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The first five years of the International Advisory Committee for Long-Distance Telephone Communications

(Comité Consultatif International des
Communications téléphoniques à grande distance)

By

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Published by „Europäischer Fernsprehdienst, Zeitschrift für
den internationalen Nachrichtenverkehr“ No. 12/13 ★ Mai 1929



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Verlag Europäischer Fernsprehdienst G. m. b. H.

Berlin-Charlottenburg 9, Rognitzstrasse 8

1929

The first five years of the International Advisory Committee for Long-Distance Telephone Communications (Comité Consultatif International des Communications téléphoniques à grande distance)

By George Valensi, General Secretary of the C. C. I.

On April 28th, 1924, a meeting — the first of its kind — was held in the Musée Social 5, Las Casas-Street, Paris. At this meeting the Telephone Administrations of 19 countries were represented: Austria, Belgium, Czecho-Slovakia, Denmark, Finland, France, Germany, Great Britain, Holland, Hungary, Italy, Lettonia, Luxemburg, Norway, Poland, Spain, Sweden, Switzerland and Yugo-Slavia.

The programme of this meeting had been prepared in 1923 by a preliminary technical committee in the form of a list of questions relating to international long distance telephony; a provisional expression of view in respect of each question was suggested as simple basis of discussion.

What was the condition of long distance telephony at this time (1924)?

Before 1914 International relations were confined to communications between adjacent countries by means of overhead lines employing heavy-gauge conductors. For purposes of increasing the range of speech over these circuits, without exceeding a gauge of wire compatible with economical or constructional possibilities, practically the only means was the insertion of loading coils in these heavy-gauge overhead lines. This coil-loading, however, brought about many difficulties and inconveniences. Indeed, very soon coil-loading of overhead lines was abandoned. During the war, moreover, when the technique of the three-electrode valve was developed, the idea was quite naturally conceived (and in different quarters at the same time) of inserting telephone relays or repeater

valves in the overhead lines to increase the range of telephone speech. It was possible in this way to establish — at least temporarily — certain long-distance circuits. For example a telephone circuit was established between the headquarters of the Interallied forces and the Italian army (Chantilly-Turin); the German, Austrian and Turkish Armies were also able to telephone from Berlin to Constantinople. At the same time it was possible by this means to realise in the United States of America a transcontinental overhead line between New York and San Francisco.

It was not long after the war that attention was directed to facilitating the systematical development in Europe of international long distance telephony. The problem to be solved was not only to overcome the considerable technical difficulties, but also to establish the necessary co-operation between the different telephone administrations in the different European countries.

Necessity of Co-operation in the International Telephone Service

There is no doubt that the operation of the telephone service by its very nature places great demands on telephone engineering. While, for instance, a letter is a material object which may be passed from one Administration to another over any route and in any manner, without the knowledge of the addressee or sender and without prejudice to either (if a rapid service is provided for), a telephone communication has always to be prepared completely from one end

to the other, before the two correspondants are able to utilize it. Hence it is necessary that the telephone lines and installations in the different countries possess in common certain essential characteristics, so that, when connected, they can work together harmoniously. Moreover, by the unification of precise maintenance-instructions these lines and installations have to be kept in perfect working condition in the different countries at all times. Lastly, the telephone services in the different countries must have received in advance detailed instructions in order that all necessary switching operations may be made in the shortest possible time so as to connect two subscribers before they begin to speak and so as to set free all the apparatus used in the establishment of the communication as soon as the conversation is finished.

These particular demands placed on telephone technique are growing incessantly. Moreover (and this is the general law of progress), as the technique grows more perfect, the installations grant a greater output for the same capital invested, but they also become more complicated. We have only to compare a circuit of the former overhead type, two-wired, with poles and insulators, with a modern four-wire cable circuit, provided with Pupin coils, relays, echo suppressors, phase correctors, and we are convinced that the increase in the range of speech and the protection against damages made by the weather and against disturbances of all kinds have only been definitely acquired at the cost of a considerable complication of the installations.

Moreover, if the range of speech increases at the rate of k , the area of the territory within which conversation between any two subscribers becomes possible increases as k^2 . Assuming that there is a uniform telephone density over all this territory, the number of subscribers to be connected in a universal service increases equally as k^2 ; therefore the number of possible communications of two subscribers (calling and called parties) augments as k^4 . Each of these combinations represents a problem of transmission, a problem of maintenance, a problem of service for one or more Telephone Administrations; for, between each possible calling party and each possible called party all links of the telephone chain for their communication have to be established and maintained as soon as the

calling party demands it. Also, all necessary operations for the establishment and the breaking of this communication have to be pre-arranged, as well as the different methods for the application of tariffs and for the collection of fees.

For all these reasons the International long distance telephone service requires a very close and frequent contact between the Administrations of the interested territories.

With regard to the diversity of languages, to the types of material already installed, to the methods of working already in use, to the organizations conforming to the different national mentality, the problem of long distance telephony on the European continent appeared in 1924, in spite of the new technical improvements, a very difficult one to solve. Different solutions had been proposed, especially by the technical reviews, all of them tending towards the institution of a Central Office for direction and control, which office should assure the standardization of materials and methods of construction as well as the unification of methods of working, and it also should undertake to conduct the financial operations for successive extension operations.

But these solutions were wrong as they were inconsistent with the legitimate prejudice of the European States to keep under their own supremacy the working of the telephone service within the limits of their respective frontiers.

On the contrary, a "Comité Consultatif International", assembling together the engineers of the Telephone Administrations of the different countries with a view to examining systematically and in a regular way all technical and service questions in connection with long distance telephony, had the chance of being able to coordinate efficaciously all efforts without offending any national sovereignty.

