-established (and researched) frequencies will continue to be preferable both from a
financial and popular standpoint. Herein lies a possible serious defect. Since the amateur service is established on the basis of the Public Interest, Convenience Or Necessity (PICON), will not a time possibly come when regulatory authorities may look with disfavor on present "farmers' line telephone" practices? Not if experimentation persists!

This must be balanced against the very real service now performed by the present setup in emergencies. This aspect will be covered in Chapter VII more fully. It is the individual ham's operating in the public interest, convenience, or necessity (PICON) which is a true measure of the service, whether he uses equipment he made himself at no cost, from junk,\(^7\) had made to order by an engineering firm (W6VQ, 1931), or bought ready-made, at a cost of over $10,000, from the advertising pages of current issues of QST.

A feature of ham operation over the years has been their ability and willingness to police themselves. Originally this was done publicly, i.e., amateurs would call attention over the air to others who were off-frequency, or with a poor transmitter that produced unnecessary interference. As time passed it was shown to be necessary to do this privately, so it is usually taken care of by mail now. In fact, the League (ARRL) has a large number of appointed volunteer Official Observers (00) who spend a portion of
their operating time tuning over the amateur bands and noting discrepancies in the signals of their fellow hams and notifying them as necessary. A similar service is the "intruder watch" which looks for signals in the "hambands" that are illegally there and notifying ARRL Hq., FCC and the State Department can then proceed with whatever action seems best. These services are rendered free of charge.

Poor signals can come from expensive manufactured equipment as well as from "haywired" experimental gear. The owner of the manufactured equipment may, however, be loath to believe anything is wrong with equipment which cost him many hundreds (even thousands) of dollars.

The OO sometimes gets "backtalk" from his fellow hams, but most of them realize that this service is just one more manifestation of the true ham spirit to keep them out of trouble with the FCC. It is certainly in a spirit of helpfulness that the monitoring is done, for otherwise the OO could spend that much more of his time operating his own gear--two-way--and be enjoying himself at his hobby rather than engaging in a thankless service which often gains him recrimination from some of those he has reported.

If a local amateur persists in an illegal or obnoxious quality of operating even after being notified, it can usually be traced to his doorstep easily by other hams close to him. Then a member of the local club, or its Interference Committee, can deal directly with the offender.
Oftentimes the latter is truly unaware of the trouble he is causing, or even lacks the technical expertise, or in some cases, the physical ability to find the trouble and correct it.

The matter of self-policing in the amateur ranks goes at least as far back as 1916 when, prior to World War I, a sixteen year old boy, operating without a license, was arrested for transmitting false SOS signals, and a seventeen year old was found to be interfering with army communications. For a while at that time, no amateur licenses were issued or renewed in a certain area. 8

Various actions to alleviate local QRM (interference) were suggested or tried. One proposed that the special license amateur stations (those with "Z" calls) report offenders direct to the Department of Commerce (the "FCC" of those days). Another suggestion was to appoint deputy government inspectors, volunteers, from among the amateurs. The most practical solution was to get the spark-coil contingent (low powered local ham operators) into the local radio club, and then arrive at a time-sharing arrangement whereby no local work was done between 9 p.m. and 7 a.m. This left those hours clear for the stations carrying on long-distance work. Later, in 1926, when the "gentlemen's agreements," set up at Hoover's Department of Commerce radio conferences broke down, law and order among the broadcast stations broke down also. 9
Zenith's court case decision, handed down April 16, 1926, caused the U.S. Attorney General to announce that in the eyes of the law, the federal government had no control over radio excepting as authorized by the 1912 act of Congress. During the fourteen year interim, broadcasting and short waves had been developed. After the decision was announced, hundreds of broadcasting stations immediately jumped the frequencies to which they had been assigned, in favor of better "spots on the dial." Moreover, they increased power as they wished, regardless of the interference they might cause.

In marked contrast, the radio amateurs did not join in the stampede but, however, stayed within their assigned bounds of frequency and power. These wonderfully effective acts of self-discipline and self-regulation were, of course, encouraged and supported by the ARRL, and QST. They could not, of course, have been nearly so effective if the thousands of individual amateurs had not supported the effort, nationwide. This was true democracy at work.

Today, we have many more hams operating in more frequency bands, using mobile equipment, and relaying automatically through repeaters and satellites--yet, with few exceptions, most operation is on an understanding, "shared basis," rather than every man for himself. During emergencies it is wonderful to see how things usually quickly settle down, and operation is accomplished on an
orderly, shared basis, using the available means to accomplish what is necessary. Otherwise all would be chaos, and no possible laws or orders could accomplish as much (even if not limited in expenditure, as FCC is). Here is a citizenry using its abilities and materiel in the best democratic spirit! Today in ham radio, we still have the desire to do what is best for all, with that desire, the hobby will long endure.
NOTES--CHAPTER V


2. QST, vol. 9, no. 6 (June 1925), p. 29.


4. Call Book. Arranged in order of difficulty. Note that the sum of Novices and Technicians is roughly the same as Generals.


8. This was at the time when the Expeditionary Army Force under General Pershing was pursuing Pancho Villa into Mexico, and the whole region showed the effect of military control.


10. The Zenith Radio Company, formerly Chicago Radio Labs., together with others, challenged the government's jurisdiction under the old Radio Act of 1912. They decided they could operate their broadcasting stations on whichever frequency and with whatever power they pleased. The Attorney-General's decision allowed "maverick" operation at that time. The hams maintained their old frequencies and power, while many broadcasters did not.
CHAPTER VI

EQUIPMENT: EFFECT OF COMPETITION AND "HOME-BREW"

It is a trite saying that where a need exists, merchants will (eventually) fill it. However, the very first issue of QST (December, 1915) shows that in the three preceding years (since amateur radio had been licensed) a number of suppliers were already advertising for the "ham" market of that day. That December 1915 issue contains the display ads of no less than ten manufacturers making amateur radio their specialty. Bunnell's full page ad on the inside front cover is that of an old company which had long catered to wire telegraphists and was trying to get its share of the new wireless "business" by featuring a crystal detector holder, and a high-current sending key—both of them specially adapted to the amateur wireless market. Photos of League members' stations printed in the same QST issue show sub-assemblies apparently made by DeForest and other suppliers.¹

By contrast, one of the latest issues of QST (October, 1980) has, out of a total of 208 pages (the first 1915 issue had 24 pages) about half devoted to advertising (the first issue had about a quarter) and shows 166 display advertisers as against 10 in the first issue. Against this, it must be remembered that the market was much smaller then, with a
few thousand total amateur population as against nearly
400,000 licensed U.S. amateurs today. Also, then the market
was confined to the 200 meter spark equipment, while now
amateurs operate a diversity of modes (e.g., Morse code,
voice, teleprinter, facsimile, TV) on over ten bands of
frequencies (based on highest usage).

