

ASSOCIATED POLICE COMMUNICATION OFFICERS

Room 619
1200 CLARK AVE.



ST. LOUIS, MO.

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APCO BULLETIN

JUNE, 1935.

The APCO was well represented by Lieut. Searle, Troy, New York, at the Poughkeepsie meeting of the Associated Municipal Signal Services. Lieut. Searle states that he was well received and that the attending delegates were extremely cordial. Inasmuch as the final recommendations as regards intercity communication had not reached Lieut. Searle, he was only able to speak generally of the plan. It was moved that the intercity plan be investigated by the separate units of the association, rather than collectively, and copies of the recommendations will be forwarded to five branches of the organization. I wish to express my thanks to Lieut. Searle for the time expended in attending the meeting and the following telegram was read to the assembly:- "PLEASE EXTEND TO THE MEMBERS OF THE ASSOCIATED MUNICIPAL SIGNAL SERVICES, THE SINCERE GOOD WISHES OF THE ASSOCIATED POLICE COMMUNICATION OFFICERS, AND THE FOLLOWING MESSAGE QUOTE WITH APPARANT SIMILARITY IN THE PURPOSES AND AIMS OF OUR RESPECTIVE ORGANIZATION IN MIND, I CAN FORSEE THE GOOD WHICH MUST RESULT FROM THE MEETING YOU NOW ARE HOLDING. WE SINCERELY REQUEST YOUR CO-OPERATION IN APPROVING OUR RECOMMENDATIONS AS REGARDS INTERCITY COMMUNICATIONS WHICH WILL SOON BE COMPLETED, AND I WISH TO EXPRESS OUR DESIRE TO COOPERATE WITH YOU TO THE FULLEST EXTENT QUOTE.

The FCGA

The May bulletin of the Florida Officers Communications Association was received too late for the May APCO bulletin, and I am including portions which should be of interest to us. The entire bulletin is well worth reading, but space will not permit. Paragraphs of general interest read:

"Regarding the evil of ambulance and wrecker chasing it is a pleasure to note that President Allen has inaugurated a move to wipe out this menace. By now all of you have received printed copies of Rules 605 and 501 of the Federal Communications Commission. This should prove to be a great aid in curbing this evil practice. Mr. Allen has had a number of copies of these rules mimeographed, and in addition has been responsible for the appearance of articles in the Jacksonville papers quoting these rules. This method of attack should prove to be very effective. If more warning does not have the desired effect, it is planned to go a step further and start proceedings against offenders. It is very easy to secure ample proof of violations, and all of you are well aware of the fact that violations of the rules and regulations are very definitely against the principles of the FCG. This method is one of complete cooperation with the FCG and should prove to be very effective. In all of the plans so far Chief Roberts and Inspector Acosta have given every aid in their power."

"I wonder if many of you have noticed the decided slump in point-to-point activity? In case you have not, let me say that such is true. There is but a small percentage of this type of traffic as compared to a few months back. This seems to indicate a state of watchful waiting on the part of police radio stations. It is going to be very interesting to find out how the FCC is to handle this problem. They have doubtless received many suggestions from all over the country and are hard at work trying to devise some method which will prove satisfactory to everybody. When this method will be made common knowledge is not known; but it is safe to predict that something will be forthcoming as soon as possible. In the meantime the only thing to do is prepare to adopt the new routine as soon as it is made public. If all police departments, whether users of radio or not, will make every effort to learn as much as possible about police radio in all its phases increased efficiency in its use will inevitably follow."

"Jacksonville recently put a code into effect for both city and county cars. One of the greatest benefits from the use of this code has been the shortening of time on the air. Being the code the average time required to place a message on the air is around ten seconds. This is much more rapid than the old system. While to a certain extent a code serves to keep messages secret it doesn't put a stop to wreckers answering all wreck calls. They seem to find out just what signal means a wreck in the least possible time. Two methods of obtaining this information has been brought to our attention in Jacksonville. The first is that of answering all calls until they discover which is the wreck call. The second method is more subtle and shows much thought. The wrecker company calls up headquarters and reports a wreck at a certain location, being careful to use a fictitious name. Naturally the order will go out sending a certain car to this location and giving the proper signal number Mr. Wrecker Man sitting in his place of business carefully notes the signal number given. Rather clever isn't it?"