But, it was said, since a minute and detailed regulation (even assuming that it was strictly adhered to) would itself be insufficient for a system as complicated as that of international telephony, because this regulation could not foresee all possible cases, you will limit yourself in such a matter to a few general recommendations by a "Comité Consultatif"? That will be something like a bet against heavy odds; it

is doomed to failure; it is just like sending off a ship without a captain, giving only an instruction containing a few short suggestions!

***The first full Conference of the C. C. I.
(Paris 1924)***

In spite of these dark predictions the "Comité Consultatif des communications téléphoniques" set to work in 1924. Its members from very different countries, in spite of the difficulty to express clearly their thoughts in a foreign language, were not long in coming to an understanding and in feeling that they did resemble one another on account of their studies and of their professional skill. Their solidarity as telephone engineers was very soon established; they understood that the hour had come to connect intimately together peoples who were unknown to each other but who had need of each other by means of a vast system of communications, on which ideas could be freely exchanged from one people to another in the active form of telephone conversations. From their first meeting in 1924 all the delegates of the Telephone Administrations recognized this as their high mission and they felt that this created a close solidarity which constituted a strong element of success: it became clear that plain general recommendations, formulated after thorough examination by a "Comité Consultatif International", would be quite sufficient for a satisfactory International telephone system, because the good will of all those in the different countries who were authorised to apply these recommendations was henceforth obtained and because, during the sessions of the committee, everybody would have been able to understand thoroughly the spirit and the justness of these recommendations.

The first care of the Congress of Paris 1924 was therefore to call into life and to organize by provisional arrangement a "Comité Consultatif International des Communications téléphoniques à grande distance (C. C. I.)", until the International Telegraph Conference which was to meet in 1925 gave a definite ruling on the subject. Moreover, this Congress made up a programme of immediate work (to be executed in 1924 and 1925) to satisfy the most urgent needs with regard to International telephony and also a programme for the least urgent work (to be executed in the five years from 1924 to 1929),

for the establishment of the first net work of underground telephone cables in Europe, to replace the then existing net*work of overhead lines, which did not comply any longer with the demands of modern International life, not only on account of the small number of circuits but also on account of the uncertainty of the communications established by overhead wires exposed to bad weather.

Here is the provisional organization settled in 1924 for the C. C. I.:

"The Comité Consultatif International des communications téléphoniques à grande distance" is entrusted with the task of preparing the complete organization of International telephony in Europe and, in the meantime, of securing the uniformity of views in respect of the International telephone service and to centralize all technical and statistical information concerning International telephony.

It is composed of delegations designated by the different Administrations, each delegation having one vote only; the Advisory Committee assembles when necessary and in principle once a year.

To obtain a more efficacious working of the Committee, a Permanent Commission assembles between two sessions of the Committee to prepare the coming meeting, and to study the results of the work of the last meeting. This Commission is composed of one member of each Administration of the countries most concerned, either because of the importance of their systems or because of their geographical situation as intermediate countries for through-traffic.

This Permanent Commission is assisted by the Permanent Secretary who centralizes the reports of studies, researches and technical work carried out in the laboratories of the Telephone Administrations. The Secretary, acting as intermediary, transmits the reports to the members of the Commission.

The method of working was as follows: At each meeting of the Permanent Commission, Sub-commissions were formed assembling together the engineers of the Telephone Administrations especially expert in the study of one kind of questions: construction of lines and maintenance of a good telephone transmission — or protection of telephone lines against interference from power systems, — or methods of working of telephone lines for commercial service etc. ... The proceedings of each Sub-Commission were assisted by official delegates of certain International syndicates interested directly or indirectly in the questions entrusted for study to the Sub-Commission concerned. These delegates

took part as experts having a deliberative vote only.

This division of labour guaranteed that each group of questions concerning International telephony was treated by an assembly of the most-qualified engineers, without regard to their countries or their organizations (official or private), before a "draft recommendation" was given. These draft-recommendations drawn up by the different Sub-Commissions of the Permanent Commission were then communicated officially to the Telephone Administrations and to the different Syndicates concerned, with a view to their ratification by the "Comité Consultatif International" during the next Plenary Assembly. It is only after this ratification that these "draft-recommendations" became regular "recommendations", and the Telephone Administrations were then invited to put them into operation as much as possible.

For the first year (1924—1925) the Permanent Commission established by the Congress of 1924 consisted of eleven members belonging respectively to the following nations: Austria, Belgium, Czecho-Slovakia, France, Germany, Great Britain, Holland, Italy, Sweden, Switzerland and Yugo-Slavia.

This Permanent Commission assembled repeatedly: 1^o) In Paris from November 24th to December 1st, 1924, for the preparation of the 2nd Plenary Assembly of the C. C. I. held in Paris from 22nd to 29th June, 1925, 2^o) also in Paris from November 26th to December 7th, 1925, and from 21st to 28th June, 1926, for the preparation of the 3rd Plenary Assembly of the C. C. I. held in Paris from November 29th to December 6th, 1926. At this period the Permanent Commission was abolished, and the new organization of the C. C. I. described below came into force.

The Congress of 1924 not only set up a provisional organization of the "Comité Consultatif International des communications téléphoniques" and composed the programmes for the work mentioned below, but also issued for the different lines of activity belonging to its domain with regard to long distance telephony, "recommendations" concerning certain important questions of which the following may be mentioned:

Transmission

Characteristics and establishment of repeater stations;

Combination and appropriation to telegraphy of international circuits;

Methods of ringing on overhead lines and on cables;

Abandonment of coil-loading of overhead lines provided with repeaters;

Practical transmission equivalent limits for cable circuits, overhead lines and mixed lines;

Tolerable values of cross-talk;

General rules about the specification of coil-loaded cables;

Homogeneousess of cable circuits between successive repeaters;

Magnetic stability of loading coils;

Transformers for the combining of two lines and terminal transformers.