Since amateur bands are available in any emergency by
order of the government (FCC) it is appropriate that manu-
factoring capacity exists (in being) at any time. An out-
standing example of this took place at the time of our entry
into World War II. A certain mobile medium power govern-
ment transmitter was not being produced in sufficient
quantities for the sudden procurement that became necessary.
It was found that an amateur transmitter was in production
and, besides fulfilling the electrical requirements of
power, modes, and frequency range, was more than meeting
government specifications for size and weight. Orders were
placed, production lines were enlarged, and very soon
thousands of this former "ham" transmitter were making a
very real contribution to the war effort at home and over-
seas (Hallicrafters HT-4/Signal Corps BC-610).²

That the amateur market is a large one can be demon-
strated by a simple calculation: taking the total active
ham population at any one time as 33 percent of 400,000 and
thus allowing for dead wood and sharing of stations, this
would represent about 132,000 stations active during any
one period. The apparatus in any station may have cost the operator anywhere from zero (junk-box construction or surplus military equipment) to over $10,000 (in the case of the most expensive "state-of-the-art" equipment, and elaborate antennas and their supports). Since most are in the middle or lower value brackets of this range, and since most equipment depreciates and is renewed over a period of 5-10 years we can make a spot value estimate. Even choosing a value of 40 percent (most commercially-made equipment is traded-in for more) we come up with a total value of 40% x $5,000 x 132,000, or approximately a quarter of a billion dollars at this time.3

A further factor to consider is that most of this equipment is state-of-the-art, and is maintained in excellent operating condition. This was illustrated at the beginning of World War II when the government's communications procurement problem was greatly eased by the spot purchase of complete transmitters, receivers, and also separate electric meters badly needed immediately, and all of no use to the amateur owners, who were then "off-the-air."

The question of whether to build or buy leaves the modern ham on the horns of a dilemma—whether to gain the experience of finding a good design, searching for (often difficult-to-find) components and then constructing, testing, and "de-bugging" the unit. There is very present the financial consideration that a home-brew unit, even if
functioning as well as the best "store-bought" apparatus, commands little or no trade-in value on new equipment. This will not, of course, deter the purist, who will merely modify his home-brew equipment from time to time to keep it current with the latest state-of-the-art design.

For the above reasons, today the average ham uses mostly manufactured gear. The loss to the nation of design ability by most hams is made up, in part at least, by the availability of large quantities of "standard" manufactured gear, with printed operating and maintenance manuals. The fewer hams left, with their experience, and capability to supervise others in the maintenance of standard manufactured equipment, will suffice in time of emergency. It is also very bad practice to have electronics operators in the field do more than the most elementary maintenance of their equipment. Even well-meaning hams with a background in maintenance of their home equipment can complicate a minor maintenance problem with their field "repairs." Over the past sixty years or so, the average ham has shifted from one who builds and services his own apparatus to one who buys his equipment and accessories, assembles them into an integrated station, and who does a good job in troubleshooting them. He is, however, not qualified by training and experience or by possession of proper test equipment to do a complete, or major repair job on modern complicated solid state gear. Dealers have found that a good service department is a very necessary adjunct to their business.
Early advertising in QST shows it to be on a regional basis, becoming national in scope after World War I. Thus J. F. Arnold in Philadelphia made a superior line of loose-couplers (receiving tuning equipment) while Parkin in San Rafael, California made a unique line of variable condensers using mercury as the fixed plate. The above were regional industries that became national in scope as their national advertising in QST and other publications became effective. 4

There was a hiatus in the steady growth of amateur advertising, starting with the onset of the broadcast boom in the early twenties when the market for receiving sets and parts was insatiable and all publications (including QST) for several years were filled with advertising directed toward the broadcast listeners. When the boom collapsed, so did the advertising, and the fewer advertisers that remained nearly all went back to their first love—amateur radio.

Since World War II we have had a somewhat similar condition, sparked by the invention of the transistor in 1948, 5 and other long-lasting, diminutive, solid-state devices. A flood of imported and domestic such devices, of good quality but reasonable price now covers the country and keeps the U.S. manufacturers on their toes. All this has ensured that our amateurs may find a wide variety of products, profusely displayed on the advertising pages of QST.
and other publications, flooding our hams with a plethora of products to choose from. U.S. manufacturers have met the challenge, and though some old-line companies no longer compete for the amateur markets, new U.S. companies spring up, presenting a line of ingenious, effective, attractive, and moderately-priced amateur gear of great variety.

An alternative to buying completely assembled gear, or building on "one's own" exists. It is known as construction from kits. The kits contain all necessary parts, as well as panels, cabinets, and printed instructions. By assembling them, the ham saves on the labor charge for assembly he otherwise would pay, has a proven design, gains experience, and, finally, has an instrument which has an established value in the marketplace.

Test equipment kits are also available, so a complete station may be built in this manner, giving considerable pride of ownership as well as the monetary savings. If problems occur, the manufacturer's engineers are available for suggestions, or the malfunctioning kit can even be returned for "trouble-shooting."

Since results are what counts, the transmitter output that can be heard, is what announces the quality of the apparatus' emitted signals. Some manufactured units are now being sold as being "FCC type-approved." This means that the FCC has reviewed or examined the new unit, and approved it for amateur use only. This has become
particularly noticeable during the past few years, when amateur equipment had been sold for easy adaptation to services that were using illegal frequencies, power, or both. Due to the budgetary limitations imposed on FCC, lack of personnel has up until now limited such governmental control of amateur apparatus. Whether or not it is a good thing for the hams or the general public remains to be seen. The amateur viewpoint, as might be expected, is that the "less control the better" be exercised—as has been the case in the past.

A comparison, by no means exact, suggests itself with U.S. automobile drivers. While a state, not a federal matter, there are some points of similarity, e.g., each operator receives a license covering certain types of vehicles, for a stated number of years, after passing an examination. The state provides more extensive monitoring of the vehicles, but the FCC is able to conduct monitoring from a few fixed stations with the (intermittent) aid of mobile monitors. It must not be forgotten that the hams are, to a large extent, "self-monitoring," and have a corps of volunteers known as OO's (Official--AARL--observers) who try to warn an offender before he is picked up by a government monitor.

Besides equipment covering all the "ham-bands" in frequency, equipment is available for the different modes (e.g., voice, CW, teleprinter, etc.), special direction-finding receiving equipment is advertised in amateur
publications (e.g., Worldradio). This equipment, besides helping to locate transmitters in the ham-bands, can be used to locate ELTs (automatic Emergency Locator Transmitters) used by downed aircraft, etc.

A wide range of measurements can be made as to frequency, purity of emissions, modulation and the like. They can be thought of as remote test equipment able to perform better at a distance than if adjacent to the transmitter being tested, and all aiding in pin-pointing the source, and also the nature of a discrepancy. Although not in the nature of direct aid to amateur two-way communication, this equipment can be of great value to hams.

The "intruder watch," mentioned above, does not use any but the normal equipment in an average amateur station (except for teleprinters) but depends mainly on the day-after-day, devoted but boring, listening and logging of unauthorized stations putting signals in the ham-bands. Although few in number, these observers have furnished much data used by ARRL and the other IARU societies at WARC's (1927-1979) in later years. While equipment used by observers can be simple, it must, above all else, be accurate.

It is trite but true, to say that in any ham station, results depend at least 50 percent on the operator and 50 percent on the equipment. The latter factor can be broken down to 40 percent for the station location and antenna,
leaving only 10 percent to the actual transmitting and receiving equipment within the station.