"Shortly after our meeting an official interpretation of rule 331 was received at WCFG. This interpretation states that it is the responsibility of the administration officer of each municipal police radio station to make such arrangements as may be necessary. It further states that consideration should be given other stations sharing the same band of frequencies; and that only those messages of immediate importance be transmitted. Boiled down to a single statement it simply means that each station is held responsible for messages emanating from it; and that the definition of a message of immediate importance is left in the hands of the person ordering the message transmitted. This leaves the whole thing up to the officers who are familiar with local conditions."

THE FINAL INTERCITY PLAN

The plan which appears below represents five months of painstaking effort on the part of the chairman and our intercity communications committee. The committee has considered the numerous suggestions and has coordinated them insofar as possible. The full and complete actions taken are compiled in book form, including the original recommendations, etc. These, I am omitting as being repetitious. The final recommendations follow:

GENERAL CONCLUSIONS CONCERNING CERTAIN PHASES OF THE COMMITTEE REPORT

There does not appear to be any question as to the need for a nation-wide intercity police communication system. Due to the limited funds available for wire communication and because of the fact that wire communication facilities are not available to all points, it is believed that an intercity radio communication plan should be adopted. In this connection it is pointed out in the report of the Committee on which this report is based that only a small file of point-to-point traffic will be handled by radio, and considering this fact together with the economy and facility of radio, wire methods of communication can not be justified. Rapid and reliable communication is necessary at all times and must be provided in a manner which will not interfere with the Mobile Police System now in operation. Since most of the intercity traffic will be of a multiple-address character, a single transmission by radio to strategically located police stations will permit immediate delivery thus avoiding the necessity of sending many costly wire messages.

With respect to Objective No.1 of the report of the Committee, it will be noted that the service to be carried on for intercity police communication shall be classified as an emergency service, i.e., only messages of an emergency nature authorized under the Federal Communications Commission Rule No.325 shall be exchanged between point-to-point police stations. In this connection it has been recommended that the term "emergency" service not be used. It is not believed that the term "emergency" is fully understood. Any message sent by a police department, altho it may not necessarily relate to safety of life or property, is regarded as an emergency message for the reason that the work performed by police departments is of an emergency character. With this distinction between the terms "emergency" and "safety" it is believed that the recommendations of the Committee defining the service under the Commission Rule No.325 is perfectly proper. It will thus be understood that emergency messages not necessarily of immediate importance to police departments may be handled.

Referring to Objective No.2 of the Committee report, it is recommended that only type A-1 and/or A-2 emission (CW and ICW) be used by point-to-point police stations. This will limit intercity communication to a written record radiotelegraph system. The advantages and disadvantages of radiotelegraph and radiotelephone communication have been considered and are given in detail in a separate section of this report.

The basic plan recommends the assignment of three frequencies primarily for day communication and three additional frequencies primarily for night operation. After careful study of the Federal Communications Commission Rule No.229, which allocates frequencies to services, it is recommended that three frequencies be designated in the band between 2000 and 2100 kilocycles and an additional three frequencies in the band between 2750 and 2850 kilocycles. However, all six of these frequencies should be available for both day and night use, with suitable restrictions being placed on their use so as to guard against interference.

It appears from this study of the Commission's Rule No.229 that frequencies in other bands suitable for intercity police communication are now assigned to aircraft stations, government stations, ship stations, and other classes; therefore, the best possibilities for frequency assignments appear to be in the bands 2000-2100 and 2750-2850 kilocycles which are now assigned to Experimental Visual Broadcast stations. In this connection it is generally believed that Visual Broadcast Stations will ultimately relinquish these frequencies and restrict their operation to the bands above 30,000 kilocycles.