Traffic and Working

Number of communications permissible for one circuit;

Variable tariffs corresponding to the different hours of the day;

Number of circuits to be operated by the same telephonist;

Subdivision of the 3 minutes unit;

Establishment of traffic statistics.

Maintenance and supervision of lines

Testing points on International circuits;

Exchange of references concerning the constitution of international circuits;

Periodical tests;

Measures to be taken for the rapid re-establishment of interrupted international communications.

Activity of the Permanent Commission of the C. C. I. from 1924 to 1926

Finally the Congress of 1924 entrusted the newly established Permanent Commission with the examination of the following five groups of questions:

1) Testing instruments necessary for supervision and maintenance of telephone installations. Efficiency of subscriber's set and transmission equivalent tests. Methods and instruments suitable for transmission tests or electrical tests on the lines. Selection of a transmission unit.

Specification for the supply of a long international cable and its accessories (loading coils, repeaters).

2) Determination of limits of tension and noise induced on telephone circuits by high power systems.

3) Establishment of variable tariffs corresponding to the different hours of the day. Different categories of facilities to be given to the public.

4) Preparation of telephone conversations by telegraph. Rapid methods for the working of international telephone circuits.

5) Rational bases for calculating international telephone tariffs. Determination of the minimum traffic guaranteed to intermediate countries.

These five groups of new questions were examined by the Permanent Commission having as basis the observations and suggestions made upon the different questions by the different Administrations belonging to the C. C. I. and by the American Telephone and Telegraph Company which has been consulted since 1925 on account of its great experience in long distance telephone matters. Though this company was not represented on the Committee, it was invited from november 1925 onwards to send semi-official representatives to the meetings of the C. C. I.

Moreover, the Permanent Commission thought fit to entrust the following supplementary questions for study from the 1st December 1924.

Selection of the uniform value to be given to real or apparent impedance (measured through transformers conveniently adapted) of international circuits;

Determination of maximum values for cross-talk measured between any two circuits on cable sections between two successive repeaters more than 100 km distant from each other;

Standardization of the graduation of the repeater amplification adjusting device;

Selection of a uniform frequency for harmonic selective signalling currents;

Selection of a uniform frequency for testing currents;

Publication of a nomenclature table of international European circuits;

Publication of statistics of international European telephone traffic;

Establishment of the map of international European telephone cables.

This vast programme has been completely dealt with in the course of the year 1924—1925, so that after the 2nd Full Conference (Paris, June 22nd to 29th, 1925) the C. C. I. was in possession of draft-recommendations drawn up by the Permanent Commission on all these questions.

After various modifications made in the course of this Full Conference these draft-recommendations gave rise to numerous official recommendations of the C. C. I., published in a pamphlet of 191 pages.

The Full Conference of Paris (June 1925) renewed the powers of the Permanent Commission and entrusted it with the task of continuing or

of taking up the study of the following questions collected in eight different groups:

First group

Is the importance of acoustic noises characterized by the energy brought into play or by the electric charge?

What is the reduction of tension or influence charge developed on wires or circuits belonging to a bunch of conductors, when the totality of the wires of this bunch is kept insulated or connected to earth?

What values should be attributed to the capacity coefficients?

Study of phenomena of magnetic induction caused by currents of industrial installations including an earthing and of electric railways in the case of short-circuit or with normal methods of working.

How can the disturbing effect of harmonics of continuous current electric traction be characterized? Examination of tolerable amplitude limits of these harmonics.

Measures to be taken in the case of parallelism between international telephone lines and continuous current railways.

Tolerable noise limits on overhead lines and underground lines.

Second group

Protection of cables against electrolysis and chemical actions.

Third group

Standardization of the graduation of the repeater amplification adjusting device.

Eventual modification of the provisional selection of a uniform frequency for testing currents.

Details of cross-talk testing methods.

Determination of methods for testing the complete subscriber's set from the local exchange.

Fourth group

Procedure and realization of connections between international four-wire circuits and instructions to prepare for their realization.

Essential clauses for a specification for the supply of a complete telephone cable between terminal exchanges, including repeater stations, if the cable is supplied by a single purveyor who is responsible for the good working of the whole installation.

Co-existence in the same cable of telephone and telegraph circuits with regard to frequency and intensity. Establishment of standard instructions and report sheets for supervision and maintenance of international long distance telephone circuits: localisation of faults, maintenance of good transmission.

Fifth group

International code of abbreviations for the preparation of conversations by telegraph.

General rules for preparing conversations by telegraph.

Sixth group

Examination of the measures to be taken to diminish the loss of time in international telephone conversations caused by the tardiness of the subscribers in replying to the trunk exchange, with a view to increasing the hourly output of international circuits.

Seventh group

Standard agreement between Administrations for the opening of international telephone relations.

Fixing of a fee to be paid by the caller for international telephone conversations in case of non-reply by the correspondent, in order to compensate for the immobilization of the circuits and the service calls.

Eighth group

Continuation of the study referring to calculation bases for international telephone tariffs.

Schedule of actual international tariffs for European telephone conversations.