It is unique that in America radio amateurs were (and are) allowed to experiment on-the-air to a degree not allowed to most of their foreign (DX) brethren, and thus have uncovered better systems for communication, as well as anomalies in some others. An example of a better system is "single-sideband" (SSB), developed between a west coast and a midwest amateur in 1947, and publicized in QST beginning in 1948. This efficient system of voice transmission has virtually replaced the older amplitude-modulation system and has been adopted by the USAF and other government agencies. General Curtis LeMay, a licensed ham, was one of its early proponents in the USAF.

With the wide geographical diversity of amateur stations in all parts of the country, the Bureau of Standards picked the ARRL, in the early twenties, to make tests on the fading of radio signals. A somewhat similar series of tests on Long Delayed Echoes (LDEs) was recently carried out successfully, according to Professor Villard of Stanford University. Since LDEs occur at long intervals, it was necessary to enlist the manpower, and diversity of geographic location, found only on the ham-bands. Here again, it was not the equipment that counted, but the availability and diversity of the operators.
Some locations (e.g., near water; on an elevation) are especially suited for any radio communication purposes. An electrically quiet location (remoteness from electrical equipment and sparking) enhances weak-signal reception—a suitable directional "beam" antenna also adds "muscle" to outgoing signals, and helps the signal/noise ratio on receiving.

It may thus be seen that a good operator, with a good location and antenna, but low power, can do as good work as a poor operator, with a poor location and antenna, but using high power. The ratio may be as high as 10 watts to 1,000 watts, or even more (± 20 db.). In this connection, it must be remembered that the flattering reports given a low-powered station in a poor location must be regarded with suspicion if the station is located in a rare country, or is otherwise exotic DX! (QSL-card flattery factor).

One of the things learned early-on by a new ham is that his signals do not increase in volume at a distant point in direct proportion to his increase in power. For example, if he increases power from 100 watts input to 1,000 watts (the legal limit), his signal will not have increased ten times at the other end. It will be some lesser amount. This is expressed in "S-units" increase (in the above example) in a proportion of 8/6 for whatever the original "100 watt" value was, at the receiving end. Given an expert operator and quiet receiving conditions at the other end, very low power
may be used successfully. An example that occurs is that of the ham in Italy who communicated with another in Australia while using the same small receiving tube for both transmitting and receiving. Many low power records were made in the twenties when amateur use of the High Frequencies (HF) was new, of long distance records made using a power of 1 watt or less. (more power is used by a flashlight bulb!). These records were under exceptional circumstances, and could not be repeated at will. They do show, however, the minor role played by equipment and power in many cases.\textsuperscript{8}

If power were limited, to make ham radio more "equal," this would be subverted by rich hams buying good locations and erecting elaborate antennas to give themselves an advantage offsetting the reduction in power.

In an editorial in \textit{QST}\textsuperscript{9} the writer discussed the subject "Whither are we bound?" Just two months before America's entry into World War I, when \textit{QST} was carrying articles on preparation for defense, he wrote:

We wonder if the ever increasing demand for amateur apparatus will lead the manufacturers to develop more and more sensitive apparatus until all of us easily hear Honolulu, Japan, South America, and Europe? We wonder if new and valuable patents on shortwave apparatus for amateur use will develop and alter the existing patent monopoly on wireless manufacturer [sic]? We wonder if the tremendous industrial advantage which our country will enjoy if the amateur is encouraged will lead foreign countries to modify their rigid suppression of the amateur wireless operator and eventually end in its being possible for us amateurs here in America to "work" amateurs in foreign countries? And last of all, we wonder if you and I
some night in the future will sit in our little room and chat with another fellow in Germany or France while we listen to what is going on between a couple of fellows, one in Brazil, and the other in Honolulu? We realize this last is a pretty good "wonder" but if we advance as much in the next ten years as we have in the past ten, it will be something to confidently expect.  

Just nine years later, his successor, K. B. Warner, commented on his predecessor's "wonder" editorially in QST:

Will you believe it? We don't know whether we think it's more amazing that these things have come to pass or that no longer ago than 1917 they were regarded as subjects only for vague speculation!

We wonder--wait a minute. We want to say that we're only speculating too. We wonder where we'll be in nine years more? We wonder if we'll be employing our 75-cm. wave then for a new order of achievements? We wonder if we will have radio vision perfected? We wonder if we will have overcome fading and static? We wonder if we will be able to continue to add to the spirit and enthusiasm and brotherhood of Amateur Radio until it completely encompasses the globe? We shall have to step some to keep up with the record of the last nine years.  

Although there is no editorial comment in his columns nine years later, Warner quotes from Dr. Bowers' dissertation of 1934 on the origin and proliferation of Amateur Radio as an American twentieth century institution. He emphasizes the inter-communication ability which had largely grown in the nine years subsequent to his 1926 editorial.

Warner's successor, A. L. Budlong, also comments editorially on this in the October 1955 QST:

Though this [Bower's dissertation] was written over twenty years ago, it still expresses the attractions that call us to our hobby today. Though perhaps the game has become more complicated, a new and friendly world still opens
its arms in welcome whenever the rig is fired up and a good fist or well-modulated voice sends out a CQ.13

Today, a quarter-century later than Budlong's editorial was written, we have, daily, virtually all of the things being done that the first editor dreamed of in 1917. Easy, cheap, international communication between individuals, two-way, goes on now every hour of the day and night.

In 1979, the ARRL instituted a Long Range Planning Committee (LRPC) to make recommendations to the Board of Directors. How will they "wonder"?
NOTES—CHAPTER VI

1. None of those advertisers in the first QST is still in business. Few survived after World War I.

2. Wm. J. Halligan's Hallicrafters company raised their specifications, and the Signal Corps lowered some of theirs. The transmitter, with two receivers, a gasoline-driven power unit and whip antennas, mounted in a van, and later in a 2-1/2 ton truck, was able to operate in motion, and was a very effective unit. Many were sold as surplus to hams after World War II.

3. It should be remembered that the ham market is relatively stable, compared with other services, and exists even during depressions, etc.

4. Other than QST, radio magazines offered non-ham merchandise—QST was always ham-oriented. Even Maxim's silencer only took a very small display ad once or twice in the early days.


6. Worldradio seems to be the only major monthly carrying this type of product, which is also very useful in pinpointing jammers. Worldradio, vol. 10, no. 4 (October, 1980), p. 9.

7. No other long-distance radio service has stations scattered over as wide an area, as hams are.

8. Although low-power proponents point to these unusual records to buttress their arguments, the fact remains that the full power of 1,000 watts is needed to get through when conditions are poor.


10. Ibid, p. 36. It seems impossible at the time. Tuska was being extremely visionary in 1917. The use of transmitting tubes and short waves changed everything.


   In 1926 worldwide communication was a fact and WAC (Worked All Continents) certificates came into being.


CHAPTER VII
COMMUNITY SERVICE AND EMERGENCIES

Community Service

Unless there was some specific need, early appraisal of amateurs, as they existed prior to World War I, was tolerant but puzzled. This was due to the nature of many early amateur stations: existing in a real backyard "shack," noisy, and perhaps causing intermittent outages of neighborhood electric power. The early operators were male, of school age, and spent most of their spare time in the shack, or improving their enormous aerial installations. Their free message-handling service for the public brought them fame and some gratitude, but was by no means as reliable as Western Union, or Postal Telegraph. The fledgling long distance telephone was then slow, indistinct and costly. One thing in the amateurs' favor was that their service was often the only way of communicating when the wires were down.

