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THE INTERNATIONAL TELEPHONE CONSULTATIVE COMMITTEE  
(C.C.I.F.)

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# XVIIIth PLENARY ASSEMBLY

GENEVA, 3-14 DECEMBER 1956

---

## VOLUME I bis of the Green Book

List of Delegates.

Minutes of the Meetings of the XVIIIth Plenary Assembly.

Modifications:

- to Volume I of the *Green Book* (Recommendations for letter and graphical symbols)
- to Volume V of the *Green Book* (Signalling and Switching)
- to Volume VI of the *Green Book* (Operating and Tariffs).

Published by the International Telecommunication Union  
Geneva, 1957

THE INTERNATIONAL TELEPHONE CONSULTATIVE COMMITTEE  
(C.C.I.F.)

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**LIST OF DELEGATES**  
**TO THE XVIIIth PLENARY ASSEMBLY OF THE C.C.I.F.**  
**(GENEVA, DECEMBER 1956)**

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*Federal German Republic* (Administration of Posts and Telecommunications):

Mr. H. BORNEMANN, Ministerial Counsellor, Head of Delegation.  
Mr. W. GRUNEFELDT, Ministerial Counsellor.  
Mr. K. WENZLAU, Ministerial Counsellor.  
Mr. W. ZERBEL, Ministerial Counsellor, Head of Division at the F.T.Z.

*Australia* (Postmaster General's Department):

Mr. L.M. HARRIS, Sectional Engineer, Head of Delegation.  
Mr. F.L.C. TAYLOR, Sectional Engineer.

*Austria* (Administration of Posts, Telegraphs and Telephones):

Mr. N. WENINGER, Head of Division, Head of Delegation.  
Mr. M. KRASSER, Ministerial Counsellor.  
Mr. F. HENNEBERG, Ministerial Counsellor.

*Belgium* (Department of Telegraphs and Telephones):

Mr. R. HAEMERS, Director General of the Department of Telegraphs and Telephones,  
Head of Delegation.  
M. H.J. CLAEYS, Chief Engineer, Director of Administration.  
Mr. M. LAMBIOTTE, Chief Engineer, Director of Administration.  
Mr. L. DEBROUX, Chief Engineer, Director of Administration.

*Belorussian S.S.R.* (Ministry of Posts and Telecommunications):

Mr. P. AFANASSIEV, Minister of Posts and Telecommunications, Head of Delegation.  
Mrs. R. PETROVA, Engineer.

*Bulgaria* (People's Republic of) (Ministry of Posts, Telegraphs and Telephones):

Mr. V. HARIZANOV, Chief Engineer, Telegraph and Telephone Division, Head of Delegation.  
Mr. N. BELOPITOV, Director, Telecommunication Research Institute.

*Canada* (Telephone Association of Canada):

Mr. G.A. CALDWELL, General Engineer, Bell Telephone Company of Canada, Head of Delegation.

*Chile* (Chile Telephone Company):

Mr. L.C. POCOCK, Senior Engineer, Head of Delegation.  
Mr. D. SIBBALD, Engineer.

*China* (Ministry of Communications):

Mr. SHUJEN CHEN, Deputy Director General of Telecommunications, Head of Delegation.  
Mr. Paul S.T. CHANG, Engineer.  
Mr. Argon C.T. KUAN, Counsellor.

*Cuba* (Cuban Telephone Company):

Mr. VAN HASSELT, Senior Engineer, Head of Delegation.  
Dr. J. KRUTHOF, Senior Engineer.  
Mr. T.R. GUBBINS, Engineer.

*Denmark* (Telephone Administration):

Mr. GUNNAR PEDERSEN, Engineer-in-Chief, Head of Delegation.  
Mr. H. LAURSEN, Chief of Technical Telephone and Telegraph Section.  
Mr. A. INGEMANN PEDERSEN, Assistant Chief of Telecommunication Exploitation.  
Mr. H.L. HALSTRØM, Assistant Chief Engineer, Copenhagen Telephone Company.

*Spain* (Compañía Telefónica Nacional de España):

Mr. E. DEL RIEGO, Head International Service, Head of Delegation.  
Mr. J.M. REBOLLO, Senior Assistant Engineer.

*United States* (American Telephone and Telegraph Company):

Mr. C.M. MAPES, Assistant Chief Engineer, Head of Delegation.  
Mr. W.E. BLOECKER, Toll Transmission Engineer.

*France* (Ministry of Posts, Telegraphs and Telephones):

Mr. ROUVIERE, Director-General of Telecommunications, Head of Delegation.  
Mr. MARZIN, Director, Centre national d'études des télécommunications.  
Mr. CHOVET, General Engineer, Direction générale des télécommunications.  
Mr. COLLET, General Engineer, C.N.E.T.  
Mr. CROZE, General Engineer, Direction générale des télécommunications.  
Mr. DREVET, Assistant Director, Direction générale des télécommunications.  
Mr. LEPRINCE-RINGUET, Director, Service des lignes à grande distance.  
Mr. LETELLIER, General Engineer, C.N.E.T.  
Mr. SUEUR, Chief Engineer, C.N.E.T.  
Mr. TERRAS, Administrative Officer, Direction générale des télécommunications.

*(Compagnie Radio-Orient):*

Mr. A. ROPER.

*India (Ministry of Communications):*

Mr. B.R. BATRA, Chief Engineer, Posts and Telegraphs, Head of Delegation.

Mr. P.M. AGERWALA, General Manager, Telephones.

Mr. H. MUKERJEE, Chief Engineer, Overseas Communications, India.

Mr. G.U. MENON, Deputy Chief Engineer (Maintenance), Posts and Telegraphs.

*Ireland (Department of Posts and Telegraphs):*

Mr. S. O'DROMA, Chief of Telecommunications Branch, Head of Delegation.

Mr. T. P. SHERIDAN, Technical Expert.

*Italy (Azienda di Stato per i Servizi Telefonici):*

Mr. V. GORI, Director, P.T.T. Institute, Head of Delegation.

Mr. F. NICOTERA, Senior Inspector, Engineering.

Mr. C. ALBANESE, Chairman of Study Group 11.

Mr. M. FARIELLO, Senior Inspector, Engineering.

Mr. E. SACCO, Senior Inspector, Administration.

Mr. F. LUCANTONIO, Senior Inspector, Engineering.

Mr. G. VERLICCHI, Senior Inspector, Administration.

Mr. A. SARACO, Technical Inspector.

Mr. G. BENASSI, Technical official.

Mr. E. CIAI, Technical official.

Mr. A. CARUSO, Secretary.

*Japan (Ministry of Postal services):*

Mr. H. MATSUDA, Controller of Telecommunications, Head of Delegation.

*(Permanent Delegation to the United Nations):*

Mr. SATO, Assistant Permanent Delegate of Japan to the International Organizations, Geneva.

*(Kokusai Denshin Denwa Co. Ltd):*

Mr. SHIGETAKA YAMAGISHI, Director of the Commercial Department.

Mr. T. SAITO, Staff.

Mr. S. OSHIMA, Staff Engineer.

*(Nippon Telegraph and Telephone Public Corporation):*

Mr. K. WAKE, Director of the Supply Bureau.

Mr. K. OGATA, Staff Engineer.

*Lebanon (Telephone Administration):*

Mr. N. KAYATA, Head of Delegation.

*Liberia (Post Office Department):*

Mr. TAYLOR E. MAJOR, Chief Telephone Engineer and Assistant Commissioner of Communications, Head of Delegation.



*Luxembourg* (P.T.T. Administration):

Mr. E. RAUS, Director-General, Head of Delegation.  
Mr. C. KNAF, Telecommunication Section.

*Mexico* (Teléfonos de México):

Mr. F. MARKMAN, Engineer, Head of Delegation.

*Norway* (Telecommunications Department):

Mr. LEIF LARSEN, Director of Traffic, Head of Delegation.  
Mr. J. RINGSTAD, Chief Engineer.

*Pakistan* (Pakistan Post and Telegraphs):

Mr. N. MIRZA, Head of Delegation.

*Netherlands* (P.T.T. Administration):

Mr. J. D. H. VAN DER TOORN, Director General, Head of Delegation.  
Mr. A. J. EHNLE, Director General Affairs and Radio.  
Prof. G. H. BAST, Director Telegraph and Telephones.  
Mr. R. P. VAN DIJK, Inspector.  
Mr. J. T. VISSER, Senior Engineer.

*Poland* (Ministry of Posts and Telecommunications):

Mr. Z. SZPIGLER, Vice-Minister P.T.T., Head of Delegation.  
Mr. S. KUHN, Professor, Assistant Head of Delegation.  
Mr. J. WOJCIKIEWICZ, Vice-Director, Telecommunication Institute.  
Mr. K. SZYMANSKI, Head of Section.  
Mr. J. KARAS, Senior Inspector.

*Portugal* (P.T.T. Administration):

Mr. J. BARROS, Engineer, Head of Delegation.  
Mr. CRUZ FILIPE, Engineer.  
Mr. MENDES BARBOSA, Engineer, Counsellor, Portuguese Marconi Radio Company.  
Mr. J. W. WHEELER, Engineer (The Anglo-Portuguese Telephone Co. Ltd.).

*Roumanian People's Republic* (Ministry of Posts and Telecommunications):

Mr. P. POSTELNICU, Engineer, Head of Delegation.  
Mr. M. GRIGORE, Engineer.  
Mr. I. UIDILA, Engineer.

*United Kingdom of Great Britain and Northern Ireland* (General Post Office):

Mr. D. A. BARRON, Assistant Engineer-in-Chief, Head of Delegation.  
Mr. R. H. FRANKLIN, Staff Engineer, Engineering Department.  
Mr. C. J. GILL, Principal, External Telecommunications Executive.  
Mr. R. MURRAY, Senior Executive Officer, Accountant General's Department.

*Sweden* (Royal Board of Swedish Telecommunications):

Mr. S. NORDSTRÖM, Chief Engineer, Head of Delegation.  
Mr. G. SVEDHEM, Director, Operation.

*Switzerland* (P.T.T. Administration):

Mr. A. WETTSTEIN, Director, Telegraphs and Telephones, Head of Delegation.  
Mr. A. LANGENBERGER, Head of Telegraph and Telephone Services.  
Mr. C. LANCOUD, Head of Lines Services.  
Mr. F. LOCHER, Assistant Engineer, Telegraph and Telephone Division.  
Mr. J. VALLOTON, Engineer, Telegraph and Telephone Division.  
Mr. W. FURRER, Professor, Head of Research Laboratory.

*Czechoslovakia* (Ministry of Posts and Telecommunications):

Mr. F. KROUTL, Chief Engineer, Head of Delegation.  
Mr. J. BUSAK, Senior Legal Adviser.

*Turkey* (P.T.T. Administration):

Mr. V. BASAR, Senior Engineer, Telegraph and Telephone Department, Ankara,  
Head of Delegation.

*Ukrainian S.S.R.* (P.T.T. Administration):

Mr. N. PASETCHNIK, Director, Telecommunication Research Institute, Kiev, Head  
of Delegation.  
Mr. E. ZAÏONTCHKOVSKI, Engineer.

*U.S.S.R.* (Ministry of Postal and Electrical Communications):

Mr. J. KLOKOV, Head of Delegation.  
Mr. P. FROLOV, Engineer.  
Mr. S. ZARINE, Engineer.  
Mr. V. AMARANTOV, Engineer.  
Mr. V. FEDOROVITCH, Engineer.  
Mr. S. BORODZIOUK, Engineer.  
Mrs. V. BESCHTCHEKOVA, Interpreter.  
Mrs. O. GORCHKOVA, Interpreter.  
Mr. V. BOUJANOV, Interpreter.

*Yugoslavia (P.T.T. Administration):*

Mr. B. LUKIĆ, Director, Telegraph and Telephone Division, Head of Delegation.  
Mr. R. PETROVIĆ, Chief Engineer, Director of the Research Institute.

*International Telecommunication Union (I.T.U.):*

Mr. H. TOWNSHEND, Assistant Secretary-General.

*International Telegraph Consultative Committee (C.C.I.T.):*

Mr. H. TOWNSHEND, Interim Director.  
Mr. J. BESSEYRE, Senior Counsellor.

*International Radio Consultative Committee (C.C.I.R.):*

Prof. B. VAN DER POL, Director.  
Mr. L. W. HAYES, Vice-Director.  
Mr. J. VAN DER MARK, Counsellor.

*C.C.I.F. Secretariat:*

Mr. G. VALENSI, Director.  
Mr. R. CHAPUIS, Counsellor.  
Mr. J. LALOU, Counsellor.

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**MINUTES  
OF THE MEETINGS  
OF THE XVIIIth PLENARY ASSEMBLY OF THE C.C.I.F.**

**(GENEVA, 3-14 DECEMBER, 1956)**

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**MINUTES  
OF THE FIRST MEETING OF THE HEADS OF DELEGATIONS  
(Geneva, 3 December, 1956)**

(approved by the Plenary Assembly)

A Meeting of the Heads of Delegations to the XVIIIth Plenary Assembly of the International Telephone Consultative Committee took place at Geneva (*Bâtiment électoral*), on Monday, 3 December 1956, at 10 a.m., under the Chairmanship of Mr. LANGENBERGER (Switzerland).

\* \* \*

The meeting made some suggestions for the C.C.I.F. XVIIIth Plenary Assembly with regard to the Chairmanship and Vice-Chairmanship of the Assembly, and in connection with working hours.

\* \* \*

The Financial Report presented by the Director of the C.C.I.F. was then examined. The following apportionment of the extraordinary expenses occasioned by the Meetings at the *Bâtiment électoral* at Geneva from the 5th November to the 22nd December, 1956, was proposed:

“ Proposal

“ The simultaneous holding of the Plenary Assemblies of the C.C.I.T. and the C.C.I.F. and the Meeting to be held immediately afterwards, on the same premises and with the same equipment, of the Plenary Assembly of the New C.C.I.T., have given rise to problems concerning the apportionment of expenses between the extraordinary budgets of these three C.C.I.s.

“ The following arrangement was proposed:

— *for the renting of the premises:*

from the 12th to the 21st November: at the expense of the C.C.I.F.

from the 22nd November to the 14th December:

50% at the expense of the C.C.I.F.

50% at the expense of the C.C.I.T.

from the 15th to the 23rd December: at the expense of the New C.C.I.T.

— *for supplementary staff expenses:*

according to the table which is the subject of Annex 4 of the Financial Report;

— *cost of stationery (paper, stencils, etc...):*

at the expense of the Organization which ordered it; however, the C.C.I.T. and the New C.C.I.T., having the same supply services, it was proposed to share these expenses in the ratio of 80% for the C.C.I.T. and 20% for the New C.C.I.T., in order to avoid difficult accounting and stock-taking during the Plenary Assembly.

— *common expenses:*

certain expenses were of a common character and their allocation to each C.C.I. was difficult to determine;

“these were, for example:

- costs incurred by the Reception Services (badge, guide, filing, etc...);
- the cost of preparing the premises (notice boards, electrical installations, removal of partitions, etc...);
- the cost of telephone and telegraph installations;
- the cost of installation of the interpretation equipment;
- the cost of transport of material, etc...

“for these expenses, the following apportionment was suggested:

40% to the C.C.I.T.

40% to the C.C.I.F.

20% to the New C.C.I.T.”

\* \* \*

The extraordinary expenses of the XVIIIth Plenary Assembly of the C.C.I.F. would be examined in detail by the Budgetary Committee of the C.C.I.F., presided by Mr. RAUS (Luxembourg) who, until his arrival at Geneva, would be replaced by Mr. KNAF (Luxembourg); this Committee consisted of the following members:

France . . . . .	Mr. DREVET
Germany (Fed. Rep.) . . . . .	Mr. WENZLAU
India . . . . .	Mr. BATRA
Italy . . . . .	Mr. SACCO
Spain . . . . .	Mr. DEL RIEGO
Switzerland . . . . .	Mr. LANGENBERGER
General Secretariat of the I.T.U. . . . .	Mr. PRELAZ
Secretary for the Committee . . . . .	Mr. WOLF

\* \* \*

The Report of the Director of the C.C.I.F. on the activity of the Consultative Committee since the end of the XVIIth Plenary Assembly (Geneva, October 1954),

until 5 November 1956, outset of the Committee Meetings preceding the XVIIIth Plenary Assembly of the C.C.I.F. (pages 180 to 190 of the Document entitled "The International Telephone Consultative Committee (C.C.I.F.) 1924-1956") gave rise to no comments.

The meeting of the Heads of Delegations proposed to the XVIIIth Plenary Assembly that the above-mentioned document, covering the history of the C.C.I.F. from its foundation until 1956, be translated into English; this document should be completed to take account of the XVIIIth Plenary Assembly of the C.C.I.F.

It was suggested that the General Secretariat of the International Telecommunication Union be asked to publish, in the form of a printed work, in English and in French, this document so completed (including the Minutes of the XVIIIth Plenary Assembly itself) and with a possible addition which might be proposed by a former Member of the C.C.I.F.

\* \* \*

After an exchange of views, it was proposed to the XVIIIth Plenary Assembly that the Minutes of this Meeting be published in the following printed works:

1. *Volume Ibis of the Green Book.*

Minutes of the Meetings of the XVIIIth Plenary Assembly; modifications and additions to Volume V (Signalling and Switching) and to Volume VI (Operating and Tariffs) of the *Green Book*.

2. *Volume IIbis of the Green Book.*

Completely replacing Volume II of the *Green Book* (Protection).

3. *Volume IIIbis of the Green Book.*

Completely replacing Volume III of the *Green Book* (Line Transmission — Maintenance).