Official consecration of the C.C.I. (International Telegraph Conference in Paris 1925)

The month of September 1925 is a memorable date in international telephone history. Up to that time the "Comité Consultatif International des communications téléphoniques" was in some ways a private and provisional organisation. In two years it had already accomplished some very important studies which each Administration unaided would have had much difficulty in completing successfully. Its recommendations had much facilitated the establishment, the joining and the working of the first underground long distance cables. The Administrations recognized that the establishment and setting into operation of the new International circuits had been considerably facilitated by the "recommendations" of the C.C.I. Where overhead lines had been substituted by these new cables, the public very soon felt a considerable improvement in respect of audibility and service acceleration. The C.C.I. thus proved in less than two years that it answered a real want.

It was in these circumstances that on September 1st, 1925, the International Telegraph Conference was opened at Paris, which had among other things to decide the final organization of International Telephony. Should the C.C.I. retain its provisional and non-official character? Would the International Telegraph Union become disinterested in telephone

questions if the telephone rules in the new revision of the International Service Regulations were suppressed? Would the International Office at Bern organize a centralized service for technical studies entrusted at the same time with questions of telephony, telegraphy and radio telegraphy? These different questions had been raised.

As it generally happens in similar cases the solution was obtained by taking the golden mean:

»The "Comité Consultatif International des Communications téléphoniques à grande distance" was officially recognized and attached to the International Telegraph Union, but remained free to choose its own "bureau", to establish its own internal regulations and to determine its own methods of working.

Moreover, a "Comité Consultatif International des Communications télégraphiques" was constituted and the German Administration was authorised to prepare its first meeting.

Finally, it was left to the discretion of the next International Wireless Conference to decide in 1927 in Washington whether it would be advisable to form a "Comité Consultatif International des Communications radioélectriques".

This solution had the merit of satisfying the conditions of division of labour which characterize modern life, and which increasing complications in technique necessitate. At the same time, this solution grouped all the organisations of telecommunication in to one single organisation (the International Telegraph Union). The International Advisory Committees were entrusted with the study of technical and service questions arising in their respective domains. The International Office at Bern was entrusted with the preparation of the official Universal Conferences which have to establish the imperative regulations as soon as experience has approved the measures recommended by the International Advisory Committees in the form of recommendations suggestions or wishes.

From the 1st of November, 1926, when the decisions of the International Telegraph Conference of Paris 1925 were put into operation, the "Comité Consultatif International des Communications téléphoniques à grande distance" enjoys a legal existence under the protection of the International Telegraph Union.

The 3rd Full Conference of the C. C. I. (Paris 1926)

In the course of its third Full conference held at Paris from November 29th to December 6th, 1926, it has moreover fixed its definite statute. Since December 1926 the following actual organization is in force:

The International Advisory Committee consists of three organs: the Full Conference, the Rapporteurs Commissions and the General Secretary.

The Full Conference normally meets once a year and forms an assembly of the official representatives of all Administrations who have stated that they wish to adhere to the C. C. I. The task of the Plenary Assembly is to accept, to reject or to modify the reports submitted by the special Rapporteurs Commissions who have thoroughly studied the questions set for study by the preceeding Plenary Assembly. When a question seems suitable for decision, the Plenary Assembly issues a „recommendation” after having taken a vote, for which the delegation of each country has one vote. The recommendations issued by the C. C. I. are considered as accepted if they obtain a majority of votes. As soon as the Plenary Assembly has dealt with the different questions submitted for the order of the day, it draws up a list of new questions to be set for study and it forms for each group of new questions a special Rapporteurs Commission.

The task of the Rapporteurs Commissions is to study thoroughly the new questions in order to submit to the next Plenary Assembly, for each question, a detailed report complete with draft recommendations. Each Rapporteurs Commission elects a chief Rapporteur who takes control of the work of the commission. Each commission makes use of a large documentation collected together by the General Secretary of the C. C. I. from all possible sources, not only from all European Telephone Administrations belonging to the Committee, but also from other Administrations or authorities competent in telephone matters, in Europe as well in America. These documents are sent in the first place to the Rapporteurs concerned. If the chief Rapporteur thinks it necessary to assemble the Rapporteurs Commission over which he presides, in

order to examine these documents, to compare the views of the different rapporteurs and to conclude with a report containing the draft recommendations, the Commission assembles at an appointed place. The report drawn up by this Rapporteurs Commission is then sent by the General Secretary to all Administrations belonging to the C. C. I., together with the documents utilized for the establishment of this report.

The General Secretary classifies the different reports presented by the several Rapporteurs Commissions and prepares the next Plenary Assembly by establishing an order of the day in accordance with the state of completion of the work of the several Rapporteurs Commissions. This Plenary Assembly takes place at a date and at a place agreed upon. Then the annual cycle of activity recommences.

Owing to this very supple organization the engineers expert in the different questions concerning long distance telephony can work, in their respective specialities, not only for the Administration of their own country, but also for all the countries. This is an honour highly appreciated by them, as may be judged by the remarkable activity and zeal with which they submit their valuable annual contributions to the meetings of the C. C. I. Moreover, there is consequently no doubt that the questions are thoroughly studied before a decision is made.

This is certainly a very important point, for the authority of an International organism may only be recognized, if all guaranties are offered that, before giving a decision on any subject, this organism has made extensive inquiries at all competent places and has thoroughly examined the information gathered from all competent places and from all possible sources.

On the other hand, by summing up every year the state of technical questions referring to long distance telephony, the C. C. I. fulfils an important didactic part, and all who are interested in these questions obtain useful informations from the official reports of the Plenary Assemblies. Moreover, the C. C. I., by forming every year new questions to be studied, gives precious indications to the laboratories of the Telephone Administrations and to those of the industry constructing telephone material, as to the direction which new researches should take.