In addition to the Commission's Rule No.229, the Committee has also considered the limitations imposed by the General Radio Regulations Annexed to the International Telecommunication Convention of Madrid, 1932, and the provisions of the North and Central American Regional Radio Agreement. Under the former treaty frequencies in the various bands throughout the radio spectrum are allocated to specific services, such as fixed service, mobile service, broadcasting, etc. Under the North and Central American Regional Radio Agreement, certain frequencies are assigned primarily for the use by Canadian stations, while other frequencies are assigned primarily for use by stations in the United States. It is understood that before the United States Government may withdraw frequencies from one service, such as Experimental Visual Broadcasting, it will be necessary to consult with Canada. However, inasmuch as police radio is rapidly developing in Canada, and because of the possibility of International intercity communication it is believed that an agreement may be reached providing for the allocation of frequencies as recommended above, namely, in the bands 2000-2100 kilocycles and 2750-2850 kilocycles.

With reference to Objective No.5, stating that the frequencies to be designated should be capable of providing reliable communication when a reasonable amount of power is used, over a path of at least 250 miles, it is recommended that the figure 250 be used only as a guide and that wherever cities are situated at distances greater than 250 miles from the nearest point-to-point police station they be permitted to communicate with one another.

With respect to Objective No.6 of the Committee report, it is desired to emphasize the importance of requiring that police communications be handled free and that no rate or other charge be imposed. This is important for the reason that the service is private in nature and is not intended to compete with any commercial system.

In connection with Objective No.7, it was originally believed that a separate transmitter should be used for intercity communication. However, after thoro study, the Associated Police Communication Officers is now of the opinion that the main transmitter licensed for operation as a municipal or State police station, should also be available for a license under the classification of point-to-point police station, provided that such use shall be secondary in nature and will be restricted to times when the equipment is not needed for mobile service. Of course, it is to be clearly understood that such secondary use of the transmitter for point-to-point communication must be on the frequencies assigned for point-to-point service. This will require modification of the equipment so as to provide additional frequencies and the necessary means for radiograph emission.

In Objective No.8 it is recommended that certain rules of the Federal Communications Commission shall be applicable to point-to-point police stations. Aside from the discussion which has already been given above with respect to certain of these regulations, it is desired to discuss briefly certain other provisions of the rules.

It is admitted that the power required by point-to-point stations bears no relation to population. However, the Committee recommended that Rule 329 serve as the basis for allocating power because "key" stations, hereinafter referred to as zone control stations, are to be designated for clearing interstate traffic, and only the larger cities will be eligible for such designation. This appears to be a logical assumption for the reason that the largest city will be expected to handle the largest file of traffic and hence should be designated as the "key" for its particular state or zone. There will be cases where two or more large cities are licensed as point-to-point police stations in the same State. In these cases, it is believed that the first applicant for a point-to-point police station license should be designated as the "key" for that particular zone or State. In other words, the power allocations in Rule No.329 appear to work out according to natural restrictions, preference being given to the largest city in any given area.

Attention is invited to the fact that Rule No.329 does not now apply to State police stations as such, but when a State police station applies for a point-to-point police station license, it will be applicable to that particular class of station. Since State police stations are normally expected to communicate over long distances, it would appear that they should be given preference as "key" stations over an application in the name of a municipality. Therefore, it is recommended that the licenses of any State police station who applies for a point-to-point police station license, be authorized the maximum power provided under Rule No.329.

Rule No.330 is made applicable to point-to-point police stations in order that the small isolated municipality which would not be entitled to high power under Rule #329 might apply for adequate power to communicate with the nearest point-to-point police station.

Referring to Rule No.333, it is recommended that frequencies be assigned to zones and that in establishing zones the zone boundaries should, insofar as practicable, coincide with State boundaries. Exceptions to this rule would be in the case of small States, such as Rhode Island. There are several reasons why this plan is desirable. Police departments in the same State are more closely connected and associated because:

- (a) All police departments of the same State are organized on the same general plan and operate under the same laws.
- (b) Extradition Laws and differences in laws of adjoining States would tend to isolate some departments were zones to include territory outside of single State boundaries.
- (c) The bulk of police communication will be intrastate, consisting mainly of information pertinent to the State in which the crime is committed.