It was suggested that the XVIIIth Plenary Assembly of the C.C.I.F. request the Ist Plenary Assembly of the New International Telegraph and Telephone Consultative Committee, to publish the 2nd Volume of the "General Trunk Switching Plan 1954/1958" incorporating therein up-to-date C.C.I.F. documentation, intended particularly for the use of extra-European countries which are developing their telecommunication networks—documentation concerning transmission, maintenance, signalling and switching.

\* \* \*

The Meeting rose at 11.30 a.m.

**MINUTES  
OF THE OPENING MEETING  
(Geneva, 3 December, 1956)**

The meeting opened at the *Bâtiment électoral*, Geneva, at 4 p.m. on 3 December 1956.

Dr. ANDRADA, Secretary-General of the I.T.U., addressed the meeting in the following words:

“Ladies and Gentlemen,

“It is with great pleasure that I respond to the kind invitation of the Director of the C.C.I.F., Mr. Valensi, to address a few words of welcome to you on the occasion of the opening of the XVIIIth and last Plenary Assembly of the International Telephone Consultative Committee.

“This is indeed a fitting moment to welcome to the seat of our Union the technical and administrative representatives of the majority of our Members and Associate Members and the Recognized Private Operating Agencies. It would not be going too far to say that it is practically the Union itself which is meeting in this room to-day and this fortunate event provides me with the opportunity of once again assuring you all of the close and constant co-operation of the Secretary-General and all his collaborators, anxious as we are that this Assembly should be crowned with the utmost success.

“Your agenda is very heavy and I shall certainly not trespass on your time and patience.

“But since this XVIIIth Plenary Assembly of the C.C.I.F. is also the last, I should not wish to leave you without paying the most heartfelt tribute of gratitude, on behalf of the whole Union, to this admirable body which has rendered the greatest service to international telecommunication without interruption for the last 33 years. We all know the importance of the part played by the C.C.I.F. in the development of telephony in Europe and the world at large and it is gratifying to be able to state that this organ of the Union has continued its work to the very end with unflagging zeal and efficiency. The introduction of fully automatic international telephony, —a problem on which you will be working this very week—is a tangible proof of this zeal and efficiency.

“But we also know that the C.C.I.F. cannot be dissociated from its faithful servant, Mr. Georges Valensi who, first as Secretary-General and then as Director, has been at the head of his Secretariat from its foundation in 1924.

“Since Mr. Valensi is to retire from the Union at the very moment when the C.C.I.F. disappears to be reborn in the new C.C.I.T., allow me, on behalf of the Union, to express publicly all the gratitude and appreciation that the telecommunication world owes him for having devoted his whole life to its service.

“Ladies and Gentlemen,

“While once again welcoming you all most heartily, I would express my sincerest wishes for the complete success of your work and a pleasant stay in Geneva, the headquarters of the Union. Thank you.”

(Applause.)

Dr. ANDRADA withdrew.

Mr. VALENSI, Director of the C.C.I.F., announced that the Meeting of Heads of delegations had unanimously proposed Mr. Langenberger, Head of the Swiss Delegation, as Chairman of the XVIIIth Plenary Assembly of the C.C.I.F.

The proposal was adopted by acclamation.

Mr. LANGENBERGER took the Chair, and made the following speech:

“ Ladies and Gentlemen,

“ Allow me first of all to express my sincere thanks for the very great honour you have paid me by calling on me to chair your Plenary Assembly, and I pass this honour on to my country.

“ As the Secretary-General, Dr. Andrada, just told you, this last Plenary Assembly of our C.C.I.F. is a milestone in the history of telecommunication.

“ If we look back as far as 1924, we can measure, without exaggeration, all that has been done in the field of telecommunication: thirty years ago international telephony was still in its infancy, whereas nowadays it is possible to telephone between any two points in the world; this has even become so natural that people are surprised when it is impossible to do so for one reason or another.

“ We can affirm that, as an international organization, ours really has made immense progress and has no reason to be ashamed. It has some remarkable achievements to its credit, perhaps more than any other organization, and these achievements concern us, Gentlemen, for this C.C.I.F. is our own creation, the result of our labours. We have all cooperated to form this great orchestra, our conductor being of exceptional quality, an extremely modest man who refuses to have his photograph taken or be published in the press, a man of the highest competence and inestimable value, who has been responsible in a large measure for the success of the C.C.I.F.

“ On behalf of you all I should like to express our warmest gratitude to Mr. Valensi, Director of the C.C.I.F., for the firm and dignified manner in which he has led all out discussions. Thank you, Sir.

“ I have said that this XVIIIth Plenary Assembly was a milestone. The C.C.I.F. will disappear in a sense, but it will in fact continue to flourish within the new C.C.I.T.; this new C.C.I.T. will show us, telephone experts, that another kind of coordination must be ensured: we must see to it that there is full cooperation between telephone and telegraph experts, and to a much greater extent than has been the case hitherto. The new C.C.I.T. is faced with numerous challenging problems and by tackling them it will lead to successes identical with those of our C.C.I.F.

“ I should like to thank you once again, Gentlemen, for the trust you have placed in me, and I sincerely hope that you will not be too disappointed in my chairmanship; you can rest assured that I shall make every effort to safeguard our interests as well as those of the Union as a whole.”

*(Applause.)*

M. VALENSI informed the Assembly that the Meeting of Heads of Delegations had unanimously proposed the following delegates as Vice-Chairmen to assist



Mr. Langenberger and to act as Chairmen at the various working meetings of the XVIIIth Plenary Assembly:

- Mr. MAPES (United States)  
for questions of S. G. 3 and S. G. 5 (Transmission-Lines).
- Mr. ROUVIERE (France)  
for questions of S. G. 8 (Signalling and Switching).
- Mr. BARRON (United Kingdom of Great Britain and Northern Ireland)  
for questions of S. G. 4 (Transmission — Apparatus).
- Mr. NICOTERA (Italy)  
for questions of S. G. 6 and S. G. 7 (Operating and Tariffs) and for questions of S. G. 9 (Maintenance).
- Mr. KLOKOV (U.S.S.R.)  
for questions of S. G. 1 and S. G. 2 (Protection).
- Mr. MATSUDA (Japan)  
for questions concerning Literal and Graphical Symbols (S. G. 10) and Vocabulary Questions (S. G. 11).

This proposal was adopted by acclamation.

Mr. VALENSI read out the following names of participants in the work of the C.C.I.F., deceased since the XVIIth Plenary Assembly, Geneva, 1954:

- Mr. Gustav SEGERSTRÖM, Teléfonos de México,
- Mr. A. DEHARD, Chief Engineer, Director of the Royal Belgian Telegraph and Telephone Administration, Brussels,
- Mr. O. DE COUTERE, Director at the Telephone Directorate, Brussels,
- Professor Ulfilas MEYER, Member of the Administrative Council of Felten and Guillaume Calswerk (deceased in 1950),
- Mr. W. H. NUNN, Deputy Vice-Chairman of the American Telephone and Telegraph Company,
- Mr. A. B. CLARK, Vice-Chairman of the Bell Telephone Laboratories,
- Mr. W. H. HARRISON, President of the International Telephone and Telegraph Corporation, and formerly Vice-President of the American Telephone and Telegraph Company.

The CHAIRMAN asked those present to stand and observe one minute's silence in memory of their deceased colleagues.

Mr. VALENSI recalled that several experts who had taken part in C.C.I.F. activities had retired since the XVIIth Plenary Assembly of the C.C.I.F.; they were:

- Mr. RUAULT, Inspector-General of Posts, Telegraphs and Telephones, Paris;
- Mr. H. DULL, Chief of Division of the Fernmeldetechnisches Zentralamt, Darmstadt;
- Mr. Humberto DA CUNHA SERRAO, Director of the Industrial Services of Posts, Telegraphs and Telephones, Lisbon;
- Mr. B. T. PHILPOTT, Senior Executive Officer, Accountant General's Department, London;
- Mr. N. R. FRENCH, Member of the Technical Staff, Bell Telephone Laboratories.

The CHAIRMAN proposed to send telegrams to these gentlemen on behalf of the XVIIIth Plenary Assembly, and this proposal was adopted unanimously.

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Mr. VALENSI pointed out that the Minutes of the First Meeting of Heads of Delegations included a draft time-table which was submitted for approval to the XVIIIth Plenary Assembly. As no amendments were suggested, the draft time-table was approved unanimously (see Annex).

The Plenary Assembly unanimously approved the proposal, mentioned in the Minutes of the Meeting of Heads of delegations, for the distribution of the extraordinary expenses of the Plenary Assemblies among the extraordinary budgets of the C.C.I.T., the C.C.I.F. and the New C.C.I.T.

The Assembly took note of the composition of the Budgetary Committee, the countries to be represented on it having already been designated in 1954 by the Plenary Assembly.

The Plenary Assembly took cognizance of the proposal, mentioned in the Minutes of the First Meeting of Heads of Delegations, to have the document entitled "The International Telephone Consultative Committee (C.C.I.F.) 1924-1956" translated into English. The document (which surveys the history of the C.C.I.F. from its foundation until 1956) had yet to be completed so as to cover the XVIIIth Plenary Assembly of the C.C.I.F. The proposal was unanimously approved.

The CHAIRMAN informed the Assembly that the Heads of Delegations, together with many delegates, had suggested that the document might be published in the form of a souvenir book, containing a historical survey of the C.C.I.F., supplemented by a few photographs; these would include one of Mr. Valensi and some photographs of previous Plenary Assemblies.

The Assembly unanimously approved the suggestion which it decided to forward to the Secretary-General of the I.T.U. together with a strong recommendation that the book should be published, insofar as the supplementary publications budget made it feasible to meet the printing expenses involved.

The XVIIIth Plenary Assembly approved the proposals of the First Meeting of Heads of Delegations for the publication of the records of the XVIIIth Plenary Assembly in three printed works, as follows:

- Volume II *bis* of the *Green Book* (replacing Volume II),
- Volume III *bis* of the *Green Book* (replacing Volume III), and
- Volume I *bis*, containing the Minutes of the meetings of the XVIIIth Plenary Assembly and the modifications and additions to those volumes of the *Green Book* which were not to be re-issued.

It was pointed out that Volume I *bis* of the *Green Book* would not include the lists of questions to be studied from 1957 on, nor the composition of the new Study Groups, as this information was to appear in the records of the 1st Plenary Assembly of the New C.C.I.T.

Mr. VALENSI reminded the Assembly that the second part of the "General Interconnection Plan 1954/1958" had not been printed, as in view of the time necessary for the revision of the *Green Book* after the XVIIIth Plenary Assembly, the second part would in fact have been out of date before it had left the printers, owing

to the adoption of new recommendations by the XVIIIth Plenary Assembly, the date of which had, moreover, been brought forward.

Taking up a suggestion by the Meeting of Heads of Delegations, the XVIIIth Plenary Assembly decided to request the 1st Plenary Assembly of the new International Telegraph and Telephone Consultative Committee to publish the 2nd Volume of the "General Interconnection Plan 1954/1958" and to incorporate into it up-to-date C.C.I.F. documents dealing with transmission, maintenance, signalling and switching; these documents were particularly intended for the benefit of extra-European countries which were in the process of developing their telecommunication networks.

During the coming meetings the Assembly would take note of suggestions by the various Study Groups for the inclusion of specific texts in the 2nd part of the "General Interconnection Plan".

\* \* \*

The delegates received the 1st and 2nd lists of documents required as a basis for discussion in the Plenary Assembly:

- first list: records of Study Group meetings held before November 1956 (already received by Administrations);
- second list: records of all Study Group meetings held between 5 November and 1st December 1956.

The delegates received those documents in the second list which were to be discussed at the meetings on the following day. Mr. VALENSI explained that the same procedure would be followed each day.

The CHAIRMAN observed that the agenda was exhausted and asked if anyone wished to raise a further point.

As there was no response, the meeting rose at 4.45 p.m.

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#### ANNEX 1

##### Time-table for the XVIIIth Plenary Assembly of the C.C.I.F. (Geneva, *Bâtiment électoral* — Room I)

<i>Monday 3 December 1956</i>	16-18 h.	Opening Meeting
<i>Tuesday 4 December 1956</i>	10-12 h.	Signalling and Switching (Questions of S.G. 8)
	15-18 h.	Transmission (1st Meeting) — Apparatus (Questions of S.G. 4)
<i>Wednesday 5 December 1956</i>	10-12 h.	Operating and Tariffs (1st Meeting) (Questions of S.G. 6 and 7)
	15-18 h.	Protection (1st Meeting) (Questions of S.G. 2)
<i>Thursday 6 December 1956</i>	10-12 h.	Operating and Tariffs (2nd Meeting)
	15-18 h.	(Questions of S.G. 6 and 7)
	15-18 h.	Maintenance (questions of S.G. 9)
<i>Friday 7 December 1956</i>	10-12 h.	Transmission (2nd and 3rd Meetings) — Lines
	15-18 h.	(Questions of S.G. 3)
	16-17 h. 30	Transmission (4th Meeting) — Lines (Questions of S.G. 3) common to the C.C.I.F. and the C.C.I.T. (or to the C.C.I.R.); questions of S.G. 5, common to the C.C.I.F. and the C.C.I.R.)

Tuesday 11 December 1956	15-18 h.	Protection (2nd Meeting) (Questions of S.G. 1).
Wednesday 12 December 1956	15-18 h.	Literal and graphical symbols; Vocabulary (Questions of S.G. 10 and 11)
Friday 14 December 1966	15-18 h.	Closing Meeting.

## PROTECTION

### MINUTES

#### OF THE TWO MEETINGS ON PROTECTION

(Geneva, 5 and 11 December, 1956)

The first meeting of the XVIIIth Plenary Assembly of the C.C.I.F. on questions relating to Protection was held in Geneva on 5 December 1956 from 15 h to 16 h 30, and the second meeting on 11 December 1956 from 15 h to 16 h 30, under the Chairmanship of Mr. KLOKOV (U.S.S.R.).

\* \* \*

The first meeting was devoted to the work of Study Group 2 of the C.C.I.T. The Report of the Meeting of Study Group 2 held in Geneva on 7 October 1956 (Document "C.C.I.F. 1955/1956 — S.G. 2 — No. 19") was used as the basis of discussion.

Mr. VALENSI, Director of the C.C.I.F., informed the Plenary Assembly that Study Group 2 has not had all the time it deserved for its work. The Study Group had only the one meeting in October 1956, as arranged by the previous Plenary Assembly. Study Group 2 would have had a further meeting if the Plenary Assembly had been held as planned normally for next year, and not in 1956.

Mr. Valensi reminded the Plenary Assembly that at the opening meeting a decision was taken to publish a Volume II *bis* of the *Green Book*, replacing Volume II, in accordance with a suggestion which originated in Study Group 1.

Mr. HALSTRØM, Chairman of Study Group 2, presented the results of the work which had been achieved by his Study Group during the short time available. All urgent questions had been dealt with as well as three non-urgent questions: as regards the remaining questions, the contributions received were briefly reviewed and their study would be continued.

The following two points were particularly brought forward by Mr. Halstrøm in the proceedings of the meeting.

1. Question 19 on the impregnation of wooden poles seemed to be of great interest to those countries whose telecommunication network is in course of development and it would be useful to publish a brochure dealing with present day methods.

After Mr. Valensi had intervened to say that this description could well be included in Part 2 of the General Interconnection Plan, the Plenary Assembly expressed the following wish to the 1st Plenary Assembly of the New C.C.I.T.:

- that the documentation already collected on Question 19 should be completed, and that the Director of the New C.C.I.T. should draw the attention of the following Administrations and Private Agencies to this fact:

Canada	Italy
Czechoslovakia	Sweden
Denmark	United Kingdom
Finland	United States of America
India	U.S.S.R.

- that this documentation should be analyzed and condensed early in 1957 by a Working Party of limited size (three members at the most);
- that the text so prepared should be published in Part 2 of the "General Interconnection Plan".

The AUSTRALIAN delegate drew attention to the desirability of having this work available as quickly as possible.

2. The second point related to bringing up to date for reprinting:
  - the "Recommendations for protection of underground cables against corrosion (Paris 1949)", and
  - the "Recommendations for protection of underground cables against the action of stray currents from electric traction systems (Florence 1951)".

The Plenary Assembly also expressed to the 1st Plenary Assembly of the New C.C.I.T. the wish that the revision of these texts should be done by a fairly widely selected Working Party consisting not only of Representatives of telephone Administrations, but also of qualified representatives of international organizations taking part in the work of Study Group 2 (C.I.G.R.E., U.N.I.P.E.D.E., U.I.C., U.I.G., International Union of Public Transport).

\* \* \*

The Plenary Assembly then examined:

- draft replies from Study Group 2 on the questions entrusted to it;
- texts of questions on protection to be studied in 1957/1959.

The draft replies were approved without comment. It should be noted that a Volume II *bis* will be printed after the XVIIIth Plenary Assembly, and the texts for modification of Volume II of the *Green Book*, already provided in the Notes to the texts of new questions, should be inserted in Volume II *bis* of the *Green Book*. This will apply particularly to "Arrangements for the reduction of intercrystalline disintegration of cable sheaths" which was given in Volume II of the *Yellow Book*, but was not carried over into Volume II of the *Green Book*, and which S.G. 2 would like to see reinserted in the C.C.I.F. documentation.

The Plenary Assembly also approved the list of questions for study, with the following amendments:

*Question A* : " Use of cables with an *entirely* plastic sheath (sheath not moisture-proof). Paper insulated conductors and conductors insulated with plastic materials should be considered separately."

*Question C* : In Note 2 delete the title " Brush (electric) " for designating the apparatus used for testing thermo-plastic sheaths.

On conclusion of the meeting, the CHAIRMAN thanked Mr. HALSTRØM and the Members of S.G. 2 for the very useful work which they had succeeded in accomplishing in so short a time.