Collaboration of the C.C.I. with other International organisms

Telephone questions do not only interest the Telephone Administrations or the constructors of telephone material, but also other services sometimes very different from telephone service: telegraphy, wireless telegraphy, transport of electric energy or lighting, electric railways etc.

From the beginning of this activity the "Comité Consultatif International des Communications téléphoniques à grande distance" has entered into close union with, and has organized a regular technical collaboration with numerous international organisms. Consequently, since 1925, the questions concerning the protection of telephone lines against disturbances by power systems have been examined by a Sub-Commission of the C.C.I., wherein the International Railway Union and the International Conference of the great Power Plants were represented. Also the International Electrotechnical Commission was kept well informed as to the activity of this Sub-Commission, which established a rough draft of "Instructions concerning protective measures for telephone lines against interference by heavy current or high tension power plants". These Instructions were published in 1926 in the form of a pamphlet of 82 pages.

These "Instructions" were of great value for the establishment of schemes for new electric lines (or for new telephone lines); they avoid the harmful bringing together of high and low tension lines illustrating the proverb: Prevention is better than cure.

The question of the co-existence of telephone lines and energy nets or of electric traction etc. is as complex as it is important. In the course of the work of the above mentioned Sub-Commission it was found that for the solution of certain points in connection with this co-existence the results tests judiciously carried out would be necessary. Consequently, an International mixed Commission for tests concerning the protection of telephone lines was constituted in February 1927 at Bern. It included, besides the official delegates of certain Telephone Administrations, official representatives of the International Railway Union, the International Conference of the great Power Plants, the International Electrotechnical Commission and the International Union of producers and distributors of electri-

city. All organisms interested in the co-existence of low and high tension lines were thus represented by experts who worked together to establish a programme of experiences, and further to validate the results of these experiences and to form an exact documentation which would serve as a basis for the examination of all undecided questions in connection with the protection of telephone lines.

In this way the questions are shifted to technical ground where an understanding is always possible, thanks to that sovereign and impartial judge, the testing instrument, and thus in future conflicts not only troublesome but above all costly can be avoided which unfortunately have occurred too often in the past between telephone operators and power current electricians.

Here are some other examples of collaboration between the "Comité Consultatif International des Communications téléphoniques" and several international organisms:

Since 1925 the study of questions concerning the relay of broadcast transmissions on international telephone circuits has been undertaken and pursued in co-operation with the International Broadcasting Union.

Since 1925 the C.C.I. has been working with the International Electrotechnical Commission, for the selection of a transmission-unit for the establishment of an International Telephone Vocabulary and for the adoption of graphic symbols representing in the diagrams the different details of the telephone equipment.

The C.C.I. has taken part since the foundation in the "Comité d'Entente", established by the Electrotechnical Commission, in 1927, for the co-ordination of the efforts of the different international organisms occupied with questions referring to electricity. The "Comité d'Entente" is composed of representatives of the offices of the said organisms, who thus exchange at regular periods (as a rule every year) all useful information as to the dates arranged for the meetings of their respective organisms and as to the programmes for these meetings.

Since 1926 the Telephone C.C.I. examines together with the Telegraph C.C.I. the questions concerning both the Telephone and the Telegraph service: telegraphy and telephony on the same conductors simultaneously, co-existence of telegraphy and telephony in the same cable. In

the course of 1929 the question of utilizing telephone lines for picture-transmission will add to the programme of work entrusted to a mixed Commission of telephone and telegraph experts.

Since 1927 the C. C. I. has been in collaboration with the "Union Internationale des Tramways, des Chemins de fer d'intérêt local et des Transports publics automobiles" and also with the principal national associations of gas and water experts and the important national associations of electro-engineers, to examine the questions relating to electrolytic corrosion of underground canalizations.

Since 1925 the C. C. I. has been represented at the congresses of the International Chamber of Commerce and at the meetings of the International Telephone Commission constituted by this Chamber, to collect and to classify coherently the demands of the users of international telephone installations as far as these users belong to the commercial world.

Finally, even before the first meeting of the "Comité Consultatif International Technique des Communications Radioélectriques" — constituted by the International Wireless Conference of Washington, 1927 —, a high official of the Telegraph Administration of Holland (entrusted with the organization of the first meeting of this new Committee) was invited to participate in the work of a Rapporteurs Commission of the "Comité Consultatif des Communications Téléphoniques" which examines the questions concerning the co-ordination of telephony and radiotelephony. This is the beginning of a collaboration that will prove very useful in the near future, taking into consideration the astonishing development of trans-oceanic telephony during the last few years by means of radiotelephone circuits combining cable sections and radiophonic communications.

Activities of the Rapporteurs Commissions in 1926 and 1927

After having sanctioned the work accomplished by the Permanent Commission during 1925 and 1926 and after having established the statutes of the C. C. I. in accordance with the preceding indications, the Plenary Assembly of the C. C. I. convoked at Paris in 1926 has constituted eight Rapporteurs Commissions (replacing the Permanent Commission henceforth abolished), and has

entrusted them respectively with the following eight groups of questions:

First Rapporteurs Commission

Questions concerning the protection of telephone lines against interference from power systems

Method of characterizing the disturbing effects of engine or instrument harmonics of railways operating with continuous current. Tolerable amplitude limits of these harmonics. Measures to be taken in case of parallelism between international telephone lines and continuous current railways.

Tolerable limits for noises induced on overhead and cable circuits.

Influence of earthing the neutral point of power systems on the importance of troubles caused in the working of adjacent telephone lines.

Importance of good rail conductivity of electric railways, operating with alternate or polyphase current, on the induction effects on parallel telephone lines.