Radio broadcasting, except for a few experimental stations, such as those of Lee DeForest and Frank Conrad, did not then exist. Thus there were not millions of receivers, and other "electronic" devices in the community's non-amateur homes. Travel (and the mail) was slow, and accomplished by street car, bicycle, and train. Autos were few and elementary—good roads did not exist outside the
cities. That was the setting when Congress enacted the first law governing radio (signed November 1912) and the ARRL was founded (May 1914).

The average citizen probably thought: "Wireless? Saved a lot of lives from the Titanic--fine thing for ships in distress--never take the place of Western Union, though." And--"Amateur radio? What's that?" It took World War I to make some of the public aware of the radio amateur. When the need came for large numbers of trained radio operators on ships and with the services, it was found that the average amateur "filled the bill" and could be put to work on government equipment with much less training than a non-amateur recruit. In fact, in the case of some amateurs, such as C. D. Tuska, editor of QST and Secretary of ARRL, and K. B. Warner, it was found that they, and others like them, were very capable of setting up courses for accelerated training, and lending impetus to the "radio war."¹

Another notable early ham was E. H. Armstrong, a prolific radio inventor, who began experimenting with radio in 1905 at the age of fifteen. As a student at Columbia, Armstrong invented the regenerative circuit, using vacuum tubes newly invented by Dr. Lee DeForest (a non-ham) and went on to invent the superheterodyne receiving circuit (now used by all radio receivers) while serving with the U.S. Army Signal Corps in France. Later, Armstrong invented the superregenerative and FM circuits. The FM system, of course, is very much in use by the community today.²
Due to amateurs such as Dr. Frank Conrad, whose amateur station 9XK in Pittsburgh, Pennsylvania started broadcasting in 1920 and had such success that his employer, Westinghouse, had him erect commercial broadcasting station KDKA on the roof of one of their buildings. In 1921 and subsequently this was so welcomed by the public that hundreds of commercial one-way radio-telephone stations across the nation were "broadcasting" to millions of privately owned receivers. The new fad, in company with Mah-Jong and "Dr. Coue" swept the nation, encouraged by such prophets as David Sarnoff of RCA who had "pushed" this use of "wireless" for years. Although Mah-Jong shortly fell from public favor, broadcasting remained the darling of the national community and was introduced in overseas countries as well.

With the crude receiving equipment used in the early years of broadcasting (ca. 1920-1930), and the broad spark transmitters used by nearly all the amateurs, there was bound to be interference. Although usually not as near to the BCLs (Broadcast listeners) commercial ship and shore radio-telegraph stations also contributed their share of interference. The BCLs tuned their non-selective receivers poorly, used long aerials to enable pickup of broadcasting stations hundreds and even thousands of miles away. The broadcast transmitters were of low power, designed to serve only local areas. It is not to be wondered at that interference from amateurs was common, especially when an amateur
and a BCL were close together, as many, particularly in the cities, were.

There were three possible solutions to the interference problem:

1. "Quiet hours" for the hams during part of the evening when the most desirable programs were being broadcast.

2. A change (expensive) by the individual hams from spark to CW (tube) transmitters.

3. Use by the BCLs of more selective receivers (e.g., Superhet. or TRF circuits). These could also give good results with small antennas, still further reducing interference from adjacent amateur transmitters.

The first two steps were taken by the amateurs in 1923, when QST³ made known an action of the ARRL's Board of Directors, calling on all amateurs to stay off the air from 7:30 p.m. to 10:30 p.m., local time, each night.

QST had been "pushing" CW transmitters since World War I, but many amateurs were not able to afford them. In 1923 and later years of QST, it is noteworthy that classified ads offering spark transmitters for sale by individual hams increased. That they were replaced by more-efficient less power-consuming CW transmitters is certainly true. These two voluntary actions by the hams and their national
society went a long way toward reducing interference to the BCLs during the mid-twenties.

The third factor, use by BCLs of more interference-free receivers was taken care of by the law of supply and demand--after the initial demand for any kind of broadcast receiver was filled in the first half of the 1920s decade, manufacturers provided excellent receivers that used a-c power rather than batteries, little or no outside antennas, with better audio quality, and requiring only one dial to tune, as well as being made more immune to nearby non-broadcast signals.

The combination of the better receivers, CW transmission by the amateurs, and the voluntary amateur "quiet hours" during the transition period was remarkably successful. Considerable credit is due to the hams for their compliance with ARRL's "quiet hours" request, purchase of expensive CW transmitters, and, be it remembered, the development of the peerless superhet. by the ham, Armstrong.

BCLs (Broadcast Listeners) met with hams to discuss their problems, attended ham club meetings, and some passed the government tests, built their own stations, and became first-class operators. One such BCL was George Bailey, lKH of Massachusetts, who was converted to ham radio in 1926, became President of the ARRL from 1940-1952 and later became executive secretary of the Institute of Radio Engineers;
President of the Armed Forces Communications Association (AFCEA); and held an important post in Washington, D.C. during World War II.\textsuperscript{4}

The advent of TV as a popular method of broadcasting after World War II may be compared with the advent of amplitude modulated (AM) sound broadcasting after World War I. Both modes received the needed technology to be successful from discoveries made during the preceding war, and both systems were open to interference from nearby transmitters. It can be said that the early TV receivers were "as broad as a barn," and in the 1950s, knowing that the amateurs were very probably soon to be assigned new frequencies in the 21-MHz range, some TV manufacturers actually equipped their new models with "21 MHz" amplifiers. In effect, they placed an amateur receiver inside their TV sets!

A bad problem had arisen, very much like the one solved in the early twenties, thirty years earlier. Due to the superheterodyne principle, signals were being picked up on frequencies never transmitted by the hams. And amateur conversations were coming out of the loudspeaker along with "Kukla, Fran and Ollie" and other TV programs. Worse, the TV screen showed beautiful "herringbone" patterns or even blacked-out, in extreme cases. What to do? The FCC could inspect the nearby amateur transmitter, when found, but
after ascertaining that the ham was operating in full compliance with the law, could take no remedial action.

When the FCC received a complaint of TV interference (TVI), the amateur(s) concerned received notification and both he and the complainant were requested to contact each other. During the early fifties when TVI was epidemic, amateur clubs designated TVI committees to investigate and referee, without bias, each complaint. Technical expertise was increased by articles in QST and other publications, and especially by a book produced by Remington-Rand, Inc. with Philip S. Rand, W1DBM, as editor. Therein, in several successive editions, Phil Rand assembled not only the pertinent articles from QST (and other publications) but from his own experiments and research. "FCC's Plan for Handling TV," an article written by an FCC engineer was included in Rand's book, excerpted from QST. All this was made available to the public in a 107 page soft-bound book for the nominal price of 25 cents (to cover postage and handling), by Remington-Rand. As the preface stated, the book was designed for the viewer, serviceman, engineer, receiver designer, transmitting engineer, industrial electronics engineer, amateur radio operator, power company engineer, and TVI committee personnel. The book consolidated thirty articles, virtually all the pertinent ones up to around 1955. It concluded with a list of 100 QST references pertaining to TVI.
The caliber and thoroughness of the work done by Rand and other hams quickly cleared up a situation, which if left to the ordinary commercial and government channels, would have taken much longer. It also, no doubt, would have caused more ill feeling by the viewers who did not get the personal touch given to the problem by the hams.