\* \* \*

The second meeting was devoted to the work of S.G. 1 of the C.C.I.F. The CHAIRMAN apologized for the absence of Mr. MIKHAILOV, Vice-Chairman of S.G. 1, who was unable to be present. The Assembly took documents " C.C.I.F. — 1955/1956 — S.G. 1 — No. 25 " and " C.C.I.F. — 1955/1956 — S.G. 1 — No. 26 " (the latter completed by an amendment slip) as the basis for discussion.

It was decided to examine, in the following order, the proposals submitted to the Plenary Assembly:

- (1) List of questions on protection to be studied in 1957 under the new C.C.I.T.;
- (2) Revision of Directives;
- (3) Cancellation of present recommendations, and draft new recommendations;
- (4) Publication of works to be printed after the Plenary Assembly.

#### *Questions for study in 1957.*

The Assembly approved the " Draft List of Questions on protection against disturbances originating outside telecommunication systems, for study under the new C.C.I.T. by the Study Group which is to replace S.G. 1 of the C.C.I.F. ", given on pages 55-77 of document " C.C.I.F. — 1955/1956 — S.G. 1 — No. 25 ", specifying the classification for certain questions and introducing editorial changes to the text of some questions.

#### *Revision of Directives.*

Mr. COLLET presented all the texts for the Revision of Directives submitted to the Plenary Assembly, as follows:

(a) Annex 1 to Draft Recommendation No. 7 constitutes a draft for a new text of the first two parts (up to and including Chapter V) of the " Directives for the protection of telecommunication lines against the harmful effects from electric lines ".

The Assembly approved this new text without amendment.

(b) Annex 2 to the Draft Recommendation No. 7 indicates the principles proposed by S.G. 1 for the revision of rules for applying the Directives.

The Assembly approved these principles.

(c) The Annex to Draft Recommendation No. 9 constitutes a draft for a new text of Chapter XVI of the Directives.

The Assembly approved this text without amendment.

*Cancellation of Recommendations : Drafts of New Recommendations.*

Consequent upon the revision of Directives, the Assembly approved the cancellations Nos. 7, 8 and 10 given in Volume II of the *Green Book*.

The Assembly approved the amendments to Recommendation No. 1 and the Draft Recommendations Nos. 7, 8 and 10 given on pages 5-11 of document " C.C.I.F. — 1955/1956 — S.G. 1 — No. 25 ".

*Publication of Printed Works.*

Mr. VALENSI announced that the Plenary Assembly, in an earlier meeting, had already approved the publication of a Volume II *bis* of the *Green Book*. The texts to be given in this volume are shown on pages 1 and 2 of document " C.C.I.F. — 1955/1956 — S.G. 1 — No. 25 ".

Concerning the Revision of Directives, the Plenary Assembly expressed the following wish:

" The XVIIIth Plenary Assembly of the C.C.I.F. particularly draws the attention of the 1st Plenary Assembly of the New C.C.I.T. to the importance of the early completion of the work on Revision of Directives, which would justify the Study Group, charged with this work, in holding a meeting each year until the calling of the 2nd Plenary Assembly of the New C.C.I.T. ".

\* \* \*

The Assembly recorded with pleasure that an extremely effective co-operation took place between the C.C.I.F. and other International Organizations interested in questions of protection against interference or against corrosion: The International Conference of Large Electrical Networks; the International Union of Producers and Distributors of Electric Power; the International Railway Union; the International Union of Gas Industries.

The CHAIRMAN thanked Mr. COLLET and the members of S.G. 1 for the very useful work which they had carried out in the field of protecting telecommunication lines against harmful effects from electric lines.

Mr. LANGENBERGER, Chairman of the Plenary Assembly, thanked Mr. KLOKOV for the competence and courtesy with which he presided over the two meetings on Protection of the Plenary Assembly.

## TRANSMISSION

### MINUTES OF THE FIRST TRANSMISSION MEETING

(Apparatus)

(4 December, 1956)

The meeting began at 3.00 p.m. on 4 December, under the chairmanship of Mr. D. A. BARRON (United Kingdom of Great Britain and Northern Ireland).

The CHAIRMAN announced that unfortunately, both Mr. SWEDENBORG, Chairman of Study Group 4 and Mr. WEST, Vice-Chairman of this Study Group, were unable to be present at this meeting.

The Assembly took first as a basis of discussion the document "C.C.I.F. — 1955/1956 — S.G. 4 — Document No. 39".

\* \* \*

Taking into consideration the two first pages of this document, the Assembly expressed, for the attention of the 1st Plenary Assembly of the New C.C.I.T. (which had to take decisions with regard to the functions of the S.Gs. of the New C.C.I.T.) the following wish:

"The XVIIIth Plenary Assembly of the C.C.I.F. draws the attention of the 1st Plenary Assembly of the new C.C.I.T. to the importance of distinguishing between the functions of the Study Group which has to deal with problems concerning the specification of telephone transmission quality and with the local systems that connect the subscribers to the trunk exchanges on which they depend and between a smaller sub-committee in charge of everything concerning the Laboratory and the tests relating to telephone transmission quality. The Study Group should principally be composed of specialists in the planning and maintenance of local networks, whereas the sub-committee should be composed of laboratory technicians."

The Assembly examined the reply to *Question 1* of Study Group 4. The Assembly approved this reply and decided that it should be published in the printed works of the C.C.I.F., for example at the end of Annex 13 of the Book of Annexes to Volume IV of the *Green Book*.

Then the Assembly approved the replies to Questions 3 to 10, 10 *bis*, 14, and supplementary Question A, with the following comments:

#### *Questions 3 and 4.*

(1) The attention of Study Group 8 has been definitely drawn to the importance of avoiding clicks, and two new questions relating to this subject have been set for study during the signalling and switching meeting of the Plenary Assembly.

(2) The reply made to these questions involves no modification of the specification of the psophometer as given in the *Green Book*.



(3) In the wording of the new question which appears on page 4 of the above-mentioned document, the Assembly decided to delete the word "automatic" in order to show that the case of faulty manual switching apparatus should also be examined.

(4) The Assembly stated that, in general, in the documents published by the C.C.I.F., the English expression "quality of (telephone) transmission" should be considered as synonymous with "(telephone) transmission performance", corresponding to the French expression "qualité de transmission (téléphonique)". The attention of the meeting devoted to Symbols and Vocabulary should be drawn to the utility of indicating this point during the revision of the "Draft list of definitions of essential terms used in telephony".

*Question 6.-*

This question will again be studied as question 23 of Study Group 3 and question 6 of Study Group 3 during the last transmission meeting.

*Question 7.*

The new wording proposed for this question underwent some modifications.

*Question 9.*

The answer to this question, with its annexes, should be reproduced in the *Green Book*, for documentation purposes.

*Question 10.*

The wording of this question underwent some changes of an editorial character.

\* \* \*

The Assembly approved without comment the French text of the "Modifications made by Study Group 4 of the C.C.I.F. to Volume IV of the *Green Book*, Section 1.2."

The Assembly approved the "Revised List of Questions" which Study Group 4 proposes to study or to continue to study, during the period 1957/1960 with a few corrections of fact.

Finally, the Assembly took note of the "Programme of work for the C.C.I.F. Laboratory during the period 1957/1959" which appears on pages 88 to 89 of the document "C.C.I.F. — 1955/1956 — S.G. 4, Document No. 39".

The meeting closed at 5.15 p.m.

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**MINUTES**  
**OF THE SECOND AND THIRD MEETINGS ON TRANSMISSION**  
**(Geneva, 7 December, 1956)**

The 2nd and 3rd Transmission Meetings of the XVIIIth Plenary Assembly of the C.C.I.F. took place in Geneva on 7 December 1956, from 10-12 hours and from 15-16 hours, under the Chairmanship of Mr. C. M. MAPES (United States). These two meetings were devoted to the examination of questions dealt with by S.G. 3 which concerned only the C.C.I.F.

\* \* \*

The meeting took documents "C.C.I.F. 1955/1956 — S.G. 3 — Document No. 49" and "C.C.I.F. 1955/1956 — S.G. 3 — Document No. 77" as the basis for discussion and in these documents the replies to Questions 3, 5, 8 *bis*, 16, 19, 19 *bis*, 19 *ter*, 20, 23, 25, 26, 27, 29, 29 *bis*, 30, 31, 32, 34, 35, 36, 37, 38, 39, 40, 41, 42, and 43, as well as supplementary Questions A, B, C, D, E, F, G, H, I, J, K, L, M and N were approved, and also point 2 for confirmation in the C.C.I.F. Recommendations. During this examination, the Assembly made comments on the following questions:

*Question 23 of S.G. 3.*

There is an urgent need to supply the necessary information, so that the opinion tests to be made by S.G. 4 can be made as soon as possible. The Assembly will revert to this point during the 4th meeting on transmission in relation to Question 24.

*Question 27 of S.G. 3.*

This question was dealt with during the signalling and switching session.

*Questions 30 and 31 of S.G. 3.*

The Assembly approved the text already introduced into the Maintenance Instructions of Volume III of the *Green Book*, on the proposal from S.G. 9.

*Question 38 of S.G. 3.*

A provisional recommendation will be inserted in Volume III *bis* of the *Green Book*, with the following note at the foot of the page:

"(\*) These recommendations should be reviewed within the scope of Question 38."

*Question 40 of S.G. 3.*

In the opening session, the Plenary Assembly of the C.C.I.F. issued a wish for the information of the 1st Plenary Assembly of the New C.C.I.T., regarding publication of the second volume of the General Interconnection Plan. It will be necessary to publish particularly in this volume, the documents indicated on pages 125-127 of document "C.C.I.F. — 1955/1956 — S.G. 3 — Document No. 77".

*Supplementary Question H of S.G. 3.*

Study of this question is concluded, without resulting in any C.C.I.F. recommendation.

After taking note of proposals by S.G. 3 for the revision of Volume III of the *Green Book*, the Assembly issued the following wish:

“ Considering that a large number of modifications must be made to Volume III of the *Green Book* (Geneva 1954), the Plenary Assembly issues the wish that a Volume III *bis*, completely replacing Volume III of the *Green Book*, should be published in 1957. As it has not been possible to edit the replies to all S.G. 3 questions in the form suitable for drafts modifying Volume III of the *Green Book*, the C.C.I.F. Plenary Assembly proposes that the Secretariat of the New C.C.I.T. should be charged with the preparation of a draft for Volume III of the *Green Book*. This draft would be passed to Mr. JOB (France), Mr. ZERBEL (German F.R.) and to a member of S.G. 3 to be nominated later by the United Kingdom Administration. These members would approve the final text of Volume III *bis*, by correspondence if possible, after a short meeting as an Editorial Committee, should that appear necessary to the Director of the New C.C.I.T.

“ It is understood that the Book of Appendices to Volume III of the *Green Book* remains valid.”

The Assembly examined, on pages 170 to 207 of document “ C.C.I.F. — 1955/1956 — S.G. 3 — Document No. 77 ”, the summary of Questions the study of which should be started or continued during 1957-1960, by the Study Group of the New C.C.I.T. which will replace S.G. 3 of the C.C.I.F. The texts of questions corresponding to those studied during the 2nd and 3rd sessions are approved. The Assembly likewise approved the study of new Questions 47 and 47 *bis*. To avoid any confusion between the field for study corresponding respectively to these two questions and to new Question E of Study Group 9, the Assembly decided to add to Question 47 *bis* the following note:

“ *Note.* — The quality of telephone transmission, during speech, on the chain of national and international circuits, forms the subject of Question 47.”

After taking note of a proposal from Study Group III of the C.C.I.T., given in document “ C.C.I.T. S.G. III/36 ”, the Assembly considered that at the moment solely the study of the following new Question by the New C.C.I.T. was necessary:

*Question 48* (Category A1) [urgent] (new question).

“ What general characteristics should be standardized to permit international transmission of metering data? ”

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## MINUTES OF THE FOURTH TRANSMISSION MEETING (Geneva, 7 December, 1956)

The 4th Transmission meeting of the XVIIIth Plenary Assembly of the C.C.I.F. was held in Geneva on 7 December 1956, from 16 hours to 17.30 hours, under the Chairmanship of Mr. C. M. MAPES (United States). This meeting was devoted to the examination of questions dealt with by S.G. 3 or S.G. 5 of the C.C.I.F., which are of interest to the C.C.I.T., the C.C.I.R., the I.B.O. and the E.B.U.

The Assembly continued the examination of Documents “ C.C.I.F. — 1955/1956 — S.G. 3 — Document No. 49 ” and “ C.C.I.F. — 1955/1956 — S.G. 3 — Document No. 77 ” and approved the replies by S.G. 3 contained therein to the question put by S.G. II of the C.C.I.T. and to Questions 6, 6 *bis*, 7, 8, 11, 12, 21, 24, 33, 34 *bis*, 45 and 46 of S.G. 3 and to Point 1 for verification in the C.C.I.F. Recommendations.

Document “ C.C.I.F. — 1955/1956 — S.G. 5 — Document No. 15 ” was also used in the discussion, and the Assembly approved the replies contained in this document to Questions 2, 4, 5, 6, 7, 9, 10, 11, 13, 14 and 15 of S.G. 5.

During their examination, the Plenary Assembly made the following comments in respect of certain questions:

*Question 7 of S.G. 3.*

The Plenary Assembly of the C.C.I.F. approved the final text of Recommendation D3 approved by the Plenary Assembly of the C.C.I.T., which contains some editorial amendments to the draft given in document “ C.C.I.F. — 1955/1956 — S.G. 3 — Document No. 77 ” (see Appendix 2 below).

*Question 11 of S.G. 3.*

The Assembly issued the following resolution:

“ The Plenary Assembly of the C.C.I.F. has noted with great interest Resolution No. 32 of the C.C.I.R., reproduced in Annex 3 below and proposes to the 1st Plenary Assembly of the New C.C.I.T. to approve the setting up of a Joint Group from the C.C.I.R. and the New C.C.I.T., and to add the following to Resolution No. 32:

- (1) As regards point (a) of its mandate (paragraph 2 of Resolution No. 32 of the C.C.I.R.), this Joint Group should not limit itself to examining the standards proposed in Report No. 84 of the C.C.I.R., but should also examine those given in the draft Recommendation of the Appendix to the reply to Question 11 of S.G. 3;
- (2) this Joint group should also study Question 11 with the new text proposed in the reply of S.G. 3 to this question;
- (3) this Joint Group should comprise, in addition to representatives of the C.C.I.R., representatives from the Study Group of the New C.C.I.T. which will replace Study Group 3 of the C.C.I.F., and also some representatives from the Study Group which will replace Study Group 5 of the C.C.I.F.”

*Question 23 of S.G. 3 (Question 6 of S.G. 5), Question 24 of S.G. 3 (Question 7 of S.G. 5) and Question 34 bis of S.G. 3.*

The Assembly considered it useful to state, by analogy with the assumptions made for the hypothetical reference circuits, that the limit for the psophometric e.m.f., measured at the end of a telephone circuit in service, is a mean value.

The Assembly also issued the following resolution:

“ The XVIIIth Plenary Assembly of the C.C.I.F. draws the attention of the 1st Plenary Assembly of the New C.C.I.T. to the importance of the opinion tests

which will be undertaken according to the instructions of the Study Group which will replace S.G. 4 of the C.C.I.F., with the object of determining the permissible limits for high-level noise of short duration. Before commencing these tests, it is necessary to choose a typical statistical distribution curve for noise as a function of time, on radio-relay systems. The XVIIIth Plenary Assembly of the C.C.I.F. propose to the 1st Plenary Assembly of the New C.C.I.T. to issue the following recommendations:

“ Administrations should proceed, as already requested, to make tests to determine the actual variations of noise as a function of time on radio-relay systems in service. In making these tests, it is important to ensure that the telephone circuits connected to the radio links do not themselves introduce on to the radio links any noise other than that being determined, particularly interference due to signalling tones, clicks, etc.

“ In addition, to permit the statistical analysis of these results, it is necessary to determine the elementary durations corresponding respectively to:

1. very short disturbances (e.g. the time-interval of one signal in telegraphy);
2. the time-interval of the shortest code-signal in the international signalling systems recommended by the C.C.I.F.;
3. the mean duration for the enunciation of one word in a telephone conversation;
4. the minimum duration for a noise-peak which causes interference with television.

“ These values should be ascertained as soon as possible by the C.C.I.T., S.Gs. 3, 4 and 8 of the C.C.I.F., and the C.C.I.R. respectively.

“ The XVIIIth Plenary Assembly of the C.C.I.F. proposes to the 1st Plenary Assembly of the New C.C.I.T. to set up a second Joint Group from the New C.C.I.T. and the C.C.I.R. which should as a matter of urgency determine these four elementary durations.

“ Administrations should then be asked to determine the statistical distribution curves corresponding to the results of the measurements referred to, analyzing these results in terms of the four time-periods indicated above.

“ This Joint Group would later meet to study:

1. The precise specification for various hypothetical reference circuits for cable or radio-relay circuits (Question 34 *bis* of S.G. 3).
2. The permissible limits for short-duration noise of high level, as it affects the quality of telephone conversation (Question 24 of S.G. 3 and Question 23 of S.G. 3 corresponding to Question 6 of S.G. 4) from the points of view of telegraphy, of signalling and of television.

“ This second Joint Group C.C.I.T./C.C.I.R. would comprise representatives from S.G. IX of the C.C.I.R. and of S.Gs. 3, 4, 5 and 8 of the C.C.I.F., as well as a representative of the C.C.I.T.; it would be administered by the New C.C.I.T.”