Second Rapporteurs Commission

Questions concerning the protection of telephone cables against corrosion by electrolysis or chemical actions.

Third Rapporteurs Commission

New transmission questions

Tolerable limits of transmission loss caused by instruments connected in series or in derivation on international telephone channels of communication.

General conditions with regard to overhead lines utilized for International communications.

General conditions concerning cable sections inserted in these overhead lines, with regard to loss of efficiency and impedance irregularities.

Possibility of unifying the long distance telephone systems.

Fourth Rapporteurs Commission

Questions relating to telephone transmission reference systems

Definition and construction of a master telephone transmission reference system.

Different modes for an acceptable realization of (secondary) reference systems and methods of comparison with the master reference system.

Realization of working standards corresponding to the different types of commercial telephone communications in the different countries, and adjusting of these working standards by comparison with the master system.

Definition and determination of the "experimental practice (working) coefficient" for the different groups of operating staff carrying out speech and audition tests and working in the phonometer laboratories of the different Administrations.

Physical or physiological experiments to be carried out when recruiting the staff for the phonometer laboratories, to make sure that they possess quick ear and good sight.

Definition and determination of the average correction factors, corresponding to the different languages, in order to allow the comparison of the results of intelligibility tests carried out in the different countries, taking into account the language used.

Fifth Rapporteurs Commission

Questions concerning international telephone accounts

Standard type for the arrangements to be made between the offices collecting the charges and the subscribers, for the establishment of fixed time calls.

Simplification of the methods in connection with the comparison of the number of conversations held every day between the international terminal Offices.

Possibility (with a view to favouring the development of international telephony) of doing away with the obligation of guaranteeing to intermediate countries a certain minimum traffic, if a new through line is in question.

Possibility of simplifying the international accounts by generalizing the method adopted for liminary relations.

Sixth Rapporteurs Commission

Several service questions

General rules for determination of the channels of communication to be utilized normally for the relations between two countries.

Uniform method of designating the circuits in all countries.

Special arrangements concerning in and out calls in connection with market-, stock- or other exchanges.

Determination of the coefficient whereby, in calculating international message fees, the length of the submarine sections must be multiplied, in order to determine the equivalent length of underground cable.

Seventh Rapporteurs Commission.

Several service and traffic questions

Unification of the method of handling "avis d'appel"-calls.

Arrangements and tariffs for international fixed time calls in international service.

Permissibility in international Service of information demands without conversation to follow.

A Rule to be followed for the attribution of consecutive numbers to the successive conversations on international communications.

Standardization of the different procedures and practical operations effectively utilized in the service of the different countries.

Eighth Rapporteurs Commission

Rules for leasing international circuits for private use

These eight Rapporteurs Commissions succeeded in going through this vast programme in the course of the year 1926/1927. Thus the Fourth Plenary Assembly after its meeting — at Como, in September 1927 — was in a position to issue a recommendation on each of the questions enumerated above.

At the 3rd Plenary Assembly (Paris, December 1926) an exhibition of testing instruments for long distance telephony and of accessories of trunk telephone cables had been organized in Paris, 27 Guyot Street, in the building destined to be the automatic telephone exchange "Carnot". Fifteenhundred square metres were covered with instruments of different types completed during the last two years. Each instrument represented in general a new invention. It was clearly shown by this exhibition that a new technique had arisen and had been developed with an impressive vivacity.

The 4th Plenary Assembly of the C.C.I. (Como 1927)

It was in September 1927 that the C.C.I. assembled at Como, the native town of Volta, to commemorate the centenary of this illustrious physician. A few days later, this General Assembly was followed by an interesting International Congress of telegraph, telephone and radio engineers, convoked for the first time since 1910. Finally, at Como in Villa Olmo (on the shores of lake Como), a great retrospective exposition had been opened some time ago, concerning numerous applications of electricity (and especially electric tele-communications).

The Plenary Assembly of the C. C. I. at Como 1927 renewed the powers of the 1st and 2nd Rapporteurs Commissions, allowing them to retain their respective programmes, which had been fixed in 1926. Moreover, it entrusted the 3rd, 6th and 7th Report Commissions with the study of the following new questions:

Third Rapporteurs Commission

Transmission and maintenance questions

Possibility of the unification of long distance telephone systems.

Limits imposed by transient phenomena and methods by which these limits may be reduced.

Method for cross-talk measuring destined to take the place of voice tests.

Draft of fresh specifications and revision of existing specifications concerning repeater stations:

- a) Terminal apparatus and protective devices,
- b) two-wire and four-wire repeaters,
- c) current supply installations,
- d) signalling devices,
- e) balancing networks for two-wire repeaters,
- f) echo suppressors.

Revision of the standard-type tables of the C. C. I., for recording the recent progresses in cable manufacture (particularly with respect to the numerical data characterizing the regularity of fabrication).

Drawing up of a list of the usual phrases to be utilized in case of disturbance, for testing purposes and in the repeater stations for the maintenance of international communications.

Sixth Rapporteurs Commission

Traffic and service questions

Intervention of exchange offices for collaboration in case of defective speech transmission on international telephone communications.

General rules to regulate the handling of traffic on international telephone communications where several ways containing one or more circuits are at disposal, in order to obtain in each case a good speech transmission, to equalize as much as possible the delay on calls in both directions of the same relation, and to allow the instruction of operators very exactly on the handling of calls.

Standardization of spelling systems and establishment of a definitive phraseology to be used for the service of international circuits.

Conditions allowing the reduction of the chargeable call time in case of feeble intelligibility.