Of course, as in all such cases, there were those hams who "did not get the word," were not interested, or possessed insufficient technical skill. But, as in the 1920s, those who had a true love for their hobby and their neighbors, carried through and licked a tough job of personal relations, technical problems, and also showed the servicemen and manufacturers what had to be done. This time "Quiet Hours" were not needed (at least on a national basis) and the amateur "business" of message-handling, emergency tests and other activities, continued unabated during the transition period.

The change to color TV later on presented a few more problems, but these were relatively easy of solution.

With manufacturers providing free filters in accredited cases of receiver problems, servicemen (at least the older ones) know how to proceed in cases of TVI. Some cases of owner non-cooperation come up from time to time and, human nature being what it is, seem impossible to solve.

Newer electronic "imports"--"pong" games, even stereos and tape recorders, present a never-ending series of new
problems, which, with the background of experience at hand can be solved. Legislation is pending in Congress to improve the situation (sponsored by Senator Goldwater, an active ham, and others).  

But basically, it comes down to good community relations. Here, the hams have come through. They have, in a majority of cases, shown themselves to be good neighbors and good citizens by cooperating fully with their neighbors, the local club TVI committee, and the government as represented by the FCC engineers. Many of the latter are active hams themselves, or have had past amateur radio experience.

In the past decade or two there have been instances of amateur jamming, or otherwise interfering with other amateurs. QST records some instances of antennas being cut down in Chicago even before World War I, modern equipment can be used for jamming purposes, and due to the growth in the number of active stations, this problem has become acute to the point where the financially limited FCC has finally found funds to provide, equip, and man several mobile units which enable them to collect evidence that will hold up in Federal Court. Once a judicial determination has been made, U.S. Marshals can do the rest. A number of convictions then can be made, and action taken on the basis of license suspension or revocation, apparatus confiscation, with fines and/or imprisonment.
Although the United States has long been considered as having primary jurisdiction over matters having to do with radio (i.e., all radio signals are considered interstate no matter how weak--because they can interfere with intrastate reception of interstate signals). The matter of antenna structures has recently been treated as a municipal problem--since antennas and their supports can be considered as coming under the pertinent building code of the local authority. This matter has not yet been carried to the U.S. Supreme Court, but many amateurs have felt unduly restricted by local codes which limit the height of their structures.  

It is possible that this matter will have to be worked out on a nationwide basis, as were the early auto speed laws that supported local "speed-traps." Certainly an example like the early 1920's ordinance of Salem, Mass., which required all owners of radio equipment that "needed a current of electricity" to operate, made hams unhappy at being legally responsible to get a municipal permit as well as their federal license for operation. Soon after the publicity in QST and otherwise, the ordinance was rescinded.  

Cases of ungainly amateur antenna structures usually are due to a competitive spirit in some ham operation which leads certain hams to believe that if a tower 40 feet high is good, one a hundred feet high will be proportionately
better. Such, however, is usually not the case, unless the tower has to compete with tall trees or structures on the property. One compromise that is possible, is for amateurs to attempt to specify through their local building codes, that the tower will not exceed "X" feet above the highest structure on the property. The value of "X" may vary with the surroundings of the area in which the tower is located, examples having been given in the range 15-50 feet. A reasonable value can usually satisfy both the ham and his immediate neighbors, so that on the one hand, signal emission is not greatly reduced, and on the other, that property values as well as aesthetics, are not degraded.

The recent perfection of extra-terrestrial satellites has resulted in the use of Extremely High Frequencies (EHF's) where a large (electronically speaking) antenna can be of rather small physical dimensions compared with antennas now in use on the amateur High Frequency (HF) bands. Here again, we are confronted with the problem of the amateur who wishes to go to the extreme limit of size to gain an advantage over others, or to extend his range and time of use.

A pertinent article appeared in the August, 1980, issue of QST, written by Julian N. Jablin (W9IWI) entitled "The Biggest Birdbath in Illinois." In his humorous true story W9IWI tells of his "dish" type microwave antenna, his wife (a bird watcher) and the effects of rain on the horizontal dish.
Since interference to receivers varies inversely as the distance from any radio-frequency generator (such as an amateur radio transmitter), and directly as the power-sensitivity factor of the particular transmitter-receiver combination involved, a formula can be written for a classic case (where the transmitter produces a field of "A" microvolts per meter at the receiver's antenna): Let "D" equal the distance in meters between transmitter "T" and receiver "R," then interference--

\[ I = \frac{A}{D} \]  

Note that "A" varies directly as the power-sensitivity factor mentioned above. All that the above formula (1) shows is the direct ratio of the power-sensitivity factor, and the direct "nearness" factor which is the reciprocal of "D" (the distance separating transmitter and receiver).

In the early days of amateur radio, as has been stated earlier, no interference was caused to neighbors because they possessed no receiving equipment. It was not until the proliferation of one-way communications (broadcasting) that sufficient receivers were in use in the community to have any mass effect, due, at first, only to shipboard and other transmitters (including amateurs).

As the tendency in the first part of the century was to move from the farms to the cities and their suburbs, less space was available for large antennas. This process
is still going on, with more people in smaller and smaller living spaces, and, as was noted, less and less space between neighbors, and for antennas. In spite of technology which has reduced the size of necessary antennas, there comes a point of irreducible minimum to be used and planned for. Here democratic sharing is a solution. Where is the electronic frontier?

Although many of today's radio amateurs are younger men and women (as nearly all were at the time of inception of the art) there are many more older citizens spread throughout its ranks. Some of these are prominent in fields not allied with electronics (e.g., politics, entertainment, transportation, defense, etc.) and have raised the level of respect and appreciation for amateur radio today much higher than it was, for example, about 50/60 years ago.

Public relations has been enhanced by press and TV releases from the local radio clubs, assisted by aid from ARRL in the form of films and other "hand-outs" tending to show the public service and emergency value of the art. However, on a one-to-one basis, resolution of this matter will always be at the individual ham, local level. As the ranks of the older and more experienced hams change, so do those of the BCLs, and in order to decrease misunderstanding between them will continue to require a continuing program of education.
It would be of the greatest misfortune if, in years to come, loss of understanding by both parties had to be superseded by inflexible government rule-making which deprived the community, then the nation and the world, of the advantages inherent in the present cooperative, lightly-governed mix of operating, experimenting and public-service ham categories--carrying out helpful and innovative roles in the midst of an understanding and appreciative community. Up to now, amateurs led by ARRL and local organizations and individuals have richly fulfilled the promise shown earlier. Overcoming many handicaps with the understanding of government and neighbors of the community, they have built a solid platform of experimenting, operating and public-service that can continue in future. Let us hope future understanding and tolerance will let it!