*Questions 45 and 46 of S.G. 3 : Questions 2, 4, 5, 13 and 14 of S.G. 5.*

The Assembly expressed the following wish:

“ The XVIIIth Plenary Assembly of the C.C.I.F. expresses the wish that the Director of the New C.C.I.T. be asked to request Administrations to state within

six months whether they regard as final the provisional recommendation arising from the reply to points (a) and (b) of Question 45 of Study Group 3. In the event of a negative reply, Administrations would be asked to state what difficulties would be encountered in applying this recommendation. A study group would meet:

- in the event of agreement on the provisional recommendation referred to, in order to reply to various points of Question 45, with its new text;
- should it be shown that application of this recommendation would raise difficulties, to study the best method of overcoming these difficulties.

“It is desirable that this Study Group should comprise, as far as possible, the same members of S.G. 3 as those in the Working Party which met during the session of S.G. 3 in November 1956 to prepare the reply to points (a) and (b)—(the provisional recommendation quoted)—and whose composition is given in the reply to this question.

“The results of the first meeting of this Working Party would be communicated to S.G. 5 of the C.C.I.F. and to S.G. IX of the C.C.I.R.

“This Working Party would then be completed by representatives from S.G. 5 of the C.C.I.F. and from S.G. IX of the C.C.I.R. which is charged with the specification of radio-relay systems. Thus it would be possible to co-ordinate studies concerning multi-circuit telephone systems (whether on coaxial pairs or radio-relay systems) which are capable of being used for simultaneous transmission of telephony and television.”

*Question 11 of S.G. 5.*

The XVIIIth Plenary Assembly of the C.C.I.F. asked the 1st Plenary Assembly of the New C.C.I.T. to communicate the following Resolution to the C.C.I.R.:

“It is desirable that, in the study of power supplies (normal and stand-by) for attended and unattended stations of a radio-relay system integrated with the cable networks of Europe and the Mediterranean Basin, the present general recommendation of the C.C.I.F. concerning the maximum permissible interruption to the power supply (150 ms) when changing over from main to stand-by, or vice versa, should be borne in mind.”

\* \* \*

The Assembly examined, on pages 170-207 of document “C.C.I.F. — 1955/1956 — S.G. 3 — Document No. 77 — the Summary of Questions for study during 1957/1960, by the Study Group which, in the New C.C.I.T., will replace Study Group 3 of the C.C.I.F.”. The texts for questions corresponding to those studied in this fourth session were approved, and also their allocation among Sub-Groups of Study Group C of the New C.C.I.T.

The Assembly also examined, on pages 35-41 of document “C.C.I.F. — 1955/1956 — S.G. 5 — Document No. 15”, the “Summary of Questions to be studied in 1957 by the Study Group which, in the New C.C.I.T., will replace S.G. 5 of the C.C.I.F.”. This list was approved.

\* \* \*

At the conclusion of the first transmission meeting, Mr. VALENSI thanked Mr. D. A. Barron for the efficiency and courtesy with which he had presided over the meeting.

At the end of the fourth meeting, Mr. C. M. MAPES, Chairman of the 2nd, 3rd and 4th meetings, thanked Messrs. G. H. Bast and R. H. Franklin, Chairman and Vice-Chairman of S.G. 3 and also Mr. Gori, Vice-Chairman of S.G. 5, for the highly effective work which had been accomplished by these Study Groups. With these congratulations, he associated Mr. Marzin, Chairman of S.G. 5, who had been unable to be present at this meeting, and also the members of S.G.s 3 and 5; he greeted the representatives of the C.C.I.T. and the C.C.I.R. and commented with satisfaction on the fruitful results of the co-operation between the three C.C.I.s.

Mr. VALENSI, in the name of the Chairman of the Plenary Assembly, thanked Mr. Mapes for the competence and courtesy with which he had conducted the debates during the three meetings devoted to line transmission.

### MINUTES OF THE TWO MEETINGS ON OPERATION AND TARIFFS (Geneva, 5 and 6 December, 1956)

The two meetings of the XVIIIth Plenary Assembly on Operation and Tariffs took place at Geneva (*Bâtiment électoral*) under the Chairmanship of Mr. NICOTERA (Italy),

- the first session, 5 December 1956, from 10 to 11.45 hours,
- the second session, 6 December 1956, from 10 to 11.30 hours.

The following Documents served as the basis of discussion:

*C.C.I.F.* — 1955/1956 — *S.G.s 6 and 7* — No. 28.

Report of the Meeting of the Committee for the Revision of International Tariffs (Geneva, 27 June 1956).

*C.C.I.F.* — 1955/1956 — *S.G.s 6 and 7* — No. 29.

Report of the Meeting of the Rapid Operating Methods Sub-Group (Geneva, 18-26 June 1956).

*C.C.I.F.* — 1955/1956 — *S.G.s 6 and 7* — No. 30.

Report of the Meeting of S.G.s 6 and 7 (Geneva, 28 June-5 July 1956).

*C.C.I.F.* — 1955/1956 — *S.G.s 6 and 7* — No. 41.

Report of the Geneva Meeting of the Rapid Operating Methods Sub-Group (22-27 November 1956).

*C.C.I.F.* — 1955/1956 — *S.G.s 6 and 7* — No. 42.

Report of the Meeting in Geneva of S.G.s 6 and 7 (28 November to 1 December 1956).

1. The Plenary Assembly first examined the replies to questions which had received a preliminary examination by the Rapid Operating Methods Sub-Group. The replies to these questions and the resulting draft recommendations were approved, with the following comments:

*New Recommendation 34 bis.*

“The question of semi-automatic transit traffic.”

*New text for Recommendation 40 bis.*

“Time to answer of operators.”

[An amendment is to be made to the final paragraph of the note given at the end of this Recommendation regarding the delay in reply by assistance-operators in semi-automatic service; this should read: “. . . 80% of the calls *in the busy hour* should be answered *with not more than 5 secs delay*”.]

*New text for Recommendation 41.*

“International telephone charges (Circuits of European Continental Type).”

*New Recommendation 41 bis.*

“Charging in a fully-automatic international telephone service.”

[The second considering of part 2 of this Recommendation (page 21 of Document No. 42) should read: “that this dissymmetry cannot be corrected by the introduction of a fixed initial amount (*fixed or variable as a function of distance*), in periodic pulse systems”.]

*New Recommendation 63 ter.*

“Determination, by calculation, of the best arrangement for alternative routing.”

\* \* \*

2. The Plenary Assembly next examined the replies to questions studied only by Study Groups 6 and 7: the Assembly approved the following new recommendations:

*New Recommendation 37 bis.*

“Charging for calls to an apparatus  $\emptyset$ ”

*New text for Recommendation 49.*

“International Broadcast Transmissions.”

*New Recommendation 49 bis.*

“International Television Transmissions.”

[It is necessary to correct the English text of the second part of this Recommendation, under the heading “Charging”; only the duration of *600 hours* should be mentioned, as being the period of usage from which a tariff revision could arise.]



Mr. TERRAS, Chairman of S.G. 7, stated that the arrangements made in this recommendation for international television transmissions were altogether parallel to those in Recommendation 49 for broadcast transmissions.

In Recommendation 49 *bis* a Coordinating Centre had been envisaged which would be the same for the control of broadcast transmission circuits and for television circuits. This should facilitate the exchange of communications and telegrams, and the application of the charging regulations.

Belgium, however, formed an exception to this general situation, since television circuits rest with the National Belgian Broadcasting Institute (N.I.B.), while telephone and broadcast transmission circuits belong to the Belgian Telegraph and Telephone Administration. Some complications resulted for other European Administrations and these Administrations *would prefer* the Belgian Administration to be the sole intermediary for all television circuits, as well as for the control circuits and for the broadcast transmission circuits.

These Administrations would thus be pleased if the Belgian Administration would undertake the somewhat delicate mission of transmitting this Resolution to Brussels.

The CHAIRMAN proposed that an extract from these Minutes be sent to the Belgian Administration for this purpose.

The delegate for Belgium saw no difficulty in this procedure, but could not vouch for the results of this step.

\* \* \*

3. In examining the replies, the Plenary Assembly approved the proposed modifications in the replies to the following Recommendations:

Recommendation 12 <i>bis</i>	Recommendation 21
Recommendation 15	Recommendation 48
Recommendation 17	Recommendation 51
Recommendation 19	Recommendation 61.

While approving the reply presented by Study Group 6 to Supplementary Question D (regarding essential operating clauses for recording apparatus  $\odot$ ), the Plenary Assembly decided that the group of clauses required for this apparatus: operating, signalling, transmission, should form a new Recommendation. This new Recommendation would take its place among the operating Recommendations as:

*Recommendation 12 ter.*

“Essential operating conditions for absent-subscriber recording apparatus  $\odot$ .”

Following approval of the reply to Question 13, the United Kingdom delegate stated that the British Administration would not be in a position to apply the rule introduced with the modification to Recommendation 17 which resulted from this reply.

Mr. VALENSI, Director of the C.C.I.F., recalled that after each Plenary Assembly an enquiry was made by Administrations and Private Agencies with a view to ascertaining which recommendations on operation and tariffs are applied by them.

The Plenary Assembly passed a Resolution to the New C.C.I.T. that this practice should continue.

\* \* \*

4. The Plenary Assembly approved the suggestions proposed by the Rapid Operating Methods Sub-Group and by Study Groups 6 and 7 as regards the programme of work for 1957/1959.

For this purpose the Assembly addressed the following Resolution and suggestion to the New C.C.I.T.:

*“ Resolution.*

“The Plenary Assembly of the C.C.I.F. expresses the view that the study of questions relating to international fully-automatic operation, which are extremely urgent, should be undertaken as follows:

(a) The Sub-Group of Rapid Operating Methods, or the Organization which succeeds it, should meet as soon as possible, towards the middle of 1957 at the latest, to proceed particularly with a preliminary examination of questions in connection with fully-automatic international operation and to establish a draft Routing Plan for the European fully-automatic service;

(b) Certain studies could then be made by one or two Working Parties to terms of reference prescribed by the Sub-Group;

(c) The conclusions reached by these Working Parties would be approved by the Sub-Group at a second meeting. These conclusions would be communicated to the Study Group of the New C.C.I.T. which replaces S.G. 8 of the C.C.I.F. and to the telephone operating and tariff Study Group of the New C.C.I.T., so that these Study Groups may present a final reply to all the questions which concern fully-automatic international service included in their study programme.”

*“ Suggestion.*

“Considering that numerous operating recommendations, which have not been examined for many years, no longer correspond to present-day operating conditions, the Plenary Assembly of the C.C.I.F. suggests that the task of revising these recommendations, particularly the following:

Recommendation 1	Recommendation 12 bis	Recommendation 33
Recommendation 2	Recommendation 17	Recommendation 34
Recommendation 3	Recommendation 25	Recommendation 38
Recommendation 6	Recommendation 26	Recommendation 40
Recommendation 7	Recommendation 30	Recommendation 55
		Recommendation 59

be entrusted to a Working Party consisting of several members of Study Groups of the New C.C.I.T. which are to replace S.G.s 6 and 7 of the C.C.I.F.

“The amendments proposed for these Recommendations would be submitted to interested Study Groups during their next meeting. In carrying out this revision, the Working Party referred to will need to bear in mind the fact that operating con-

ditions which may be regarded in some countries as obsolescent may still be of interest to countries with a telecommunication network less fully developed.

“The Plenary Assembly of the C.C.I.F. also observes that C.C.I.F. Recommendation 1 contains definitions which do not entirely agree with the list of definitions or with present-day techniques. The proposals of the Working Party on Recommendation 1 should, if necessary, be sent to the Vocabulary Study Group of the New C.C.I.T.”

\* \* \*

5. The Plenary Assembly approved the list of questions on telephone operation and tariffs to be studied in 1957/1959, with some modifications in the wording.

\* \* \*

Mr. C. J. GILL, speaking on behalf of the delegates, thanked Mr. Nicotera for the competent and friendly manner in which he had presided over these two plenary meetings on operating and tariffs.

## SIGNALLING AND SWITCHING

### MINUTES

#### OF THE MEETING DEVOTED TO QUESTIONS ON SIGNALLING AND SWITCHING

(Geneva, 4 December, 1956)

The meeting, devoted to questions on signalling and switching, of the XVIIIth Plenary Assembly, took place in Geneva (*Bâtiment électoral*), on 4 December 1956 from 10 a.m. to 11.40 a.m. under the Chairmanship of Mr. ROUVIERE (France).

The following documents formed the basis for discussions:

“C.C.I.F. 1955/1956 — Study Group 8 — Document No. 23 — Report of the Meeting of Study Group 8, in Geneva, from 11 to 16 June 1956.”

“C.C.I.F. 1955/1956 — Study Group 8 — Document No. 27 — Report of the Meeting of Study Group 8, in Geneva, 21 to 24 November, 1956.”

\* \* \*

1. The Plenary Assembly approved, with the comments given below, the replies presented by Study Group 8 to the questions studied:

(1) *Supplementary Question D* (Document No. 27, page 29).

[Essential clauses for a recording apparatus  $\emptyset$  for absent subscriber service.]

To the list of pairs of frequencies to be avoided in sending a tone from the apparatus, the combination 1200 c/s and 1600 c/s should be added, since this corresponds to frequencies used in the U.S.S.R. network.

(2) *Question 27 of Study Group 3* (Document No. 23, page 57).

[“ Out of band ” signalling.]

The delegate of France stated that this question had been examined the previous day by representatives of Study Group 3 and Study Group 8.

The position as regards this question was as follows:

- on the one hand, Study Group 8 saw no need to change the conclusions reached in June 1956, especially as this question should not lead to a specification for a new international signalling system;
- on the other hand, Study Group 3 expressed the wish, which appears justified, to see a study made on the transmission characteristics of national “ out of band ” signalling systems recorded in the C.C.I.F. *Green Book*.

Standardization of these characteristics would enable bilateral agreements to be made between Administrations, if required, to use their national “ out of band ” signalling systems for direct international circuits (i.e. circuits not passing through a transit country).

It became clear during this joint examination, that the most satisfactory method of meeting the wishes of both Study Group 3 and Study Group 8 would be to introduce a slight modification and addition to Chapter II, Part II, of Volume V of the *Green Book*.

The modification concerned the text of Note 2 at the foot of page 13, which should read as follows:

“ Signalling systems not using frequencies within the speech band; and not presenting, or not presenting to the same extent, the disadvantages (2), (3) and (5) referred to below, have been developed for modern multi-circuit carrier cable systems.

“ If Administrations desire, by bilateral agreement, to use such systems for direct routes which would not carry transit traffic, it would be highly desirable from the transmission aspect, to use one of the types of out-of-band signalling system defined in the Appendix to this chapter.”

The addition related to the Appendix at the end of Chapter II (see Appendix I to these Minutes).

Mr. BARRON, Chairman of Study Group 8, and Mr. FRANKLIN, Vice-Chairman of Study Group 3, expressed, in the name of their Study Groups, their complete agreement with the suggestion made by the delegate for France.

The Plenary Assembly accordingly approved this addition and modification to Volume V of the *Green Book*.

\* \* \*

2. The Plenary Assembly approved, with certain editorial amendments, the list of questions on signalling and switching for study, to commence or to continue in 1957-1959. The editorial changes to the texts of these questions, together with other necessary amendments, are shown in Appendix 2 to these Minutes.

\* \* \*

3. Mr. BARRON, Chairman of Study Group 8, recalled that in 1954, at the time of the XVIIth Plenary Assembly, the problems under discussion consisted in defining the international signalling system for semi-automatic operation. It is symptomatic of the world progress achieved by telephony to state that in 1956 the emphasis placed by Study Group 8 is now upon fully-automatic operation. A striking demonstration of the progress made can be found in the telephone booths installed by the Swiss Administration for the use of delegates, from which members can themselves dial directly into Brussels, Germany, London, Milan, Netherlands, Paris and Stockholm.

The CHAIRMAN spoke of the excellence of the work done by Study Group 8, which in a very short time passed from problems of semi-automatic international switching to those relating to fully-automatic switching.

Mr. VALENSI, on behalf of the Plenary Assembly, thanked Mr. ROUVIÈRE for the competence and courtesy with which he had presided over this meeting.

The Meeting closed at 11.40 a.m.

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## MAINTENANCE

### MINUTES

#### OF THE MEETING DEVOTED TO QUESTIONS ON MAINTENANCE

(Geneva, 6 December, 1956)

The meeting devoted to Maintenance questions took place at Geneva (*Bâtiment électoral*) on 6 December 1956 from 15 hours to 17.30 hours, under the Chairmanship of Mr. NICOTERA (Italy).

\* \* \*

1. The Plenary Assembly took the Report of the Study Group 9 Meeting, held in Geneva from 5 to 15 November 1956 (Document "C.C.I.F. — 1955/1956 — S.G. 9 — No. 36") as the basis for discussion.

Mr. VALENSI, C.C.I.F. Director, recalled that this was the first occasion on which the Maintenance Study Group had reported directly to the Plenary Assembly. Until 1954 there was only a Maintenance Sub-Group. The XVIIth Plenary Assembly raised it to the status of a full Study Group, so constituting Study Group 9. The wisdom of this step had been amply demonstrated by the quality of the work presented and the efficiency of this Study Group.

Study Group 9, in addition to its normal activities as a Study Group, was also charged with the annual preparation of the "Periodic Maintenance Programme for European Telephone Circuits". This document, which did not have to receive approval by the Plenary Assembly, became of greater importance as the number of telephone circuits increased. (A few copies of this work were distributed for

circulation among delegates to enable them to appreciate the magnitude of this document.)

In addition, in 1955, in accordance with the mandate given by the XVIIth Plenary Assembly, Study Group 9 was charged with the issue of a new text for the "Maintenance Instructions". The preparation of this was done by a Working Party which met in Geneva in June 1955, and was completed at the Paris Meeting (October 1955) by Study Group 9. The texts thus issued have constituted replies to a number of questions which were included in the Study Group 9 programme. The Summary on page 3 of Document No. 36 refers to this fact for Questions 4-11.