Rule No.338 is made applicable to the intercity plan for the reason that in a given area one city may provide service to contiguous municipalities, thus obviating the necessity of each city within a small area maintaining its own independent facilities.

With reference to Rule No.348 requiring licensees to maintain adequate records of the operation of the station, including hours of operation and the nature of each transmission, the question has arisen a number of times as to whether or not officers may arrest the wanted person on the strength of a radiogram, the warrant being in the possession of the originating department. It is believed that if the term "adequate" in the Commission's rule is interpreted by all departments to include any information of vital importance in crime apprehension work, it would be impracticable and unreasonable to expect the originating department to send a confirmation copy to every department which might contact the subject.

In this connection it will be of interest to know that the Attorney General of the State of Michigan rendered the following opinion on April 15, 1935:

"...we are of the opinion that any law enforcement officer would be justified in making an arrest in cases of felony, upon receipt of a radiogram or communication by police broadcast, provided the broadcast is made in accordance with the rules of the Federal Communications Commission."

By rules of the Federal Communications Commission the Attorney General no doubt had in mind the provisions of the Commission's Rule No.348 with respect to stations maintaining adequate records.

COMMUNICATION ORGANIZATION.

Referring to Objective No.9, the Association has studied several possible communication plans. Of these the following are recommended for study with the request that the Federal Communications Commission work out the final details in cooperation with representatives of the Associated Police Communication Officers and International Association of Chiefs of Police.

PLAN NO. 1.

This plan involves the use of a zone control station in each State or zone and the use of secondary stations hereinafter referred to as Class B stations. Stations handling inter-zone communications shall be known as Zone Control Stations, while stations within the same zone, or State, other than the Zone Control Station will be known as Class B stations.

The zone control station should be located as near as possible to the geographical center of the zone. In practically all cases this is true of the capital city of the State and for this reason and because of the availability of complete records it is believed that whenever possible the capital city of the State should be the zone control station. Also the capital city is usually a large city, or the location of a State police radio station and would have additional radio facilities to handle the greater volume of communication work that would fall to the zone control station.

If day and night frequencies are to be assigned as such, the zone control station would ordinarily maintain a continuous watch on three frequencies simultaneously; two for inter-zone communication and a third for intra-zone communication, or some other combination depending upon which one is found to be most suitable.

The zone control station should control all communications between Class B stations within its own zone. All Class B stations should be required to relay traffic through the zone control station where reliable communication from one Class B station to another is not certain. In any case it is believed that all Class B stations should request and obtain permission to transmit from the zone control station, before attempting to communicate with other stations within the zone.

The zone control station should act as an intra-zone "radio central", merely making intra-zone contacts between Class B stations in the same zone that desire to communicate directly with one another, thus eliminating intra-zone relays. This would reduce time on the Air to a minimum as compared with the time necessary to relay each message through the zone control station. However, Class B stations should be required to route, in all cases, through the zone control station any messages destined for transmission outside of their immediate zone. When messages are for transmission to stations within their immediate zone, the zone control station should have authority to decide whether Class B stations are permitted to contact each other directly or relay their traffic through the zone control station. This will depend upon experience and good operating practice.

Except when otherwise authorized by the zone control station, all inter-zone contacts and messages of an inter-zone nature shall be handled between zone control stations only.

PLAN NO.2

This plan is substantially in accord with the preceding one except that it is desired to submit for consideration the following suggestions with respect to the assignment and use of frequencies.