**Emergencies**

In the first part of this century emergency communication, particularly in isolated regions, depended entirely on railroad and commercial wire telegraph lines for electrical communications. Many times during floods or other natural catastrophes, these lines would not be in place when most needed. A memorable example of heroism "at the key" occurred at Johnstown, Pennsylvania when the female operator remained at her post, passing on information about the flood until she died, as the flood, rushing down the valley, carried all before it.12
As radio-telegraph stations began to appear on ships and a few coastal stations were built to communicate with them, thoughts must have arisen that the new medium, requiring no interconnecting wire lines, might be ideal for emergency work on shore as well as at sea. But commercial stations, when established to work between a few inland cities, were far from being sufficient for the task. When amateurs came, they were at first in or near the major port cities (e.g., Boston, New York, Philadelphia, New Orleans, San Francisco). Later on, amateurs established themselves inland, around the interior cities (e.g., Chicago, Denver, Fresno, California) and were able to use commercial electric power, so were heard at distances of fifty to one hundred miles radius. This encouraged lower-powered stations in rural districts to come on the air, using batteries and ignition type spark coils for short-range transmitting. Amateur radio clubs were formed on a local basis.

What was needed was regulation, not by the government, but by the hams themselves, to make an effective organization to handle messages, particularly in emergencies. In May, 1914, three months before the war started in Europe, the A.R.R.L. was founded by H. P. Maxim, with the aid of C. D. Tuska and others. A year and a half after this national organization was started, QST commenced (monthly) publication (December, 1915).
One of the first items mentioned in QST's 1915 "December Radio Relay Bulletin" is "National defence--our services offered to Government," where Maxim wrote to the Secretary of War, and also to the Secretary of the Navy, Josephus Daniels. Maxim apparently wrote on August 7, 1915. In Maxim's letters in QST, he makes the following interesting observation:

Some of our stations have already been of public service in establishing communications when floods have prostrated the regular telegraph and telephone lines. Our organization can unquestionably be of value in the event of similar disaster or invasion. A fire which happened to destroy the telephone and telegraph central stations in a city would stall communication. Our organization could fill this interval while repairs were made. Most of our membership is along the Atlantic and Pacific coasts. It is not impossible that we might be of value to our fleet standing off our coast in time of war.13

Secretary Daniels' reply stated that "The (Navy) Department has a plan outlined for the employment of the services of amateur stations in time of war as may best serve the interests of the country and the office of the Superintendent of the Naval Radio Service is in immediate charge of matters relative to the coordination of means of radio communication, so far as the Navy is concerned, in the event that the necessity arise for controlling and using stations other than those under Naval jurisdiction."14 The Acting Chief Signal Officer of the Army, Lt. Col. Samuel Reber replied in similar noncommittal vein.

However, when war came in April, 1917, the amateurs were still apparently awaiting action by the government to
use them when they received orders signed by a Naval officer to dismantle their stations, and report their compliance on pain of "a rigid investigation."

During World War I and World War II use has been made of amateur frequencies and also licensed radio amateurs in the Services. The skills learned by the hams have been found to qualify them for better jobs in the Army, Navy, and Air Force with a minimum of training. Between World War I and World War II, both the Navy and Army Signal Corps had established peacetime training programs to give interested hams at home or summer camp or cruises, to train them in military procedure.

Besides the use of amateurs in defense jobs for which qualified, and the "hambands" of frequencies (now vacated at start of war) some of the amateur equipment was useful "as is" or with minimum modification (as mentioned in a preceding chapter). Thus, in time of war the amateurs furnished personnel, frequencies, and materiel, and these practically immediately, while procurement, training and manufacturing facilities were being set up and expanded.

An early use of amateur stations for emergency message-handling was affiliation with the nation's railroads. QST for March, 1925, tells of work done and the institution of the signal "QRR" as a sort of land "SOS" to alert others on the frequency that an important emergency was at hand.
The same year, QST tells of amateur radio at "Floyd Collins' cave where news of rescue attempts, for front pages, was sent by an amateur station established at the remote cave." When H. Hoover, Jr. (W6ZH) was president of ARRL (1962-1966) he entered on an agreement with the Red Cross to supply emergency communication which has continued through the years.

The latest QST at hand (October 1980) shows an establishment of "District Emergency Coordinators" (DECs) in each of the 73 sections of the League (including seven in Canada). A periodic Simulated Emergency Test (SET) was scheduled for October 18 and 19, 1980, according to the same issue. Another item in the latest issue of QST was headlined "Red Cross Division Emergency Communication," with the subhead "Success in emergency situations depends on experience, planning, and coordination." From the article:

The American National Red Cross carried on a nationwide program of disaster relief. All Red Cross disaster assistance is a gift, never a loan, made possible by the voluntary contributions of American citizens. The Red Cross relies on volunteers for most of the work needed to deliver the assistance to the disaster victims. From the advent of radio, hams have assisted the American Red Cross. Organization of the amateurs' efforts, in cooperation with the ARRL and local radio clubs, is helpful to the Red Cross, the amateurs and the public.

and from the same article:

The League recently added the District Emergency Coordinator appointment to its structure of field leadership officials. The DEC appointment may be
ideally suited to the functions of the Red Cross Division coordinator, should the SEC and SCM (Section Communications Manager) deem it appropriate. In this way, direct involvement with the ARRL Amateur Radio Emergency Service (ARES) can be enhanced.20

In a country as large as America, it has been found necessary to have an emergency service in being and manned with operators, with their equipment, who have had training and experience in this work. Capable otherwise, many well-meaning hams have come on the air with messages of inquiry, and offers to help, during emergencies and wasted valuable time until the frequency was clear again for vital messages. With the large number of hams today who have had little or no experience in message-handling of any type, let alone emergency traffic, there has to be a familiarization program by local clubs and ARRL emergency coordinators in each of our 73 sections to insure that the "word" on proper procedure is passed to as many hams as possible. For the small percentage of hams who insist on having their "rights" to the air under all conditions, there remains the possibility of FCC/FBI intervention and the eventual sentencing and punishment in the Federal courts. This, however, is usually a long drawn-out process.

However, cases of confiscation of apparatus, fines, and the spectre of jail-sentences occur and one or two are written up in QST and other ham magazines nearly every month. Although some of these cases happen to come from sheer
ignorance, unfortunately, with so many licensed hams active, there are, inevitably, a few who insist on what they call their "rights," and so run afoul of the law.\textsuperscript{21}

The proliferation of 2-meter "rigs" in cars or trucks, with repeater-enhanced distance ranges, has, during the past decade, greatly enlarged the amateur's ability to serve effectively during an emergency. Where at one time ham stations were more-or-less fixed in one location, now a great many have, as a secondary or even primary, station, one that is mounted, or can be quickly mounted, on a vehicle. Supplied with electricity from the car's battery and electrical system, and supporting a whip antenna, the car now becomes a mobile radio station, able to go where traction suffices, and able to operate so long as fuel is in the tank. Further, these mobile "rigs" are assisted by repeater stations on elevations, that are able to re-transmit signals from the "mobile" to greater distances than it could unassisted. In addition, hand-held portable battery-operated miniature transceivers are also in wide use, to be carried to points inaccessible to vehicles. Some of these mobiles and repeaters have been provided with means of dialing into the local telephone lines, if the latter are serviceable, and thus saving time.\textsuperscript{22}

There is no doubt that the kudos that resound in praise of the emergency-handling ham do a great deal toward PICON (operating in the Public Interest Convenience Or Necessity)
along the same lines as written messages or "Phone-patches" for the public in otherwise difficult-to-reach places (e.g., "South Pole," Vietnam, etc.).