The other questions studied may be divided into two categories:

- Questions 1 to 3 concerning stability in transmission over the European network, and
- Questions 12 to 16 concerning maintenance of television circuits and radio links.

\* \* \*

2. The Plenary Assembly approved the replies presented by Study Group 9 to its questions. (The Plenary Assembly however, reserved its approval for Questions 12 to 16 until the second transmission session when the replies to these questions or related questions would be submitted by Study Groups 3 and 5.)

The Plenary Assembly decided:

2.1. To modify, as shown below, in the reply to Question 12 (page 66 of Document No. 36), paragraph 4: "Technical Monitoring on Television Circuits" (Text of the Maintenance Instructions for Television Circuits):

*"Technical Monitoring on Television Circuits.*

"Television programmes in progress may be monitored by technical staff of Telecommunication Administrations at all times:

- at switching centres on the circuit,
- at the final station before the frontier in each country (by providing demodulators if required).

....."

2.2. To transmit the two following suggestions to the 1st Plenary Assembly of the New C.C.I.T.:

*1st suggestion.*

The study of stability in transmission over the European network cannot be achieved under the best conditions, except by a Working Party of limited size; this principle has always been followed by the C.C.I.F. It is found necessary to take a very great number of recordings and to analyse these. This analysis must be done by the closest comparison of recordings taken at both ends of a circuit.

It is therefore suggested that a 6th series of observations on international circuits be commenced, as suggested by Study Group 9, i.e. by a Working Party which should meet in April-May 1957 and in mid-1958.

The XVIIIth Plenary Assembly was advised by the Belgian Telegraph and Telephone Administration that this Administration would be pleased to receive the Working Party of Study Group 9 in Brussels on the occasion of its first meeting in April-May 1957.

*2nd suggestion.*

It will be useful to set up a special Working Party consisting of a small number of representatives of the Study Groups which will supersede Study Groups 3 and 9 of the C.C.I.F., in order to commence a complete revision of the "Maintenance Instructions for Programme Circuits", and of Part 3 "International Programme Circuits" of Volume III of the *Green Book*.

2.3. To send the following Resolution to the C.C.I.R.:

*"Resolution.*

It would be desirable for Recommendation 128 (London 1953) of the C.C.I.R. to be cancelled, or at least for the wording to be amended, since the text of this Recommendation can only result in confusion. It is of course the province of the C.C.I.R. to define the characteristics to be given to terminal stations of radio relay systems from the point of view of the operation of the radio link itself, but it is desirable to avoid the use, without further explanation, of the terms "sub-control stations". The considerations of this Recommendation 128 could also be completely revised.

[As an Annex to this Resolution will be given the considerations put forward on page 69 of Document 36]."

\* \* \*

3. The Plenary Assembly approved the list of Maintenance Questions for study in 1957/1959, with a slight modification in the wording of the questions, with regard to the value fixed for the transmission equivalent of international automatic circuits.

\* \* \*

Mr. LANGENBERGER, speaking on behalf of the delegates, thanked Mr. Nicotera for the authority, spirit and courtesy with which he had presided over the meeting.

The meeting closed at 17.30 hours.

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## SYMBOLS AND VOCABULARY

### MINUTES

#### OF THE MEETING DEVOTED TO SYMBOLS AND VOCABULARY

(Geneva, 12 December, 1956)

The meeting devoted to symbols and vocabulary took place in Geneva (*Bâtiment électoral*) on 12 December 1956, from 15 hours to 15.50 hours, under the Chairmanship of Mr. MATSUDA (Japan).

The following documents were used as a basis for discussion:

“C.C.I.F. — 1955/1956 — S.G. 10 — Document No. 6 — Proceedings of the meeting of Study Group 10 of the C.C.I.F. at Geneva, 28-29 November 1956.”

“C.C.I.F. — 1955/1956 — S.G. 11 — Document No 4 — Proceedings of Study Group 11 of the C.C.I.F. at its meeting in Geneva, 30 November-1 December 1956.”

\* \* \*

The Plenary Assembly examined firstly the proposals which were made by Study Group 10.

The Assembly approved without comment:

(a) modifications and additions to the list of graphical symbols in telecommunication, annexed to Recommendation 5 of the C.C.I.F.;

(b) a new Recommendation 5 bis relating to timing diagrams showing the sequence of relay operations in switching circuits;

(c) the list of questions concerning letter and graphical symbols to be studied during 1957/1958.

The Plenary Assembly drew the attention of the 1st Plenary Assembly of the New C.C.I.T. to the need for setting up the Joint Commission formed from representatives of the C.C.I.s of the I.T.U. for the purpose of establishing a list of graphical symbols for telecommunication to be submitted for the approval of the International Electrotechnical Commission.

Mr. VALENSI, Director of the C.C.I.F., pointed out that the C.C.I.F. secretariat had not contributed as it would have wished in the preparation of the report on Study Group 10 meeting. This report was prepared entirely by the Chairman of Study Group 10, Mr. Van Poeteren, assisted by Messrs. H. Venhaus and K. J. Bohren, and Mr. Valensi, on behalf of the Plenary Assembly, thanked them warmly for this work.

\* \* \*

The Plenary Assembly next examined the report of Study Group 11 (Vocabulary Committee). This report was presented by Mr. ALBANESE, Chairman of Study Group 11, who expressed his thanks to all those who had assisted in the preparation of this report, and particularly Mr. Collet.



The Plenary Assembly approved:

- definitions for relays which had been proposed (these definitions are for insertion in the Draft List of Essential Definitions in Telephony);
- the two vocabulary questions to be studied in 1957/1958 (the Plenary Assembly, during its second session on operation and tariffs, had already taken note of the new question for study by Study Groups 6 and 7 concerning the use of the terms “ public ” and “ private ” to define a telecommunication service or network).

The Plenary Assembly drew the attention of the 1st Plenary Assembly of the New C.C.I.T. to the urgent need for a meeting of a Joint Committee of the C.C.I.s of the I.T.U. for the Telecommunication Vocabulary. The International Electrotechnical Commission was at present preparing the section on Telegraphy and Telephony in the International Electrotechnical Vocabulary, and this Committee expected to take decisions on this section by 30 June 1957.

The Joint Committee of the C.C.I.s of the I.T.U. would have the task of:

- (1) ensuring that in the Draft Lists of Definitions already produced by the C.C.I.s, there would be no differences between certain terms which occur in these various Drafts.
- (2) to take note of proposals already made or received by the International Electrotechnical Commission, in order to be able to indicate those proposals on which the C.C.I.s had no reservations and also to indicate those definitions already appearing in the Draft Lists of the Union which seemed preferable to certain definitions proposed to the Committee.

\* \* \*

Mr. VALENSI, in the absence of the Chairman of the Plenary Assembly, thanked Mr. MATSUDA on behalf of the Plenary Assembly for the competence and courtesy with which he had presided over this meeting.

The meeting rose at 15.50 hours.

## **REPORT BY THE C.C.I.F. BUDGET COMMITTEE**

**(Geneva, 11 December, 1956)**

The C.C.I.F. Budget Committee met in Geneva, at the *Bâtiment électoral*, on 11 December 1956 at 10 a.m. Mr. KNAF (Luxembourg) was in the Chair.

The list of Delegates attending the Meeting is annexed hereto.

The Committee dealt with the two following points:

- I. Extraordinary expenses for the XVIIIth Plenary Assembly of the C.C.I.F.
- II. Apportionment of the extraordinary expenses of the C.C.I.F. from 1954 to 1956.

(The Budget Committee did not have to prepare a report on financial needs up to the next Plenary Assembly as prescribed in Chapter 12 of the General Regula-

tions annexed to the International Telecommunication Convention, as this report falls within the competence of the New C.C.I.T.)

# I. Extraordinary expenses for the XVIIIth Plenary Assembly of the C.C.I.F.

I. 1. The following table shows the recapitulation of the extraordinary expenses of the C.C.I.F. for 1955 and 1956, and the corresponding budget estimates:

	Budget Swiss francs	Expenses Swiss francs
1955 . . . . .	90,000.—	32,670.30
1956 . . . . .	200,000.—	187,978.49 (estimate)
	290,000.—	220,648.79

I. 2. The extraordinary expenses for 1955 were audited and approved by the I.T.U. Administrative Council. The relative data will be found in the I.T.U. Financial Operating Report for 1955.

I. 3. The Budget Committee submitted for the approval of the XVIIIth Plenary Assembly a Table (see Annex 1) estimating the expenses in 1956 for the XVIIIth Plenary Assembly of the C.C.I.F. The table makes allowance for the apportionment of expenses between the C.C.I.F., the C.C.I.T. and the New C.C.I.T., approved by the Plenary Assembly at its opening meeting.

I. 4. The data in the Table concerning the extraordinary expenses of the C.C.I.F. for 1956 were examined by the Committee; the vouchers for expenses already incurred were put at the disposal of the Committee, which made a sampling check that called for no particular remark. The Committee made the following comments on the Table:

— Item II.5. (Premises, furniture, machines) shows excess expenditure over the budget estimates. The reason for this is that the contract signed with the State of Geneva for the lease of the *Bâtiment électoral* includes not only the rent proper of the *Bâtiment*, but also such expenses as those for the simultaneous interpretation installation in the main Meeting room of the *Bâtiment électoral*; it should be noted that under item II.8 (simultaneous interpretation and other technical installations) there is, as an offset, an excess in the budget estimates over the actual expenditure.

— The Committee noted that the rent paid to the State of Geneva was a normal rent and that the financial terms for holding the XVIIIth Plenary Assembly at the *Bâtiment électoral* were much more advantageous than those which would have resulted from holding the Assembly in the United Nations buildings at the *Palais des Nations*.

— The Committee wished to pay tribute to the courtesy of the State of Geneva which, after the lease had been signed, kindly authorized the Meeting of Study Group 9 of the C.C.I.F. in the *Bâtiment électoral* a few days before the original date, without any extra charge.

I. 5. The Committee was unanimous in stating that the C.C.I.F. had worked in the most economical fashion and to the entire satisfaction of all the delegates.

*The Director of the C.C.I.F.* stressed the fact that the expenses of the C.C.I.F. had been kept relatively low because of the two following sources of economies.

- (1) In the C.C.I.F. the preparatory documents of the Study Groups were not issued systematically in all the working languages, since they were of no more importance once the meetings were over. Only the important documents which were a basis for discussion in the Plenary Assemblies, including in particular all the records of the meetings of the Study Groups, were drawn up in English and French. The Administrations of the Spanish-speaking countries, taking part in the work of the C.C.I.F., had said that they would be satisfied with oral interpretation and had not asked for the bases for discussion in the Plenary Assembly to be presented in written form in Spanish.
- (2) The documents, which are sometimes very bulky, are, in principle, given only to the delegates who are members of the Study Groups concerned, and to those taking part in the Plenary Assembly.

## **II. Apportionment of the extraordinary expenses of the C.C.I.F. from 1954 to 1956**

The Budget Committee had prepared the "List of Members and Associate Members of the Union, recognized Private Operating Agencies, Scientific or Industrial Organizations and International Organizations which are to contribute to the extraordinary expenses of the C.C.I.F. for 1955 and 1956".

This List will be found in Annex 2.

The Committee was informed of the agreement between the Ministry of Postal and Electric Communications of the U.S.S.R. and the Directors of the C.C.I.T. and the C.C.I.F. for interpretation into Russian during the Plenary Assembly's meetings in the *Bâtiment électoral* in Geneva. As a result of this agreement, the I.T.U. recruited four interpreters for Russian. The C.C.I.F.'s share in the expenditure (see footnote to the Table of Extraordinary Expenses for 1956) was the outcome of the apportionment of expenses between the C.C.I.F., the C.C.I.T. and the New C.C.I.T., approved by the Plenary Assembly.

The expenses incurred by the C.C.I.F. for the use of Russian were due to be borne by the Members and Associate Members of the Union which had asked for the use of Russian or have expressed their willingness to contribute to the relevant expenses. The Administrations concerned would be requested, at the Meeting of the Plenary Assembly which approved the Report of the Budget Committee, to inform the Secretariat of the C.C.I.F. of their intention of contributing to the expenses relative to the use of Russian.

## **III. Miscellaneous**

The XVIIth Plenary Assembly of the C.C.I.F. had requested the I.T.U. Administrative Council to study whether arrangements could not be made for the C.C.I.F. Reserve Fund to bear interest.

The Administrative Council made the requisite arrangements.

It was recalled that the Administrative Council had agreed that the C.C.I.F. Reserve Fund, which has been transferred to the I.T.U., should, in principle, be used for improving the C.C.I.F. Laboratory, since this Fund is the result of economies made on contributions paid before the second World War by the few countries which at that time participated in the work of the C.C.I.F.

\* \* \*

Mr. TERRAS, speaking on behalf of all the members of the Budget Committee tendered his sincerest thanks to Mr. Knaf for the competence and courtesy with which he had directed the discussion of the Committee.

The meeting rose at 11.20 a.m.

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### BUDGET COMMITTEE

11 December 1956

*Chairman:* Mr. KNAF (Luxembourg)

France . . . . .	Mr. TERRAS
Germany (Fed. Rep.) . . . . .	Mr. ZERBEL
India . . . . .	Mr. BATRA
Italy . . . . .	Mr. VERLICCHI
Spain . . . . .	Mr. DEL RIEGO
Switzerland . . . . .	Mr. LANGENBERGER
United Kingdom . . . . .	Mr. MURRAY
I.T.U. General Secretariat . . . . .	Messrs. WEBER, PRELAZ
C.C.I.F. Secretariat . . . . .	Mr. VALENSI, Director
	Messrs. CHAPUIS AND WOLF

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# ANNEX 1

## Extraordinary Budget of the C.C.I.F., 1956 — Estimated Expenses for the C.C.I.F. XIIIth Plenary Assembly

Items and Allocation	Budget 1956 Study Groups and XVIIIth Plenary Assembly Geneva	Expenses for 1956 S.G.'s and preparatory work for XVIIIth Plenary Assembly	Budget Balance Available	Expenses and estimated expenses XVIIIth Plenary Assembly	Differences +/- Budget Exc. — Exceeding expenses
<i>Item I. Staff Expenditure</i>					
1. Administrative Services . . . . .	16,000.—	4,994.10	11,005.90	9,317.40	+ 1,688.50
2. Language Services . . . . .	84,000.—	35,424.54	48,575.46	46,128.95	+ 2,446.51
3. Reproduction Services . . . . .	8,500.—	5,631.15	2,868.85	9,941.80	— 7,072.95
4. Insurances . . . . .	1,400.—	159.—	1,241.—	92.40	+ 1,148.60
<i>Item II. Expenditure for Rent and Supplies</i>					
5. Rent, furniture, machines . . . . .	5,500.—	2,768.70	2,731.30	22,514.50	— 19,783.20
6. Production of Documents . . . . .	34,000.—	15,128.15	18,871.85	7,056.—	+ 11,815.85
7. Supplies and General Office Expenses . . . . .	14,500.—	6,681.85	7,818.15	4,383.70	+ 3,434.45
8. Simultaneous interpretation and other technical installations . . . . .	12,500.—	1,948.—	10,552.—	1,360.—	+ 9,192.—
9. Contingencies . . . . .	9,700.—	53,10	9,646.90	5,792.85	+ 3,854.05
<i>Item III. Treasury Expenditure</i>					
10. Interest on Capital . . . . .	3,900.—	—	3,900.—	3,900.—	—
<i>Item IV. Cost of Representation</i>					
11. Participation in other C.C.I. or other international meetings . . . . .	10,000.—	4,702.30	5,297.70	—	+ 5,297.70
	200,000.—	77,490.89	122,509.11	110,487.60	+ 12,021.51
Cost of Russian language interpretation . . . . .	(Extra. budget)			3,705.—	

# ANNEX 2

**List of Members and Associate Members of the Union and Recognized Private Agencies, Scientific or Industrial Organizations, and International Organizations who would contribute to the Extraordinary Expenditure of the C.C.I.F. for the years 1955 and 1956**

	Participant to the XVIIIth Plenary Assembly	Number of Units
<i>a) Members</i>		
Afghanistan . . . . .		1
Argentine (Republic) . . . . .		25
Australia (Federation of) . . . . .	×	20
Austria . . . . .	×	1/2
Belgium . . . . .	×	8
Bielorussian S.S.R. . . . .	×	3
Bulgaria (P.R.) . . . . .	×	1
Burma . . . . .		3
Ceylon . . . . .		1
China . . . . .	×	15
Colombia (Republic) . . . . .		3
Czechoslovakia . . . . .	×	8
Denmark . . . . .	×	5
Egypt . . . . .		5
Finland . . . . .		3
France . . . . .	×	30
Federal German Republic . . . . .	×	20
Greece . . . . .		3
Hungarian P. R. . . . .		1
India (Republic) . . . . .	×	20
Iceland . . . . .		1/2
Iran . . . . .		1
Ireland . . . . .	×	3
Israel (State of) . . . . .		1
Italy . . . . .	×	20
Japan . . . . .	×	25
Lebanon . . . . .	×	1/2
Liberia . . . . .	×	3
Luxembourg . . . . .	×	1/2
Morocco . . . . .		1
Netherlands, Surinam, Netherlands East Indies, New Guinea . . . . .	×	10
Norway . . . . .	×	5
Pakistan . . . . .	×	15
Poland (P.R.) . . . . .	×	10
Portugal . . . . .	×	8
Portuguese Overseas Provinces . . . . .		8
Roumanian P. R. . . . .	×	1
Saudi Arabia (Kingdom of) . . . . .		1
Spain . . . . .	×	3
Spanish Possessions . . . . .		1
Sweden . . . . .	×	10
Switzerland (Confederation) . . . . .	×	10
Syria (Republic) . . . . .		1
Tunisia . . . . .		1
Turkey . . . . .	×	5
Ukraine (S.S.R.) . . . . .	×	5
United Kingdom of Great Britain and Northern Ireland . . . . .	×	30
Union of South Africa and Territory of South Western Africa . . . . .		13

	Participant to the XVIIIth Plenary Assembly	Number of Units
Uruguay (Oriental Republic) . . . . .		3
U.S.S.R. . . . .	×	30
Yugoslavia (F.P.R.) . . . . .	×	1
<i>b) Recognized Private Agencies</i>		
American Telephone & Telegraph Co. . . . .	×	30
British Columbia Telephone Co. . . . .		10
Chile Telephone Co. . . . .	×	3
Compañía Telefónica Nacional de España . . . . .	×	2
Cuban Telephone Co. . . . .	×	5
Kokusai Denshin Denwa Co. Ltd. . . . .	×	1/2
Nippon Telegraph & Telephone Public Corporation . . . . .	×	1
Société Radio Orient . . . . .	×	1/2
Téléfonos de México S.A. . . . .	×	5
Telephone Association of Canada . . . . .	×	10
<i>c) Scientific or Industrial Organizations</i>		
Allgemeine Elektrizitäts-Gesellschaft, Fernmeldetechnik . . . . .	×	1
Felten & Guilleaume, Carlswerk . . . . .	×	1
Felten & Guilleaume, Fernmeldeanlagen . . . . .	×	1
N.V. Philips Telecommunicatie Industrie . . . . .	×	1
Siemens & Halske AG. . . . .	×	3
<i>d) International Organizations</i>		
European Broadcasting Union (E.B.U.) . . . . .	×	*)
International Broadcasting Organization (I.B.O.) . . . . .	×	*)
International Conference of Large Electrical Networks (C.I.G.R.E.) . . . . .	×	*)
International Union of Gas Industries (I.U.G.) . . . . .		*)
International Union of Producers & Distributors of Electrical Power (U.N.I.P.E.D.E.) . . . . .	×	*)
International Union of Railways (I.U.R.) . . . . .	×	*)
United Nations Organization (U.N.O.) . . . . .	×	*)
Total Units . . . . .		476

\*) Organizations exempt from all contributions to expenditure, by application of Resolution 222 (Modified) of the Administrative Council.