Since it has been recommended that six frequencies be provided for intercity communication, and inasmuch as these frequencies appear in bands widely separated in frequency from one another, it is believed that three groups of frequencies may be designated as follows: Group No.1 would consist of one frequency in the 2000-2100 kilocycle band and one frequency in the 2750-2850 kilocycle band, which would be used for calling purposes only. Group No.2 would consist of two frequencies selected from the same bands and to be used by Class B stations for intra-zone working purposes only. Group No.3 would consist of two frequencies selected as in the case shown in groups Nos.1 and 2 above, which would be used by zone control stations for inter-zone working purposes only.

There are still other possibilities; for example, only one frequency, preferably in the band 2750-2850 kilocycles, need be designated for calling purposes, thus permitting the assignment of the other five frequencies to individual zones. If this system is adopted, intra-zone as well as inter-zone communication would be carried out on the same frequency.

As an additional suggestion, consideration should be given to the possibility of using any, or all frequencies for calling as well as working purposes. If, for example, the States of Michigan and Indiana are considered to be in separate zones, and Lansing and Indianapolis are considered as zone control stations, an exclusive frequency would be assigned to Michigan and a separate exclusive frequency to Indiana. All inter-zone as well as intra-zone communication would be carried out on the respective zone frequencies. The other four frequencies not mentioned would be assigned to the next adjacent zones for use in the same manner as described for Michigan and Indiana. Obviously, after all six frequencies are assigned it will be necessary to duplicate them in the next six zones and follow on in this manner for the entire United States. This plan, however, would not be satisfactory unless additional frequencies are provided so as to make it unnecessary to duplicate assignments in adjoining States.

To summarize, it is believed that a plan requiring the use of a calling frequency is most desirable; otherwise, it will be necessary for zone control stations to maintain a listening watch on each frequency, utilizing six receivers for this purpose.

OPERATING PROCEDURE

In Objective No.10 of the Committee report it is recommended that for the purpose of uniformity an operating procedure be specified in the rules and regulations of the Federal Communications Commission and that the procedure be made as simple as possible and at the same time provide for an efficient and rapid means of communication.

The Committee has given considerable study to this problem and believes it to be of great importance. It is necessary that the procedure be simple and that a standardized system be provided and that the license be issued contingent upon strict adherence to the procedure to be promulgated by the Commission.

In order that these stations may communicate with one another with a minimum amount of transmission and consequently a minimum of interference to other stations working on the same frequency, a form of procedure symbols that have predetermined meanings should be used. An ideal system of procedure symbols are those in use by the U.S.Navy, which, if necessary, may be modified for police use. A few such symbols which could be used in police communication work are given below with their meanings:

- AA - all after
- AB - All before
- B - Sent after a call, means "did you receive last message".
- B - Sent after conclusion of a message, means "more to follow"
- C - Correct
- G - Repeat back
- J - Check, verify and repeat
- K - Go ahead
- L - Transmit to all stations for which you are responsible.
- M - Relay via
- N - (a) Nothing received
(b) Information of
- P - Priority.
- Q - Wait; stand by
- R - Received OK
- T - Transmit to
- W - Local interference (same as QRM)
- WA - Word after
- WB - Word before
- X - Atmospherics; Static (same as QRN)
- Y - Please acknowledge receipt of this message
- Z - Addressed to for action

These are cited merely as examples of what can be done with such a group of letter symbols and for those who are not acquainted with Naval form it will serve to make clear the message examples which will follow. As a means of illustrating more clearly the various message forms and examples of how a modified form of Naval Procedure would expedite the handling of police communications, we cite here a few examples of messages which in all probability will comprise the bulk of intercity traffic, both within individual zones and in communicating between zones.

(1) Direct Communication. In the case of a message being handled between two stations where the message concerns only those two stations, the following method of procedure, adapted from the Navy, is both short and to the point:

WMDZ V WRDS-NRG-GRG BT

The call letters of both stations are necessary at the beginning of the transmission and so they can be used for the dual purpose of indicating the addressee and the originator of the dispatch. Translated, the message heading consisting of station calls and procedure symbols divulges the following information:

- (a) Message addressed to Indianapolis Police Department for action.
- (b) Received from Michigan State Police, East Lansing, which is the originator of the message as denoted by the call sign WRDS.
- (c) The message is number six sent this date by WRDS to WMDZ.
- (d) The text of the message consists of three words.
- (e) The BT sign is the break between the body and the text.