That there is really no government law or rule requiring the licensed ham to give the services of his time and equipment underscores the fact that a great many, if not most, hams are willing and ready to do so. As was mentioned above, however, not all are best suited for emergency work. The fact that some are, and do give of their time, is one of the great distinguishing features of ham radio from other hobbies. Why do they do this? Is it because they have a history of free public service message handling right from the beginning? Is it because they appreciate the right to use many many more frequencies and modes of communication than they originally had?

In searching for possible ways in which American amateurs are phenomenally interested in voluntary emergency cooperation, early root-sources in American communications should be sought. What makes our American amateurs unique? To begin with, electrical communications in America have never been a government monopoly. Even though Morse's telegraph was instituted between Baltimore and Washington, D.C. (1844) with the aid of a Congressional grant---even though the U.S. Army Signal Corps perfected the mobile field telegraph during the Civil War and the Indian campaigns, there has always been a degree of free enterprise
in the wire telegraph and telephone industry, lacking in other nations.

Stories of the "boomer" telegraph operator picture him as a restless roving individual, heading West to the "head of (R/R) track," favorite telegraph key in pocket, and one of that tribe of Western roamers who helped build the West, along with the printer with a shirt-tail of type and other, now legendary, characters of the last century. Such freedom and neighborliness as our country afforded was transferred to the wire telegrapher's successor, the wireless ham. In those early days, around the turn of the century, small communities worked together for a fire, a clambake, or a church social. This was the American pattern of voluntary cooperation.

It is only natural that the small number of emergency operations that took place should grow—along with the spread of population and growth of the ham ranks. With the granting of bands of short-wave frequencies by the U.S. government to the hams of this country on a temporary basis in 1925—stations lost track of each other as they moved to different bands to continue their operations. No longer was it possible to blast out a "CQ emergency" on spark, on the old 200 meter wavelength, and expect to be heard by everyone within range.

A system had to be, and was, set up. Designated volunteer stations met—on the air—on certain carefully
designated frequencies at carefully selected times to conduct tests of operators, their equipment, and procedures. Courteous forbearance for the rights of others who also wanted to use those same frequencies at the same time, usually effectuated a compromise which involved changing one or the other. The main thing was the establishment of a central controlling agency, whose coordination would assure that the enthusiasm of the participants would be encouraged during times of "non-emergency" conditions and given effective orderly restraint when disaster struck. It also had to be a democratic system, able to cope with change rapidly and effectively, using what resources were available. In this, a resemblance to a volunteer fire company is very marked. We now generally have municipal fire companies throughout the land, but the volunteers still can be found in remote places, or at a small town unable to support a professional fire department.

With today's proliferation of the telephone into every part of the country, one may wonder whether there is still a necessity for the ARES (Amateur Radio Emergency Service). But it is exactly in the remote smaller settlements where disaster may strike and find the commercial communications disabled or nonexistent. This is the essence of the ARRL emergency system. It is only necessary to remember the vital contribution made by hams in great disasters such as the Alaskan earthquake of 1964 to visualize the scope and
magnitude which may be involved. Incidentally, it was in commemoration of that disaster that the first U.S. postage stamp honoring the hams was issued in 1964.

But, although of the highest importance to those involved, there are emergencies involving only a few, or even one person that have been handled by the hams. The short waves operate sometimes in a peculiar manner. It is possible for one station to be coming through with good volume at one location, and weakly or not at all at other, even nearby, points. Thus a South American ham trying to get a rare drug for a dying person may find that he is answered (in the U.S.) by the only station that is picking him up well in, say, Idaho, when the offices of the drug manufacturer are in New York. To the great credit of virtually all U.S. hams, they will stay with the distant station and, using the telephone to call friends, obtain a supply of the drug for hand-handled air shipment to South America. Lives have been saved by such devoted and effective care.23

The diversity of the hams helps too. In one case, watermelon was prescribed for a rare ailment, but at that season of the year, none was to be had. But the call went out, and the need made known through hundreds of contacts. Finally a source was found in cold storage in Florida and watermelon was sent to the patient for his relief.24
Tornadoes come regularly to certain parts of the country and floods to others. The telephone and electric power systems may be out of service for days. Ships unloading in port blow up. Volcanoes erupt, trains transporting munitions and chemicals are derailed—the list goes on and on. But due to the diversity of the hams, almost always there is one nearby willing, and usually able, to get the message through. The impetus which led him to pass the FCC exams, and continue to perfect himself in the use of his station for communicating, often with DX under poor conditions, has made many hams naturals for emergency communications when the crunch comes.

The range of emergencies varies from a coordinated search for a missing child, using handy-talkies and perhaps the neighborhood repeater (built and maintained by hams), through catastrophes due to nature, to hands-across-the-sea assistance, up to the ultimate emergency: war. In war, of course, amateur stations as such, are not employed. But the knowledge of the operator is available for many assignments, his apparatus and needed parts are there—in being—his frequency bands are vacant for use by the government. Also, the manufacturing know-how and equipment have been developed over the years to supply that critical and competitive market—the Amateurs.

In America, we are blessed with the best communications on earth (or in space!). This proves a handicap when
travelling abroad where communications are not available
to the extent they are in the U.S., are relatively expen­
sive, and of inferior technical quality. With monarchs such
as King Hussein of Jordan (JYI) operating on the hambands,
more consideration is sure to be given to a country's
communication needs, and a system of emergency radio worked
up and utilized. After all, if apparatus will still work
satisfactorily after being operated for several days con­
tinuously under emergency conditions of exposure to wind,
rain, snow, salt air, under-and-over-voltage, and rough
handling, it must be good. At least, breakdowns and weak
points are noted, and reported. Thus emergencies serve as
an apparatus "heat-run" under conditions few manufacturers
would contemplate. Few amateurs would expect to have to
wind their antennas around the house to keep them from
being blown away, but this is exactly what W1BDS had to do
in the New England hurricane of 1938. 25

No one forces the men and women to risk property and
lives in an emergency. It is part of the American tradi­
tion of mutual aid--call it "neighborliness" that is found
in all parts of the country and among virtually all Radio
Amateurs.
NOTES--CHAPTER VII

1. Tuska and his successor Warner met while serving as young officers in the Army Air Service. Warner was recommended to Maxim by Tuska, and served the League as its Secretary from 1919 to 1948 when he died.

2. Prior to his death, Armstrong erected the first commercial FM broadcast station, to serve the New York area.

3. QST, vol. 6, no. 9 (April 1923), p. 31.

4. Bailey wrote QST a letter, published in the Correspondence section of the June, 1927 issue (vol. 11, no. 6, p. 67). Titled "QST made," it gave complete credit to the League for the "making of a ham" entirely by QST.


6. Philip S. Rand, ed., Television Interference, 3rd ed. (New York: Remington-Rand, Inc., 1953). That TVI is not a factor today must be credited to hams like Phil Rand. The TV set manufacturers were mostly lethargic. FCC, as usual then, was critically short-handed.

7. For some reason, these bills are never passed. Although a small extra expense would be involved in installing a filter on each TV set, etc. at the factory, it would save much money compared with the cost of post-manufacture in individual cases.

8. As an example: Section 301 of the Communications Act of 1934, together with P.L. 95-234 authorizes FCC to issue forfeitures of up to $5,000. Federal radio laws provide for even higher penalties and also imprisonment. QST, vol. 65, no. 2 (February 1981), p. 58.