## THE MINUTES OF THE FINAL MEETING OF THE XVIIIth PLENARY ASSEMBLY OF THE C.C.I.F.

(Geneva, 14 December, 1956)

The final meeting of the XVIIIth Plenary Assembly was held in the *Bâtiment électoral*, Geneva, from 15.00 to 16.30 hours on December the 14th, 1956. Mr. LANGENBERGER (Switzerland) was in the Chair.

The minutes of the preceding meetings of the Plenary Assembly had been approved on 13 December, 1956, at a special meeting convened for that purpose. Some amendments were made. They will be introduced into the printed documents.

The CHAIRMAN:

"I hereby open the last plenary meeting of the last Plenary Assembly of the C.C.I.F. We shall now listen to the report by the Budget Committee, submitted by its Chairman, Mr. KNAF (Luxembourg). Mr. KNAF, please."

Mr. KNAF (Luxembourg):

"Mr. Chairman, Ladies and Gentlemen:

"We thank you once more (I speak on behalf of the delegates of Spain, France, India, Italy, the Federal German Republic, the United Kingdom of Great Britain and Northern Ireland, Switzerland, and the little Grand Duchy of Luxembourg) for the honour you did us in electing us to sit on the C.C.I.F. Budget Committee.

"First of all, let me thank my colleagues of the Budget Committee for all the help they have given me.

"We have taken our task very seriously, and have subjected the extraordinary expenses of the C.C.I.F. during 1956, and especially the estimates in connection with this Assembly, to a most meticulous scrutiny.

"In most cases, we could, of course, do no more than make sounding checks. And our investigation of bills has shown that the figures submitted to us were exact and in no way exaggerated. Thus, with valuable assistance from the Secretariat, we have drawn up a list of I.T.U. Members and Associate Members, of the Recognized Private Operating Agencies and the Scientific and Industrial Organizations called upon to share in defraying C.C.I.F. extraordinary expenses for 1955 and 1956, in so far as they have undertaken so to do.

"Apart from that, my Committee would be failing in its duty, were it to make no mention of the exceedingly efficient manner in which the C.C.I.F. is run. For this, Mr. VALENSI and every single member of his staff deserve our warmest congratulations.

"We are in the exceedingly happy position of being able, without any reservation whatsoever, to recommend that you adopt the report now before you.

"We have nothing to add. Obviously, however, anybody can ask for explanations in connection with any point in our report.

"Thank you, Mr. Chairman. Thank you, Ladies and Gentlemen."

*(Applause.)*

\* \* \*

Mr. LANGENBERGER (Switzerland) thanked the Chairman of the Budget Committee for his report. Were there any objections?

Mr. DEL RIEGO (Spain) said that Spain must be mentioned in that report among the countries represented on the Committee.

\* \* \*



Mr. VALENSI (Director, C.C.I.F.), thereupon:

“As regards the C.C.I.F. Reserve Fund, to which the last paragraphs of the Budget Committee's Report relate, there is this to be remembered: although, in 1925, the C.C.I.F. was recognized as an official permanent organ of the Union (Section S of the International Telegraph Convention, Paris Revision, 1925), no staff pension system was set up for the C.C.I.F. permanent staff in Paris, whereas the International Bureau of the Union in Berne had a Pension Fund. Hence it was that the XVth Plenary Assembly (Paris, 1949) unanimously decided that the I.T.U. Administrative Council was fully entitled to use the Reserve Fund in order to attach the C.C.I.F. officials to the I.T.U. Pension Fund (see page 60, Volume I *bis*, of the *Yellow Book*). The Council kindly acknowledged unanimously the valuable services rendered to the I.T.U. by the old C.C.I.F. officials, by raising the requisite money for their pensions from the C.C.I.F. Reserve Fund. On behalf of the old C.C.I.F. staff, let me express our gratitude to the Council.”

Nobody had anything else to say about the Report, which was therefore approved unanimously.

The CHAIRMAN said how outstanding was the work accomplished by the Committee, which had acted as C.C.I.T. Finance Committee too. That very morning it had submitted another, similar, report to the VIIIth and last Plenary Assembly of the C.C.I.T.

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The CHAIRMAN thereupon delivered the following speech:

“Ladies and Gentlemen,

“After thirty-two years, our International Telephone Consultative Committee, our dear old C.C.I.F., now stops to recover its breath, consider its future, and take a look at the past.

“But before we let our imagination wander in the vast and promising field opened up by electronics and very high frequencies, before revelling in all that the future holds for telegraphy and telephony, both by wire and wireless, let us consider what the position is. What, internationally, is the situation to-day? Well, let us not be falsely modest; thanks to the C.C.I.F. and its wonderful work of international cooperation, we can now telephone from anywhere in the world to anywhere else. There is an everwidening network of high-speed cables. We possess efficient apparatus, and the requisite technical equipment to link sets together.

“All this seems so exceedingly natural that we give hardly a thought to the difficulties that have had to be overcome, to all the investigations that have had to be undertaken before this state of affairs could be arrived at. The results achieved are the more to be valued in that the C.C.I.F., whatever it does, keeps a careful eye on the economic aspect of the action it recommends and of the technical novelties it seeks to introduce.

“ Now I do not wish to bother you with too exhaustive an enumeration, especially since our Director, Mr. VALENSI, with his well known acumen, has already submitted a very full document on all aspects of C.C.I.F. activities.

“ Ladies and Gentlemen, the immense amount that has been accomplished, this feverish activity and these positive results, are but the logical outcome of things, but all this would have been as naught, had it not been for those far-sighted and disinterested men who in 1924 set up the C.C.I.F. as a coordinating body in the realm of international telephony.

“ All these various people, from many different countries, have been invited to attend this closing meeting of the XVIIIth and last Plenary Assembly. Unhappily, some of them have been unable to come. But we shall not fail to recall here the services they have rendered.

“ Firstly, *Mr. Muri*, formerly Director-General of Swiss P.T.T. and sometime Director of the U.P.U. Bureau, sat in 1923 in the preliminary technical committee for long-distance telephony in Europe which gave rise to the C.C.I.F. Since that date, he was for many years leader of the Swiss delegation in the C.C.I.F.

“ *Dr. Osborne*, formerly Senior Engineer in the American Telephone and Telegraph Company, took part in C.C.I.F. activities from the outset; firstly as Counsellor; later, he was one of the most eminent representatives of the Recognized Private Operating Agencies.

“ *Mr. Fossion* (Belgium) was for several years Chairman of the sixth Study Group, on telephone operating questions.

“ *Mr. Haemers*, Director-General of the Belgian Telegraph and Telephone Concern, has represented Belgium since 1926.

“ *Dr. Jaeger* (Federal German Republic) was for several years Chairman of the first Study Group and of the Committee for revision of the instructions for protection of telecommunication lines, in which capacity he was then assisted by Dr. Klewe.

“ On behalf of the XVIIIth Plenary Assembly, to all these people, I hereby pay a solemn tribute.

“ It is our great good fortune to have here, prominent in this Assembly, many old C.C.I.F. veterans.

Firstly, *Mr. Gneme*, the esteemed senior Delegate to the International Telecommunication Union.

“ Then *Mr. Albanese* (Italy), who since 1924 has been Chairman either of the Study Group on Letter and Graphical Symbols, or of the eleventh Study Group, which met a few days ago in Geneva.

“ *Mr. Möckli* (Switzerland), sometime Director of the Swiss Telegraph and Telephone Division has taken part in C.C.I.F. activities from the outset. For many long years he was Chairman of the sixth Study Group, on telephone operating questions.

“ *Mr. Santing* (Netherlands), who was Chairman for many years, too, of the seventh Study Group, on rates.

“ *Mr. Chamney* (United Kingdom of Great Britain and Northern Ireland) who for several years was Chairman of the third Study Group, on line transmission.

“ *Mr. Holmblad* (Denmark), sometime Chief Engineer in the Danish Administration, Director of the Great Northern Telegraph Company, who was for several years Chairman of the eighth Study Group, on signalling and switching.

“ *Mr. Collet* (France), General Engineer in the P.T.T. Administration, was a member of the preliminary technical committee as far back as 1923. He has been Chairman of the first Study Group for a number of years, as well as of the Study Group for revision of the instructions for protection of telecommunication lines.

“ *Mr. Rynning Tonnesen*, Director-General of the Norwegian P.T.T., has played an active part as delegate of Norway since 1928.

“ *Mr. Nordström* (Sweden), Senior Engineer in the Swedish Administration, who for many years has taken part in the work of the third, fourth and fifth Study Groups.

“ *Mr. Pocock* (Chile) has been representative of the Chile Telephone Company since 1925. He has always played an important part in the work of the C.C.I.F. Laboratory.

“ *Mr. Markman* (Mexico) has represented the Sociedad Teléfonos de México since 1931. He, too, has done much for the C.C.I.F. Laboratory.

“ *Mr. van Hasselt* (Cuba) has represented the Cuban Telephone Company since 1929, and has always played an active part in the work of the technical Study Groups.

“ *Mr. Gastebois* (France), now Director-General of the Algerian P.T.T., has shown outstanding competence as Chairman of the Study Group for the General Switching Plan in Europe, the Mediterranean, the Middle East and Southern Asia.

“ Lastly, let us pay tribute to *Miss Félix*, who from 1924 to 1954, with exemplary conscientiousness, was Secretary-Administrative Officer in the C.C.I.F. Secretariat. Nor must I forget *Mrs. Brunet*, who was Secretary for many years.

“ On behalf of this Assembly, I express our profound gratitude to all these C.C.I.F. veterans here present. The C.C.I.F. is fully aware how much it owes them

“ Let us think, too, with gratitude, of *Sir Gordon Radley* (United Kingdom of Great Britain and Northern Ireland), *Mr. Lange* (France), *Mr. Clara Corellano* (Spain), *Mr. West* (United Kingdom of Great Britain and Northern Ireland), *Mr. Drouet* (France), *Mr. Chavasse* (France), and *Mr. Swedenborg* (Sweden), who have on various occasions made valuable contributions to our labours.

“ I shall not, of course, overlook our Director, *Mr. Georges Valensi*, distinguished engineer and poet in his off-moments, who is to retire in order to devote even more time to his beloved engineering problems. I shall not tell you what I know, for I should prefer that this were done by somebody else, who will speak shortly.”

(Applause.)

“ You all know our senior Delegate, Mr. Gnome. Mr. Gnome, please.”

Mr. GNEME (Italy), the senior Delegate:

“ Mr. Chairman, Ladies and Gentlemen,

“ As the senior I.T.U. Delegate, it is with considerable emotion that I now take the floor at a meeting which is to bring to an end the International Telephone Consultative Committee as a separate I.T.U. organ, after a long and fruitful existence.

“ Now you will all remember that the Committee goes back to 1923, when, on the initiative of the French Administration and with the support of several European Administrations, the International Long-Distance Communications Consultative Committee was set up with a laboratory. In 1925, it was replaced by the International Telephone Consultative Committee, which became an organ of the Union by a decision of the Paris Telegraph Conference that same year. Its Director was Mr. Valensi.

“ First and foremost, let me emphasize what Mr. Valensi has done in the realm of pure science. You all know that he has done important original research on telephone engineering problems. It will suffice to recall his treatise on telephony, written at the dawn of telephony—a closely-reasoned work which goes to the heart of his subject, and is so clearly written that it can still be perused with profit to-day. This is an epoch-making volume on which all technical progress in telephony since then has been based.

“ As regards Mr. Valensi's decisive contribution to the development of the international telephone network, I would recall that the Committee and its Laboratory, once set up, speedily produced fruitful results. In 1924, it was hardly possible to put a call through from one country to the next, but the triode valve was already in existence, and provided the means whereby the range of telephone calls might be almost indefinitely extended. To take full advantage of this, and to lay down and maintain coil-loaded cables equipped with triode repeaters, the technical work being done by the various Administrations needed to be more closely coordinated than in the past, and this considerable task was done by the C.C.I.F. and its laboratory within a very few years. So that, by 1938, all the European countries were linked by high-quality lines, the continent of Europe was connected to other continents by radiotelephone circuits, and more than 90% of the world's subscribers could, if they wished, communicate amongst themselves.

“ After this initial period of creative activity, the problem arose of setting up new international lines with a higher transmission speed than the old coil loaded cables. Thanks to the use of carrier systems, a great saving was effected in raw materials at the same time as quality was improved. The second modern long-distance line network has been set up in the light of the investigations undertaken by the C.C.I.F., and the recommendations it has issued, during the last few years. The public has been made to benefit by technical inventions as soon as they got past the laboratory stage.

“ Tribute has been paid to these outstanding achievements, to which the engineers from Administrations and Recognized Private Operating Agencies, as well as industrial experts, have contributed, in the C.C.I.F.'s Plenary Assemblies, in the I.T.U. Administrative Council, and in the Plenipotentiary and Telegraph-and-Telephone Conferences held from 1925 to the present day.

“ For all he has done, we are infinitely grateful to Mr. Valensi, and so are our Administrations, for his wonderful work, which will ever remain a beacon in the general realm of international telephony.

“ Our hearty good wishes for many, many years of happiness. He will, I can assure him, always be considered present in the meetings of the New amalgamated C.C.I.T., as the ideal guide in international telephony.”

*(Applause.)*

\* \* \*

Mr. BARRON (United Kingdom of Great Britain and Northern Ireland), thereupon:

“ Mr. Chairman, Ladies and Gentlemen, it is a great honour, and indeed a great privilege, to have the opportunity this afternoon of trying to give some expression to those thoughts and emotions which fill us all on this very special occasion.

“ Mr. Gnome has already directed our attention to some of the dominant historical facts concerning the growth and accomplishments of the C.C.I.F. under its Director, Mr. Valensi, and those facts are in themselves most eloquent. If I may, therefore, I should like for a few minutes to talk a little about Mr. Valensi, the man.

“ Sometimes on farewell occasion it is not very easy to find the right things to say because of the risk of overpraising and therefore seeming insincere. Happily, on this occasion, I have in this respect a very easy task, because it is almost impossible to overstress the value of the contribution which Mr. Valensi has made to the C.C.I.F., and the warmth and sincerity of our feelings for him are abundantly clear.

“ When I first became associated with the C.C.I.F., not quite ten years ago, he was already almost a legendary figure, and I looked forward with great interest to meeting him. I shall always remember and appreciate the courtesy and warmth of his welcome, and perhaps he would permit me to say that from that moment began an association and a friendship which I shall always value. I am sure that everyone present who has the privilege of knowing him must feel the same, because, Ladies and Gentlemen, who could fail to realize that he is truly an outstanding and exceptional man?

“ He is the architect of the edifice we call the C.C.I.F. He has been concerned with the practical work of building it. He is familiar with all the work which goes on, on every floor and in every room. He provides even the roof which has so often protected the organization against troubles from without.

“ If I may use an even more vital analogy, and regard the C.C.I.F. as the living body which it is, has he not been its very heart?

“ There are many men holding high positions who successfully deal with matters of major policy and administration, but who quite understandably find it difficult at the same time to have much knowledge of the more detailed operations of their organizations. There are others who concentrate overmuch on detail, to the detriment of wider issues. But Mr. Valensi has the exceptional ability of being able to carry out all his duties, both great and small, with the same abounding energy and impressive efficiency. The C.C.I.F. owes much of its success to this fact, because clearly the successful direction of such a body with its many complications and its wide technical span, must make heavy demands on its director, and the C.C.I.F. can count itself outstandingly fortunate in having had the services, over such a long and vital period, of a man who is at once an engineer, an administrator, and a politician (in the best sense): a man who can converse freely and fluently in a number of languages, and who couples with his efficiency those vital qualities in human relationships of humour, understanding, sympathy and humanity.