A careful consideration of the information contained in that brief heading to the message, transmitted rapidly and with a minimum of characters, should convince even those who are unfamiliar with message handling procedure, of the great advantages of such a system.

(2) Where a message is for action by one city and for information of another.

We now consider an example of a message that concerns two stations. In this message we have the addressee, the station originating the message, and the station to whom we desire to transmit the message for information only.

Example: WPGN V WMDZ-NR1-Z-WRDS V WMDZ-N-WPGN-GR 31 BT

Translating the procedure symbols contained in the heading of the message we find the following information contained therein:

- (a) Indianapolis transmits to South Bend message number one of that date.
- (b) The procedure sign "Z" indicates that the message is "addressed for action" to the Michigan State Police, East Lansing and was originated by the Police Department at Indianapolis, Indiana.
- (c) The procedure symbol "M" indicates that the message is also being sent to South Bend for its information.

INTERNAL ORGANIZATION.

The internal organization of each department should provide for:

1. Sufficient personnel to handle the work efficiently at all times.
 2. Maximum rapidity of handling of messages. -- Some standard system must be adopted so as to provide the following copies of messages: Action, information, relay, file. The system of internal routing must provide for prompt messenger service and the redrafting of messages for retransmission.
 3. Quick routing and action in emergency cases. -- Messages must be handled as rapidly as possible from the receiving point to the action official.
 4. Designation of action officials, at least one of whom shall be on duty at all times. -- The "book" of an original and at least one copy, originally prepared at the receiving station, should provide a distinctive color for the action official. Other copies may also be of distinctive color if desired.
 5. Prompt action, including acknowledgment if required. -- Form acknowledgments may be prepared in advance for the various classes of messages which may require acknowledgment. If necessary, the forms may provide suitable blank spaces, thus requiring a minimum of typing.
 6. Dissemination of information. -- The proper dissemination of information requires that the central office be prepared at all times to provide a large number of officials in the organization who may be interested in the contents of a message, with copies. If necessary, suitable duplicating apparatus should be provided.
 7. Coding personnel for confidential and secret reports -- It is possible that certain dispatches will be classed as "secret" and may be coded only by higher officials. Other dispatches will be classed as "confidential" and may be coded by personnel on watch, such as the supervisor or other person.
 8. Preservation of secrecy. -- It is of utmost importance that the personnel be trained concerning the care necessary in handling confidential and secret matter.
 9. Efficient recording and filing which does not delay delivery to action personnel.
- Every effort should be made to simplify the system and reduce the work required in connection with this subject to a minimum compatible with the keeping of adequate records for quick reference.

10. Instruction and training of personnel.-- A radio installation involves a considerable amount of intricate material, but the real basis of communication remains a matter of operation. In any activity where operation is the basis feature the instruction and training of personnel becomes a most important factor in efficiency.

DISPATCHING SYSTEMS

Considerable variation will be necessary for dispatching all sections of a State or zone or the whole United States. Suitable maps should be provided for headquarters use on which the United States and sub-divisions thereof are divided into zones and the zones into districts.

Each zone should correspond with the area to be covered by the zone control station, and the channels of communication, both for inter-zone and intra-zone communication, should be plainly marked by drawing connecting lines between stations.

Means may be provided on each map so that the dispatcher may determine the routing with the least possible delay. For this purpose it is recommended that colored tacks be used to distinguish the zone control stations from the Class B stations. In addition the colored tack system could be broadened to show at a glance certain vital information concerning the hours of watch for each station, the time schedules for important broadcasts, and other important data.

PUBLICATIONS.