Several details concerning the handling of pre-advice calls, in order to allow the designation of several persons at the same subscriber's station or of several subscriber's stations for the same person.

Possibility for a caller after placing an ordinary international toll call to have this call shifted to another subscriber, provided the latter belongs to same local exchange.

Recommendation to exchange offices to give notice from office to office directly if subscriber's station is found to be faulty, during an international conversation thus enabling quick testing and repairing of the said station.

General rules for the establishment of detailed telephone statistics.

Publishing of lists for international telephone service users, containing the relations opened to the public, the facilities offered in these relations and also the tariffs for conversations exchanged by these relations.

Model form for the establishment of a Nomenclature chart of international telephone circuits, in order to facilitate its use by the services.

Recommendation to the Administrations to admit to the international Service, when telephone relations are extended, all local systems belonging to a certain geographical area, instead of restricting themselves to certain determined systems.

Possibility of admitting collective calls ("conferences") on international circuits.

Seventh Rapporteurs Commission

Unification of rules concerning stock-exchange calls.

Considering the high percentage of stock-exchange calls on International circuits, at busy hours, this question was of very great interest. To treat it thoroughly, the 7th Rapporteurs Commission visited the stock- and commercial exchanges in the principal European towns. The International Chamber of Commerce willingly made all efforts to procure for this Commission free access to the syndicates of exchange-merchants, bill- and stock-brokers etc. Thus for the first time in International life, systematical relations were set up between the Telephone Administrations and an important part of the commercial world.

The European master telephone transmission reference system

The Plenary Assembly of Como 1927 also made the 4th Rapporteurs Commission of a permanent nature and entrusted it with the solution of all questions concerning the organization and the activity of the European master telephone transmission reference system laboratory. This system, according to its French name (Système Fondamental Européen de Référence pour la Transmission Téléphonique) briefly designated as SFERT, serves as a basis for the comparison of the working standards already utilized or to be utilized in future by the different Telephone Administrations for the verification of the transmission characteristics of subscriber's sets. This is, in some ways, the standard international metre, from the point of view of long distance telephone transmission. The Plenary Assembly at Como 1927 decided that two identical master reference systems were to be installed at New York and at Paris, for the comparison of American working standards with those of Europe. The American Telephone and Telegraph Co. constructed these instruments and offered to the C. C. I. those to be utilized in Europe. These instruments have been installed

in the course of the first six months of 1928 in the localities offered to the C. C. I. by the French Government; they are situated at the Conservatory of Arts and Professions, 292 St. Martin Street, in Paris.

The laboratory of the European master telephone transmission reference system was officially inaugurated on June 16th, 1928.

The 5th Plenary Assembly of the C. C. I. (Paris 1928)

In 1928 the 5th Plenary Assembly of the "Comité Consultatif des Communications téléphoniques à grande distance" was held at Paris. It succeeded, in the course of one week, in deciding all the questions set for study by the preceeding Plenary Assembly of Como. The report of the 5th Plenary Assembly fills a volume of 464 pages in quarto. Such a result proves the efficaciousness of the actual organization of the C. C. I. and the considerable activity of the Rapporteurs Commissions. The 5th Plenary Assembly of the C. C. I. (Paris, June 1928) renewed the powers of the 1st and 2nd Rapporteurs Commissions and entrusted them with the task of continuing the study of the same questions. The 1st Rapporteurs Commission had to take into consideration the new results of tests made by the International Mixed Commission with regard to line protection. The 2nd Rapporteurs Commission had to take into consideration the criticism made by the International Tramway Union of the general draft recommendations for protection of cables against corrosion, brought out at Como, 1927.

Moreover, the 5th Plenary Assembly entrusted the 3rd, 4th, 5th, 6th and 8th Rapporteurs-Commissions with the study of the following new questions:

Third Rapporteurs Commission

Questions concerning transmission and maintenance

Conditions under which the transient phenomena on International trunk circuits with repeaters become harmful, and permissible asymmetry limits of these circuits.

Measures for compensating on very long International telephone circuits (for instance those with more than 12 repeaters) the timely transmission equivalent variations.

Methods of determining the stability of two-wire and four-wire circuits with repeaters.

Rules for applying capacity unbalance values relative to manufacturing lengths of 230 metres to such relative to different lengths.

Permissible maximum limit for the resistance unbalance of any phantom circuit.

Permissible limit for the inductance unbalance, the resistance unbalance and the capacity unbalance to earth of telephone cable loading coils.

Results of tests obtained with spiralled two-wire cables for trunk lines.

Drafting of the essential clauses for the specification for the supply of multiple high frequency carrier current telephone installations, and for the supply of high frequency repeater stations.

Examination of anti-induction methods on telephone lines (transposition or crossing) to reduce crosstalk, not only with regard to voice frequencies but also with regard to carrier high frequencies.

Examination of a special insertion of loading coils in unavoidable cable sections (particularly the underground pieces) in high frequency overhead circuits.

Essential clauses for the specification for the supply of repeaters and special correcting devices for the relay of broadcast transmission.

Electrical conditions to be considered as a criterion for the good condition of lines for the relay of broadcast transmission.

Instructions to be given respectively to broadcast organizations, on the one hand, and to Telephone Administration terminal offices or repeater stations, on the other hand, for the setting up of a connection to be utilized for broadcast transmission, and for the re-establishment of this connection in its normal working conditions.

Specification of special arrangements for International collective calls ("conférences"):

a) when the grouped subscribers belong to two systems only;

b) when the grouped subscribers belong to more than two systems.

Technical conditions for adapting telephone lines to picture transmission.

Definition and tolerable noise limit at International circuit terminals.