“ Well, Ladies and Gentlemen, I mustn't say much more. I think we all feel in our hearts the essential truth of what I have tried to convey in these few remarks. The C.C.I.F. and Mr. Valensi have been almost indivisible, and his parting will be a grievous loss. We are happy to see him leave us not old and worn out, but with his vigour and efficiency unimpaired.

“ It only remains for me now to wish him, and Mrs. Valensi, on behalf of us all, a continuation for a long time of what are perhaps the most important things of all—health, well-being, and contentment. May he enjoy, for many, many, years the happiness he deserves in the confidence of a job supremely well done, and in the knowledge that he carries with him the respect, admiration and affection of us all.”

*(Applause.)*

\* \* \*

Mr. KLOKOV (Union of Soviet Socialist Republics):

“ May I, on behalf of the delegations of the U.S.S.R. and of the Ukrainian and Bielorussian Soviet Socialist Republics, say a few words to demonstrate our cordial appreciation of Mr. Georges Valensi, founder, director and moving spirit of the C.C.I.F. from its foundation down to the present day?

“ We all know that enormous technical strides have been made since the C.C.I.F. was first created. For example, major carrier systems have been set up. We are approaching the time when international relations will be automatic. It is with the greatest satisfaction that we pay tribute to the distinguished part played by the C.C.I.F. in all this, under Mr. Valensi's direction.

“ Mr. Valensi's authority, his erudition, and his ability as an organizer have made it possible to solve the most difficult technical and administrative problems with which the C.C.I.F. has had to deal.

“Mr. Valensi, too, deserves our gratitude for the way in which he has been able to maintain that spirit of cooperation and mutual understanding that have ever prevailed in the C.C.I.F. I hope these things will persist in the new body. They are indispensable qualities in our atomic era, at a time when automation and electronics are in full development. These magnificent discoveries must be directed towards peaceful applications, to meet the deeper aspirations of peoples.

“To Mr. Valensi, then, our deep, our sincere thanks for his work in the C.C.I.F. May he enjoy a long and happy retirement. He will, in any case, ever be most welcome should he desire to take part in any aspect of the work of our future C.C.I.T.”

(Applause.)

\* \* \*

Mr. Leslie W. HAYES (Vice-Director, C.C.I.R.):

“I was looking through an old passport of mine the other day and I noticed one of the many rubber stamps they put on your passport when you cross a frontier. This one was put when I landed at Calais. It reads: *Commissariat spécial — Calais — Débarquement — 23 juin 1926*. Yes, just over thirty years ago. I remembered that I was then on my way from London to Paris to attend a meeting of the C.C.I.F. —my first—and the first occasion on which I met Georges Valensi, looking (if possible) even younger than he does now.

“I was then working as an engineer in a broadcasting organization, the B.B.C., and in company with one or two other observers from the International Broadcasting Union, we were going to Paris to ask the C.C.I.F. to do all it could to hasten the provision of international high-quality wire circuits with which we could transmit music in Europe. For, in 1926, national music circuits weren't too good, and international ones didn't exist.

“Mr. Valensi recognized the need and with the foresight, initiative and drive which you now all know so well, he got to work on the problem and under his guidance the C.C.I.F. produced specifications for suitable circuits for music transmission, and the circuits soon followed.

“The position today, thirty years later, is that the C.C.I.F. is now confronted with an almost exactly parallel problem in the provision of international circuits for the transmission of television. During this meeting here, in Geneva, you have had observers from the broadcasters to discuss this question with you, and they were given as warm and friendly a welcome by Mr. Valensi as the one he gave us in 1926.

“Ladies and Gentlemen, it is primarily on behalf of broadcasters that I asked to speak this afternoon, for I am sure they would not wish Mr. Valensi to leave the C.C.I.F. without associating themselves with the thanks and good wishes offered to him today, as his work with the C.C.I.F. is drawing to an end.

“ We do wish him a very happy and long retirement where, who knows, he may sometimes have time to listen to broadcasting and to look at television so that he can satisfy himself that the C.C.I.F. standards for permissible distortion are not being exceeded.”

*(Applause.)*

\* \* \*

The CHAIRMAN:

“ Mr. Valensi, the XVIIIth Plenary Assembly, through the Heads of the delegations here assembled, asks me to present you with this little souvenir, in the form of this tray and these few flowers.”

*(Enthusiastic applause.)*

The Chairman presented Mrs. Valensi with a bunch of roses.

Mr. VALENSI (retiring Director):

“ Mr. Chairman, Ladies, my dear Colleagues,

“ I have devoted many years of my life to international communications. Now that this period is drawing to a close, it is with deep emotion that I receive these fine gifts. And thank you for your kind good wishes. It is not without a certain sadness that I espy among you, in this last Plenary Assembly, all the colleagues and friends with whom I have been used to working at regular intervals. And not to working only—I have enjoyed the pleasant chats we have had in our rare moments of leisure. I do hope, though, that in the years to come I shall have occasion to see you all again from time to time. I shall leap at the opportunity of doing so, you may rest assured.

“ In 1924, the C.C.I.F. was a very small body indeed. The preliminary technical committee for long-distance telephony in Europe resembled a little stream that had just sprung from the ground, although with considerable energy; it was not long before it made its way among the first obstacles by it encountered. All of you have helped it on its way from time to time, and the little stream speedily became a mighty torrent, the energy of which is efficiently used for creative work, now well under way: the creation of a world-wide network of major telecommunication lines.

“ The fact that I have spent so many years of my life in this great work is, I consider, a great honour for me. My satisfaction is extreme when I hear you say that those numerous Administrations which have so long and so constantly supported me have not been disappointed.

“ I must, though, confess that if I have been successful it is thanks to my devoted colleagues. And it is thanks, too, to the fact that I have ever kept before my eyes a certain concept—like the star which guides the pilgrim in his wanderings—which has proved such a source of inspiration that I venture to outline it for the benefit of future C.C.I. Directors, should they be willing to profit by a veteran's experience. I refer to a certain conception of the perfect international official.



“The perfect international official must, I feel, be imbued with a respect for human individuality. He must, too, be exceedingly honest, both morally and intellectually, for the success of an international organization is based on a moral authority, which alone can catch and keep voluntary allegiances.

“Thereafter, technical competence in a high degree. This, even after a solid preliminary training, can be maintained only by a stubborn effort to keep abreast of scientific and technical developments, for an international consultative committee is not just a body for codifying the present. It is a laboratory in which solutions for the future are being concerted, and its Director must consider himself a perpetual student.

“Before meetings he must, like a radar station, scrutinize the technical horizon (be it distant) to discover the probable ends to be achieved, and any obstacles in the way, and to define the ways and means whereby such obstacles may be overcome. During meetings he must, like a parabolic mirror, collect all the light rays which may reach him from any delegation (for, in science and engineering, there is no difference between large countries and small), and he must endeavour to focus these various rays into clear, enduring sentences accessible to all.

“Now of course I am only too well aware that I have not been this ideal official. But if I have sometimes fallen short of expectations, please excuse me. I have always tried my best to approach the ideal.

“The C.C.I.F. is about to surrender its bachelor existence for what will undoubtedly be a very happy marriage with the C.C.I.T. What, now, is the position with regard to the world-wide network of telecommunication lines? We can already guess its development from the carrier systems on metal lines or by radio relay link, from submerged-repeater underwater cables, and from high-speed electronic switchboards. But this world-wide network is at present embryonic only.

“If, now, we compare it with a road network in which the traffic is composed, no longer of motor cars and bicycles, but of groups of modulated electromagnetic waves, we shall see that in many parts of the world we already have many paths and alleys (subscribers' lines), quite a few city streets and secondary roads (national cables), but certainly not enough interurban long-distance routes. And besides, the existing roads will shortly be too narrow to cope with traffic. True it is that plans have been made to increase the width of certain existing roads (the major ones) from four Mc/s to 12 Mc/s. But we shall have to build real motor highways earlier than might be thought. There are laboratories already far advanced in the investigation of a highway five hundred Mc/s wide, equivalent to eighty times nine hundred telephone circuits, plus eighty television circuits. It will take the form of a tube some two inches in diameter, filled, for example, with purified nitrogen, and carrying millimetric waves modulated by coded pulses. These pulses will faithfully carry millions of human thoughts and emotions from one end of the tube to the other, where they will be reproduced as vocal sounds, or music, or written pages, or as moving coloured pictures.

“The 1924 network (when the C.C.I.F. was set up) seems to us now a frail thing, full of shortcomings. In the same way, the 1956 network will in 1976 seem

a poor thing to the delegates of the new C.C.I.T. It will constitute the tangible proof that the C.C.I.T. has worked hard and well.

"I wish you, with all my heart, every success in the future. As Director, I say farewell, but as a friend I merely say good-bye for now."

*(Enthusiastic applause.)*

\* \* \*

The CHAIRMAN:

"Well, Ladies and Gentlemen, we have reached the end of this final meeting. What is going to happen now? Nothing new, since we shall continue the joint work which started in 1956. In our sister-organization, the C.C.I.T., several speakers have spoken of its 'death'. Nothing like that has been said in the C.C.I.F. And why? Because, as you well know, we shall to-morrow be celebrating the marriage of two entities, the C.C.I.F. and the C.C.I.T., which have gone their separate ways for many years, a 'mariage de raison' decided on last year by a substantial majority of I.T.U. Members.

"Thus the very great majority of countries felt that this marriage was a necessity, and that the times demanded it.

"Telegraphy is entering upon a new phase of prosperity. Some countries have done away with the old Morse system, and the younger telegraphists are no longer learning the Morse alphabet. The fully automatic international call, from subscriber to subscriber, using teleprinters, will be the rule tomorrow. Similar transformations are going on in telephony. Fully automatic switching from one country to another promises automatic intercontinental calls. Work on an international coaxial cable system associated with radio relay links is in full swing, etc.

"In telephony, as in telegraphy, there is less and less difference in equipment and operating methods. This marriage, decided on more than a year ago, will be firmly celebrated to-morrow. It is a matter for rejoicing that our work in common will go forward to the greater good for our countries, our Administrations, and our Recognized Private Operating Agencies. By dint of mutual support, telegraphy and telephony will use all the technical advances now appearing on the horizon to the best advantage. In so saying, I am thinking of the perspectives opened up by semi-conductors, by wave guides, by very high frequencies. Hence let us place full confidence in the new amalgamated body, for the tasks still to be undertaken are immense. By their united efforts, telegraphy and telephony will make a yet more effective contribution to international understanding.

"On behalf of this Assembly, may I cordially thank the following staff of the C.C.I.F. Secretariat:

- Mr. Lalou and Mr. Chapuis, its devoted engineers;
- Mr. Wolf, secretary-administrative officer;
- Mrs. Wisard and Miss Schuli;
- Messrs. Castagné and D. J. Musk, of the C.C.I.F. Laboratory, and also the technical operators of this Laboratory;
- Mr. Dassonval, the clever draughtsman to whom we are indebted for so many excellent diagrams and sketches;

- Mr. Renton, who has been responsible for the English translation of all documents. These have invariably been available the day before the relevant documents were to be discussed;
- Messrs. Henry and Dorier, who have operated the simultaneous interpretation equipment in impeccable fashion;
- Mr. Buecher, head of the document distribution section;
- Mr. Burge, head of the mimeograph section;
- To the typing pool and document reproduction section auxiliary staff, who have spared neither time nor effort to provide us with so many bulky reports in so short a time;
- To our interpreters, always somewhat embarrassed by our technical discussions. They have acquitted themselves exceedingly well.

“ Allow me to express our congratulations and thanks to our two sister bodies, the C.C.I.T. (to be our bride to-morrow), and our first cousin, the C.C.I.R. .

“ Lastly, on your behalf, best wishes and a safe return home for all our beloved veterans. To those leaving us today, good-bye until next year. As for the others, we'll be seeing each other tomorrow.”

*(Applause.)*

\* \* \*

Mr. RYNNING-TONNESEN (Norway), on behalf of the delegates, made the following speech:

“ Mr. Chairman, Ladies and Gentlemen, .

“ I have the honourable task—on behalf of the representatives—to express the last thanks from the floor to our Chairman of the last Plenary Assembly of the C.C.I.F.

“ Before doing so, permit me, Mr. Chairman, firstly to press upon you from the floor a further duty: to convey our warmest thanks to the Swiss hosts of yesterday's charming reception in the Art Gallery.

“ In old C.C.I.F. style we unconventionally met old and made new friends—a valuable contribution to all future collaboration and success within the New C.C.I.T.

“ As a representative of a relatively small Administration, we—more than anybody else— appreciate the spirit of collaboration within the C.C.I.s., whose advice based on solid experience so lavishly is put to our disposal. Without this advice, it would not be easy, for a small Administration, to keep up to the telecommunication standard of the day, all in a nutshell expressed by a journalist the other day in my office in Oslo: ‘ the subscriber set on your desk is in reality a part of the New York or Moscow telephone machinery ’.

“ Our Chairman of the last Plenary Assembly, Mr. Langenberger, has handled the chairmanship in accordance with the best C.C.I.F. tradition, with skill, authority, and last but not least, with charm.

“All in an atmosphere healthy for the solving of all the knotty problems and as a true representative of the atmosphere and warm hospitality we always meet in Switzerland.

“Mr. Langenberger, may I express our warmest gratitude with the simple word: ‘Thanks’.”

*(Applause.)*

\* \* \*

The CHAIRMAN:

“Thank you. I shall transmit your expression of gratitude to the Cantonal Authorities, the Town of Geneva, and the Swiss P.T.T. Department. Nobody, I see, wants to speak. Then, if you so agree, I shall declare the XVIIIth and last Plenary Assembly of the C.C.I.F. closed.”

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# **MODIFICATIONS TO VOLUME I OF THE GREEN BOOK**

**(Graphical symbols)**





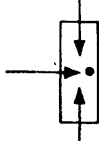
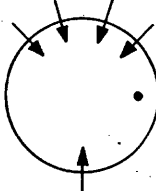
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A. Modifications and additions to the list of graphical symbols in Telecommunication, annexed to Recommendation 5 (List given on page 118 of Volume 1 of the Green Book.)

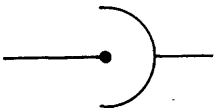
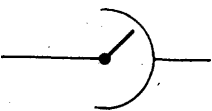
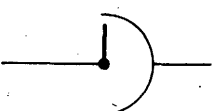
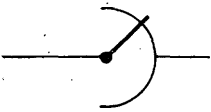
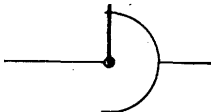

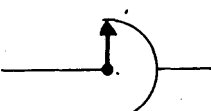
a) Replace symbols 121-123 by the following Table:

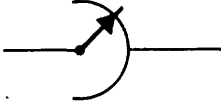
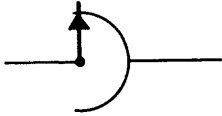

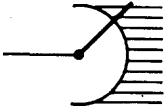

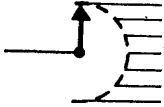
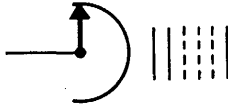
No.	Name	Symbol	Remarks
121	Voltage limiter, general symbol.		
N 121-1	Voltage limiter — air-filled with carbon electrode.		
N 121-2	Voltage limiter — air-filled with metal electrode.		The letter M may be replaced by the chemical symbol for the metal, or by any other conventional sign.
123	Voltage limiter — gas-filled, 2-electrodes.		
N 124	Voltage limiter — gas-filled, 3-electrodes.		
N 125	Voltage limiter — gas-filled, 5-electrodes.		

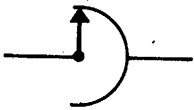
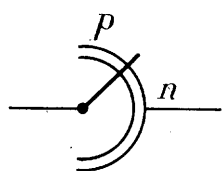
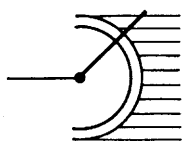
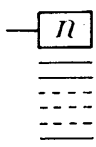
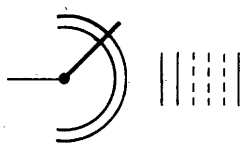
b) (concerns only the French text of the List.)

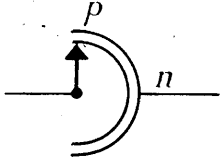
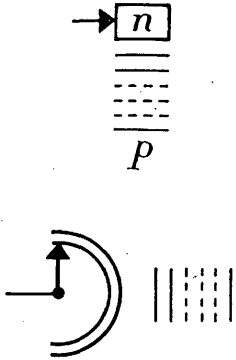
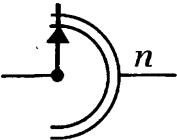


c) Replace symbols 371 to 377-8 (pages 138 to 140) by the following:

No.	Name	Symbol	Remarks
N 363	Selector, general symbol.		
N 364	Selector without home position, general symbol.		
N 365	Selector with home position, general symbol,		
N 366	Selector, hunter, without home position, free selection.		
N 367	Selector hunter with home position, free selection.		
N 368	Selector, without home position, controlled selection.		
N 369	Selector, with home position, controlled selection.		