It is recommended that the Associated Police Communication Officers issue a handbook for the information and guidance of all persons connected with police communication matters, which shall include the following information:

- (1) A standard message form for use by all police departments.
- (2) A simple code for service dispatches relating to corrections, repetitions, etc.
- (3) A standard arrangement of the content of messages. (For example, name and description of missing person might be transmitted as follows: Name, age, height, weight, physical characteristics, clothing; if car used, the license, make, description and motor number. This information would actually be transmitted in the text of the message as follows: John Brown 28-5-9-165 medium build brown eyes dark hair dark suit light hat Mich 35 lic W 2605 Ford S 35 blue red wheels 2345678 may go to Indiana).
- (4) A standard record system for logging the operation of the station.
- (5) Other important records in accordance with the uniform crime reporting system sponsored by the International Association of Chiefs of Police.

TECHNICAL CONDITIONS FOR SATISFACTORY SERVICE

Satisfactory reception at any given location depends on the ratio of signal to noise existing at that location, and, therefore, is dependent on factors pertaining to the receiving system, the transmission path, including the medium thru which transmission takes place and the transmitting system.

So far as the receiving system is concerned, satisfactory reception depends on the following:

- a. The sensitivity of the receiver.
- b. The selectivity of the receiver. The band width over which interfering noises may be received depends on this factor. The greater the selectivity, the larger the ratio of signal to noise obtainable.
- c. The design features of the receiving antenna for the elimination of man-made noise (from electrical machinery). For satisfactory reception of high frequency signals, the antenna should be located at a distance from a source of this type of interference and should be coupled to the receiver by properly balanced transmission lines.
- d. The directivity of the receiving antenna. The amount which the antenna will discriminate against undesired sources of interference approaching the antenna from directions other than that of the desired signal is an important factor in increasing the signal to noise ratio.
- e. Local noise. This is one of the most important limiting factors to satisfactory reception. The local noise due to atmospherics will vary with the frequency being used and with the geographical location, being at its worst on the lower frequencies and in the lower latitudes. It will also vary with daylight and darkness, and with local conditions, such as thunderstorms. Noise caused by electrical machinery will also vary over wide limits, depending on the location of the receiving antenna.
- f. The type of transmitter used. The signal to noise ratio required for satisfactory reception varies with the type of signal, being greater for Type A3 (telephone) and A2 (automatic printing) than for A1 or A2 (aural reception).
- g. The quality of communication desired. This depends on the number of repeat messages which may be sent, the necessity for accuracy in recording, etc.
- h. The nature of the response mechanism at the receiver, whether the reception is aural, visual or mechanical.

Because of the wide variations to be expected in all of the factors above, it is not possible to specify definite figures for the required signal-to-noise ratio for satisfactory service. The relative order of the ratio as indicated by experience, however, is as follows:

	<u>Average signal-to-Noise Ratio</u>
Aural Reception	2
Automatic Reception (tape recording)	5
Automatic Reception (printer)	20
Telephony (message service)	20

The above recommendations will be forwarded to our executive committee for approval, and if approved will be placed before the International Association of Chiefs of Police. It is our sincere hope that the recommendations be approved and that we may extend our communication services, intercity, intrastate and interstate, without impairing services to local mobile units.

A suggestion to limit associate memberships to a certain number, or a certain percentage of the active membership has been received here. This I think, is a good idea. We do not want to discourage memberships but we can not afford to allow the APCO to become "topheavy" either. We want our associate members to feel that it is a privilege to belong to our organization, rather than to think that anyone with \$2.50 can get in. Your comment will be appreciated.

Corrections in membership roster of May bulletin:

Burrows, Laurence W., Clara and Catharine Avenues, Affton, Mo., was listed as an ASSOCIATE MEMBER - he is an ACTIVE MEMBER.

Doran, Joseph L., 8635 South Grand Blvd., St. Louis, Mo., was listed as an ACTIVE MEMBER - he is an ASSOCIATE MEMBER.

In order that this bulletin be kept from being uninteresting due to its length, I am terminating same, and will run the high frequency transmitter "dope" in the July bulletin.

Very truly yours,

Everett E.H. Fisher

EVERETT E.H. FISHER,
President A.P.C.O.,
Supervisor, EGPC.