Fourth Rapporteurs Commission

Different questions concerning the master telephone transmission reference system, the working reference system and the working standards

Connection between syllable- and word-intelligibility during a call, particularly on very long telephone circuits.

Description and results of the different methods for testing the subscriber's sets and loops in service, in order to see whether the subscriber's sets and loops satisfy the conditions required for International service.

Fifth Rapporteurs Commission

Questions concerning the co-ordination of Telephony and Radiotelephony

To what extent a radiotelephonic communication connected to the International telephone system may be allowed to differ, totally or partially, from the normals fixed by the C. C. I. for International metallic circuits:

a) with regard to the intensity of sound and to the band of transmitted frequencies,

b) with regard to interfering noises?

Will such a radiotelephonic communication probably impose for the extension circuits more rigid conditions than those specified by the C. C. I. for lines extending an International metallic circuit?

Questions concerning switching devices controlled by voice:

A. Under what conditions is it necessary or desirable to utilize on radiotelephonic communications a switching device controlled by the voice, especially in the case of:

a) Utilization of the same radio-frequency for both ways;

b) Utilization of low or very high radio-frequencies.

B. Will the necessity of resorting to a switching device controlled by the voice influence the conditions or limits given in answering the two above questions; if so, to what extent?

Sixth Rapporteurs Commission

Traffic and Service Questions

Priority to be granted to an aircraft pilot in the case of a forced landing to telephone to his aeronautical home station.

Conditions for regulations relating to the metering of the duration of International calls.

Formula for determining the number of circuits necessary for the handling of a certain traffic at the different hours of the day, in order to keep the delay on a call always under a certain limit.

General rules for the service at International trunk exchanges, with regard to writing work, calculation of charges etc. done by telephone operators.

Measures to be taken to prevent, in the case of important toll line faults, the traffic between the countries connected by this line suffering serious and lasting injury. Beforehand preparation of subsidiary circuits and assessing of tariffs to be charged by the different Administrations concerned in each case, when a subsidiary circuit is employed.

Termes of sale to the public for telephone directories ("annuaires téléphoniques").

Standardization of the method of pronunciation of subscriber's numbers in the different countries.

Rules to be followed for nullifying toll tickets for pre-advice calls and "avis d'appel"-calls, if no conversation is accomplished.

Possibility of amalgamating in to a single service préadvice calls and person to person calls, the latter having been introduced in Europe since the opening of the relations with America.

May a subscriber be allowed to shift an International fixed time call to a number other than that originally indicated?

Preliminary serial transmission of booked calls, in order to ameliorate the utilization of International circuits.

Possibility of increasing the maximum duration of calls fixed by International regulations.

Collaboration between the chiefs of important terminal offices for the control of the International telephone service by means of observation desks, in order to augment the time of utilization of International circuits.

Results of tests of the new method of comparing the number of conversations between International terminal offices.

Results of the new investigations as to the proper means of diminishing on International telephone communications the loss of time caused by the tardiness of the subscriber in replying to the trunk office call.

Seventh Rapporteurs Commission

Questions of tariff

Possibility of granting to the press a reduction of International telephone tariffs.

Possibility of levying an accessory charge for making use of a public telephone cabin at the departure station or incoming station of an International call.

Revision of the tariff for leasing International telephone circuits, at least for one year, for private use.

Permission of long duration fixed time calls.

Basis for tariff calculation with regard to the utilization of circuits especially established for music transmission.

Service conditions and tariffs for circuits to be utilized for picture transmission.

Revision of the tariff for conversations between local systems, where the bee-line distance does not surpass 200 kilometres.

Eighth Rapporteurs Commission

Questions having both a technical and a service nature

1) Conditions which cord circuit repeater desks should satisfy with regard to the facilities of repeater adjustment by the telephone operator and with regard to observation and taxation of calls.

2) Conditions which foreign call operator's positions should satisfy with regard to the form of the operator's working instruments (use of head-phone and breastplate transmitters) and to the transmission loss caused by the operator's over-hearing.

3) General conditions which new stock-exchange installations, should satisfy with regard to the working of International circuits.

All these questions have to be treated by the 6th Plenary Assembly of the "Comité Consultatif International des Communications téléphoniques", to be held at Berlin from 3rd to 10th of June, 1929.

To finish this general view of the C. C. I.'s activity during the first five years of its existence, it may be interesting to enumerate the Administrations belonging to the C. C. I. giving for each of them the year of their adhesion:

Albania — 1928	Germany — 1924
Austria — 1924	Great Britain — 1924
Belgium — 1924	Holland — 1924
Czecho-Slovakia — 1924	Hungary — 1924
Danzig Free City — 1928	Italy — 1924
Denmark — 1924	Lettonia — 1924
Esthonia — 1925	Lithuania — 1925
Finland — 1924	Luxemburg — 1924
France — 1924	Mozambique — 1926
	Norway — 1924
	Poland — 1924

Portugal — 1926

Roumania — 1926

Spain — 1924

Sweden — 1924

Switzerland — 1924

Union of Soviet

Socialist Republics — 1926

Yugo-Slavia — 1924.

Thanks to the activity of the C. C. I. and of the above mentioned Administrations belonging to it, a vast telephone trunk cable system has been established in Europe. More and more it will extend and branch off. It is already connected by radiò links (and soon will be by submarine telephone cables) to similar systems existing or under construction on the American continents. The Telephone Administrations and Telephone Companies as well as the constructors of telephone material of the different countries may be proud of having participated in the rapid development of the new Universal Telephone System. It certainly represents a master-piece of modern life and at the same time one of the greatest services rendered to mankind.