9. ARRL has assisted local attorneys by citing Court decisions favoring less restrictive antenna ordinances. On the whole, most rulings can be lived with and are restrictive only to those who desire super antennas.

10. The ordinance applied to Broadcast Listeners (BCLs) as well, since all but crystal sets required a "current of electricity" to operate. That was not the desire of the municipal council in issuing their poorly-worded ordinance.

12. An example of radio operating "until death" is cited by DeSoto in his "Calling CQ" (1941). It tells of the airplane "Dallas Spirit," one of the airplanes trying to cross to Hawaii in 1927. Equipped with short-wave radio, the operator, Alvin Eichwaldt, sent bulletins to the listening hams. Finally, as weather conditions worsened, Eichwaldt sent an SOS, followed by a "belay that." The plane had recovered from a spin. Soon a second SOS was sent and news given of a second spin. The second SOS was cut short by the crash--Eichwaldt was still sending when his trailing antenna hit the water (p. 40).


14. At that time, what the Services wanted was trained operators. The amateurs provided several thousand.

15. *QST*, May 1917, p. 3. Amateurs were forbidden to receive or make any experiments.

16. See editorials in *QST*, June, 1917, and the article "Wanted by Uncle Sam: 2,000 amateur wireless operators; for World War I and World War II, see, for example, "U.S.A. calling--and how!", *QST*, February, 1942, p. 29. Military procedure was all that needed to be taught.

17. After World War I both the Army and Navy set up reservist summer camps or cruises to still further limit the time necessary for training in an emergency. See *QST*, October 1925, p. 22 and December, 1925, p. 7.

18. *QST*, March, 1925, p. 8. During emergencies, difficulty in keeping certain frequencies clear is experienced. Unless hams have some experience in this type of operation, even well-meaning hams can cause delay.

19. *QST*, May, 1925, p. 42. Communications to and from the remote cave where Collins was trapped were handicapped by lack of wire communications and news-organization radio. Things have changed in the past fifty-five years or so.

20. *QST*, vol. 64, no. 10 (October 1980), p. 50. This is an example of pre-planned emergency communications where the National ham organization works with the National Emergency Society.
21. Is this a defect? Is it better to have strong government control over all phases of ham operating? Our system puts more onus on the individual to respond quickly to changes, as in emergencies. For example, see QST, October, 1980, p. 58, "FCC Censur-Y Club," and p. 90 "Hurricane Hurts vs. Hertz."

22. See QST, October, 1980, p. 92. "Public Service, et seq." This "Two-meter FM repeater" service, with or without access to telephone dialing, has established itself in just a few years, as the reliable ham communication system.

23. This has been shown by mercy calls from hams in South and Central America, where need arises for a specific unobtainable drug. An "eyeball" network also exchanges information on the need for, and availability of, eyeballs.

24. Perhaps no other way could have broadcast the need, and replied with a source, so quickly.

25. DeSoto, in Calling CQ states: "On his way in from the yard, the pliers were whipped from his hand by the wind." Also, "So strong was the wind and so dangerous the flying debris that in order to keep the antenna up it was finally necessary to wrap the wire around the house." Another example of ham ingenuity in an emergency!
CHAPTER VIII

CONCLUSION

American Radio Amateurs and American Culture.

Outlook for the future

It has been shown that the communicating type of radio amateur is a development of the old wire telegraph amateur, who was confined to a local operation because of lack of interconnection. How wireless allowed the communicating amateur to enlarge his horizon is allied to other pioneer Americans who, shortly before had gone from local to national and, at the end of the nineteenth century, were going international. A further parallel can be made to the American culture ethic which caused those pioneers to rally to the need of a neighbor for barn-raising, country dances, etc. The distinction between American and foreign culture, as seen in ham radio, was that the hams presented their neighbors with a volunteer, altruistic communication (message-handling) service, and still do.

First local, then national, and finally international in scope, ham radio grew as the national and international organizations were formed, received support, and found ways of influencing treaties (WARC), laws (the Congress, and rules/regulations (FCC). In the United States, this had come about in the mid-teens, the mid-twenties and later parts of the twentieth century. To implement the rules
there had to be technical progress, and this was quickly
supplied, usually by the hams themselves (cf. Armstrong's
regenerative and superheterodyne receivers; the short
waves by Reinartz and others). These changes were shortly
reflected in the activities of foreign hams, who for some
years after World War I had not been licensed, and suffered
much opposition from their governments.

The International Amateur Radio Union (IARU) now con­sists of over a hundred national radio clubs and continues
to justify its existence by informing the national voting
representatives before, during, and after the World
Administrative Radio Conferences (WARCs) held by the United
Nations Organization at intervals of ten years or so. It
is precisely the institution of an effective American
national radio society in 1914 that gave purpose and
solidity to the desultory ham hobby as it had existed since
Marconi came to America at the turn of the century.

It may be trite to say that the future of ham radio
depends, in the final analysis, upon the individual ham,
but a good case can be made for just that. If the American
(and now, foreign) ham does not continue to observe PICON,
and the amateur's CODE, and continue to support his national
radio organization by electing and supporting qualified
Directors, American amateur radio as we know it today will
be doomed to a state-controlled "radio-sport," wherein the
practitioners have no say about its direction. Such is the
case today in certain totalitarian countries if, that is, amateur radio is allowed at all.

Americans have always had active minds and are interested in developing things. Abraham Lincoln, while a young river navigator, was granted a patent on a method of getting a river boat across shoals, and went on to become a President. Senator Goldwater is a long-time ham, and President Reagan, though not a ham, was a radio announcer in his youth. It will be remembered that Herbert Hoover, Jr., an avid ham, was a President of ARRL. The list could go on and on. So long as the general public in our country has this inquiring mind, reaching out toward new horizons, and continuing to embrace ham radio in all its modern forms, we will not need to fear for the future.

The wife of a ham, married to him for half a century, but not a ham herself, was asked to jot down her observations on ham radio. They follow:

Ham ops come from every age, from energetic poor with home-made gear to the very wealthy who may even hire people to operate station when working to help when disaster has disabled all professional communication.

In early days when commercial phoning was terribly expensive or none at all, messages could be relayed in far shorter time and also even phone communication via ham radio.

American hams are of all "classes" but foreign hams would tend to be more of "upper class" due to cost of equipment and not so much chance of procuring even junk to build with.
Clubs help new hams and then some hams help beginners personally—helping build station and helping to learn code, etc. for getting license.

Problems of installing antennae in apt. house. Now people accept hams as having an interesting hobby rather than complaining about interference —not so much now due to filters in radio and TV sets—even in stereos.

In "olden days" when the amateur signal might be picked up by neighbor turning on water faucet.

Great importance of good antenna even more than good equipment. [By Mrs. K6CZ. As has been mentioned, a good antenna is important. And it can be built so as not to offend the neighbor's esthetic sensibilities.]

Those random notes, set down by a lay person who has been close to ham radio since 1931, give a sampling, from one point of view, of ham radio today.

The QST editor's dream in 1917 has been fulfilled. Amateurs talk to each other all over the world today. What they say can be heard by nearly everyone. So far, foreign amateurs enjoy most of what is said. It is important that they continue to do so in the future.
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