No.	Name	Symbol	Remarks
N 370	Selector, without home position, controlled selection followed by a free selection.		
N 372	Selector, with home position, controlled selection followed by a free selection.		
N 373	Examples of application: Selector, hunter, without home position, free selection on a single level (simple form) (3 variants).	  	If useful in this or the following symbols "n" may represent the number of lines per level.
N 374	Selector, with home position, controlled selection with a single type of movement on several levels (simple form) (2 variants)	 	

No.	Name	Symbol	Remarks																		
N 375	The same (detailed form)	<div></div> <div><table border="1"><tr><td>1</td><td><math>n^1</math></td><td><math>c^1</math></td></tr><tr><td>2</td><td><math>n^2</math></td><td><math>c^2</math></td></tr><tr><td>3</td><td><math>n^3</math></td><td><math>c^3</math></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table></div>	1	$n^1$	$c^1$	2	$n^2$	$c^2$	3	$n^3$	$c^3$										The numbers 1, 2, 3... indicate the different levels; the numbers $n^1, n^2, n^3...$ are the number of contacts of each level, the numbers $c^1, c^2, c^3...$ are the total numbers of links to the grading.
1	$n^1$	$c^1$																			
2	$n^2$	$c^2$																			
3	$n^3$	$c^3$																			
N 376	Selector, hunter, without home position, free selection with two types of movement on several levels (simple form) (2 variants).	<div></div> <div></div>	If useful in this and the following symbols "p" may represent the number of levels.																		
N 376-1	The same (detailed form) (2 variants)	<div></div> <div></div>																			

No.	Name	Symbol	Remarks
N 376-2	Selector with home position, controlled selection with two types of movement on several levels (simple form)		
N 376-3	The same (detailed form) (2 variants).		
N 376-4	Selector, with home position, controlled selection followed by a free selection with two types of movements on several levels.		

d) The symbols N 377-11 and N 377-12 should be replaced by:

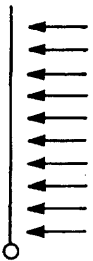
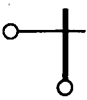

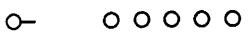
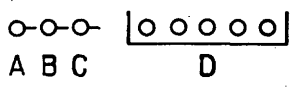


and



respectively

e) Between N 377-12 and 381 should be added:

No.	Name	Symbol	Remarks
N 378	Part of a crossbar selector		For functional diagrams
N 379	Crossbar selector or unit of a crossbar selector		For link diagrams
N 380	Circuit.		
N 380-1	Method of showing which circuits can be connected to a particular circuit		
N 380-2	Method of showing that all of the circuits A, B and C have access to circuits D		



B. Insert after the Recommendation n° 5, the new Recommendation hereafter:

**RECOMMENDATION No. 5 bis**  
**(New Recommendation)**

**Sequence Charts**

THE INTERNATIONAL TELEPHONE CONSULTATIVE COMMITTEE,

Considering

— that some Administrations feel it desirable to use time diagrams (sequence charts) showing successive relay operations in switching circuits,

Issues unanimously the recommendation

— that for studying rules for establishing these diagrams, interested Administrations might consider the information contained in the appended Netherlands Standard "Rules for Sequence charts" (Netherlands Electrotechnical Committee, V 3088, 1956).

# NETHERLANDS ELECTROTECHNICAL COMMITTEE

## Netherlands Standard V 3088

OCTOBER 1956

### Rules for sequence charts

#### CHAPTER I

##### GENERAL

#### 1. Definitions.

Charts showing through symbols the sequence of operations in a circuit-arrangement are called *sequence charts*. They differ from *time-sequence charts* in that the latter have a linear time scale. The sequence charts do not give information about the duration of a phenomenon, but they show the sequence in which various operations are effected and the situation at any moment.

#### 2. Efficiency.

By trying to convey more information in a sequence chart than is strictly necessary, much harm is done to the readability, which is a great drawback because readability is the most important requirement for these charts. Therefore it is not *completeness* which should be aimed at, but *restriction* to the *essential* requirements.

#### 3. Essential requirements.

A sequence chart must clearly show:

a) The difference between the moment at which the energization of a relay<sup>1</sup> is changed in such a manner that the armature has to change its position, and the moment at which the contacts change over.

---

<sup>1</sup> Whenever the term «relay» is used in this standard, it may be taken in a very wide sense, to cover electronic relays, drum controllers, selectors, etc.; in general, any electrically controlled device fulfilling the function of bringing about a change in one or more electric circuits, in such a manner that a certain series of conditions at the input corresponds with one (or more) situation(s) at the output.



b) Which relays are energized at a certain moment, which valves are lit, which tones are given, etc.

c) The coherence between the changing over of the contact of one relay and the beginning (or end) of the energization of another relay and conversely.

d) The moments at which the energization of a relay, which may not release during a series of impulses, is interrupted for a moment and restored in such a manner that the armature remains in the operated position.

e) Through which winding(s) current flows in relays with more than one winding.

f) The moment at which a (holding) circuit, for a relay, (other than the circuit(s) already closed) is closed.

g) References to and from other equipment.

#### 4. Undesired data.

To guarantee good readability in a sequence chart, it is *not* desirable to mention data which are not necessary for the sequence. These data are to be found in the functional diagram, e.g.:

a) Which *contact* of a relay effected or ceased the energization of another relay.

b) Whether a relay was released by short-circuiting or by the opening of the circuit via which it was energized.

c) Whether a relay switches off the winding via which it was operated, by a contact of its own.


d) Whether the current flowing through a winding reaches another value, provided the latter is such that the relay remains in the same position when the changed value is maintained for some time.

## CHAPTER II

### EXECUTION

The requirements mentioned in Chapter I, Paragraphs 3a to 3g, can be met in the following manner.

#### 1. Operating, releasing.

As basic symbol a square is adopted: 

The diagram is supposed to have a vertical time axis, the positive time direction being taken from top to bottom.

To each relay a narrow vertical column is allotted.

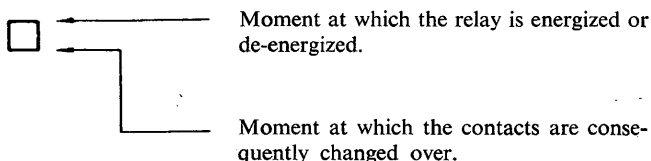
The operating or releasing of a relay is indicated by the square, in such a manner that the upper line of the square corresponds with the moment at which the electrical energization of the relay is started or finished and the lower line of the square corresponds with the moment at which the contacts are changed over. (Requirement 3a.)

In other words:

The upper side of the square indicates the moment at which the electrical energization changes; the lower side indicates the moment at which the relay responds to that change (i.e. changes over its contacts).

See also Chapter III below.

A

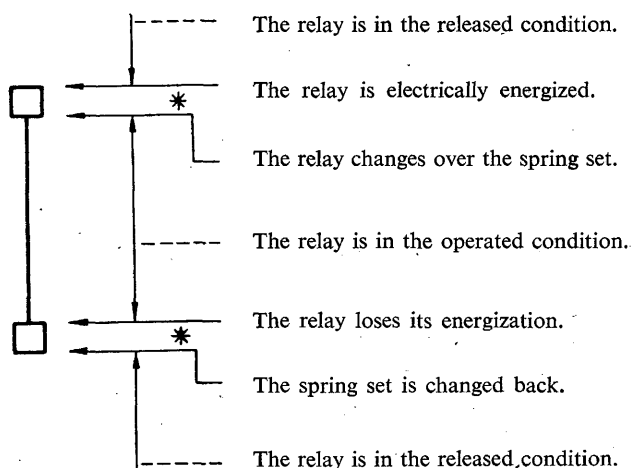


To indicate that a relay is in the operated condition, a line is drawn from the square indicating that the relay operates, vertically down to the square indicating that the relay releases.

A horizontal line can then be drawn corresponding to a moment at which no switching operations are effective. The vertical lines intersected by this horizontal line determine which relays are operated at that moment. (Requirement 3b.)

So:

B



During the operating and the releasing of the relay, (indicated in the foregoing by an asterisk) the relay is unstable, i.e. if the external influences are not changed, it cannot infinitely maintain its position.

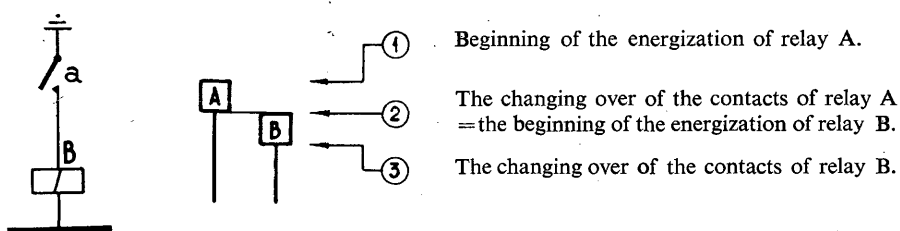
In general, it will only be necessary to ascertain which relays are operated or released when the condition of all the relays concerned is stable.

It is recommended to place the name of the relay inside the square indicating the operating of the relay.

## 2. Mutual co-operation between the various relays.

The direct influence of one relay on another can easily be indicated by means of horizontal lines. (Requirement 3c.)

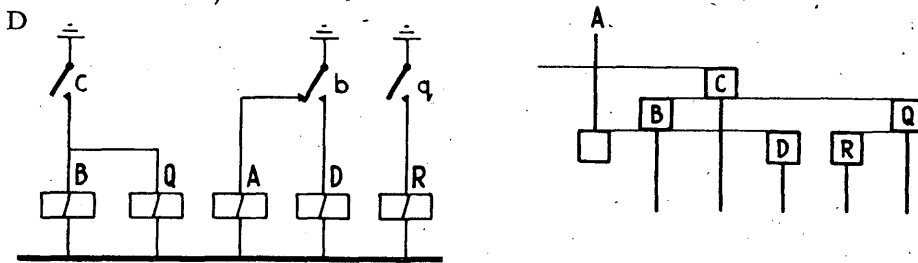
C



As far as (1): relay A is in the released position.  
 as far as (2): relay B is in the released position.  
 from (2): relay A is in the operated position.  
 from (3): relay B is in the operated position.  
 from (1) to (2): unstable condition for relay A.  
 from (2) to (3): unstable condition for relay B.

In this manner reading from cause to effect and from effect to cause is unambiguous and clear.

Below, a more complicated case is given:



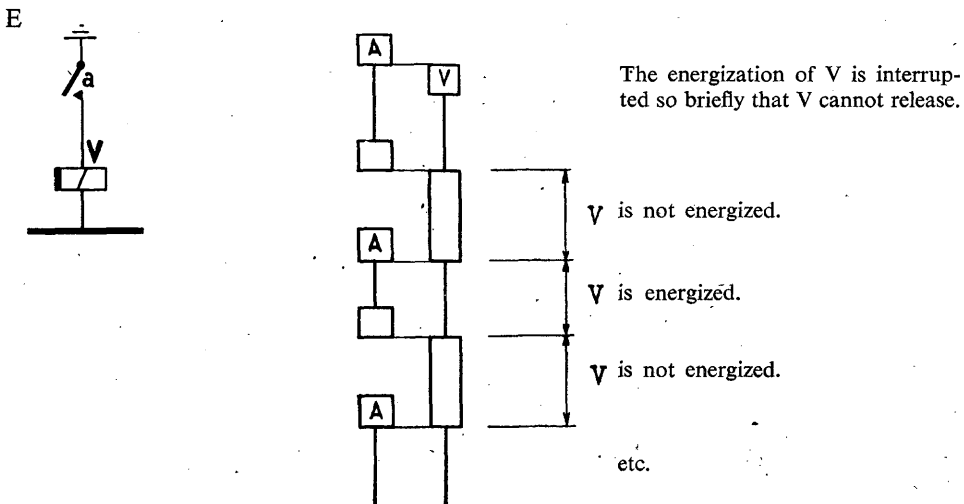
Because of the symbolical method of drawing applied, the sequence chart clearly shows that e.g. the operation of Q does not affect the operation or not of D.

*Remark:* The sequence from left to right of the various relays in the sequence chart may be chosen in the manner which is most suitable.

### 3. Relays which remain operated during a series of impulses.

When the energization of a relay is interrupted so briefly that the relay is not released, this may be considered as an incomplete release combined with an operation that has already started. (Requirement 3d.)

The logical consequence is:

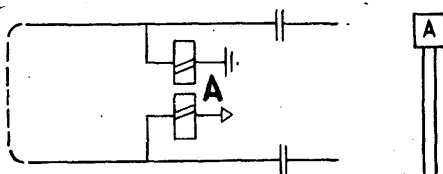


### 4. More than one winding.

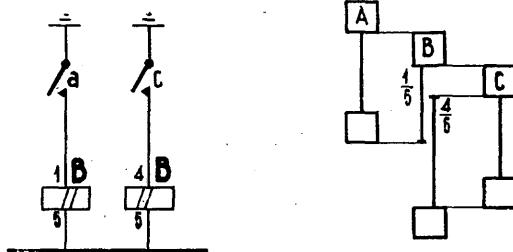
When the relay has more than one winding, each winding through which current flows can be indicated by means of a vertical stroke. (Requirement 3e.)

If necessary, the relevant winding(s) can be mentioned.

F



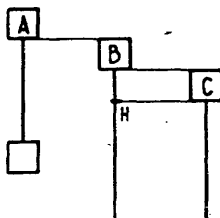
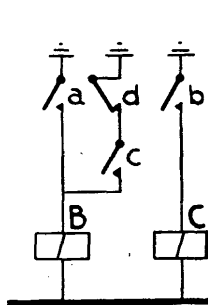
G



### 5. Holding circuit.

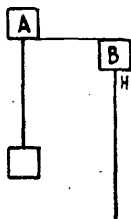
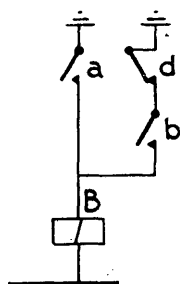
The closing of a circuit other than the one via which the relay was operated may be indicated by adding an « H » at a height corresponding to the beginning of the closing of that circuit, i.e. just *under* the line indicating the moment at which that holding circuit was switched on. (Requirement 3f.)

H



The holding circuit is closed by a contact of another relay.

I



The holding circuit is closed by a contact of its own.

## 6. Columns.

The relay unit considered usually co-operates with other relay units which are arranged in front of and behind the said unit.

It is then recommended to mention the former on the left hand side and the latter on the right hand side of the relevant sequence chart. If desired, a table of contents can be put on the extreme left hand side. If required, one or two narrow columns can be added, in which e.g. a number can be put which refers to a description.

Then the following columns will be obtained:

Indication of the chapters	Reference to description	Co-operation with apparatus in front	Relevant sequence chart	Co-operation with apparatus behind	Reference - to description
----------------------------------	--------------------------------	--	-------------------------------	--	----------------------------------

At the top and at the bottom of the sequence chart the names of relays can be mentioned once more.

## 7. Co-operation with other apparatus.

This is indicated on the same lines as mutual co-operation between various relays (see page 8), i.e. by drawing a horizontal line from the relevant square to the column: "Co-operation with apparatus in front (behind)."

All co-operation received from and given to other apparatus must be indicated. (Requirement 3g.)

This is done by means of a horizontal line with an arrow against the line separating the columns, which arrow indicates in what direction the influence is exercised. All information must be as brief as possible.

Some explanatory examples are given beneath.

The first column shows co-operation with the apparatus in front and the third column shows co-operation with the apparatus behind. The second column contains the relevant sequence chart. In the fourth column an explanation is given of the symbols used in the first three columns.

J			In the apparatus in front, earth is switched on the <i>d</i> -wire.
K			An earth on the <i>f</i> -wire is given to the apparatus in front.
L			An earth on the <i>c</i> -wire is given to the apparatus behind.
M			From the apparatus behind, voltage is applied via a relay winding to wire <i>g</i> .
N			The connection over wire <i>d</i> is interrupted in the apparatus in front.
O			Draws special attention to the fact that it was the earth on the <i>d</i> -wire in the apparatus in front that disappeared.
P			In the apparatus in front, an impulse is emitted by switching an earth on the <i>a</i> -wire for a short time.
Q			In the apparatus in front, the <i>a</i> - <i>b</i> loop is closed over a relay winding.
R			To the apparatus behind, on the <i>a</i> -wire and the <i>b</i> -wire, voltage and earth are reversed.

## CHAPTER III

## FURTHER DETAILS

## 1. Slow and quick functioning.

As described, the operating and releasing of relays are represented by squares. It stands to reason that the different types of relays have quite different times of operation and release, varying from a fraction of a millisecond to some seconds.

So the distribution of the time over the time axis is very irregular. 1 mm will sometimes correspond to e.g. 1 msec. and sometimes to 1 sec. So a linear scale, as applied in time-sequence charts, would not be suitable here.

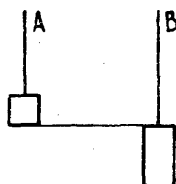
Even if quick functioning could be represented on a very small scale, too much paper would be required.

It may be remarked that the correct values of the operating and release times are in many cases unimportant and are usually not precisely known.

Sometimes it is desirable to draw attention to slow or quick functioning, e.g. for relays that may not release during a series of impulses and quick testing relays.

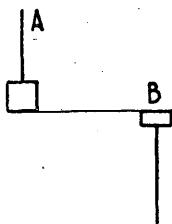
In these cases, slow functioning is represented by a rectangle bigger, and quick functioning by a rectangle smaller than the standard square.

S



Relay B is slow-releasing.

T



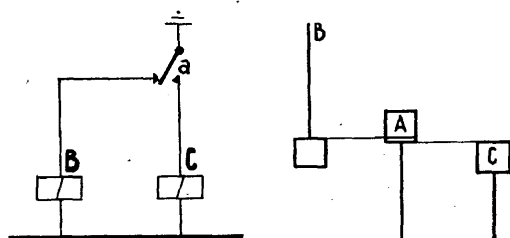
Relay B is quick-operating.

## 2. Different change-over times.

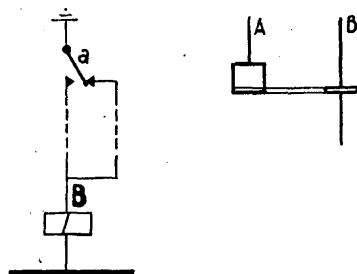
If it is necessary to indicate the difference in time between e.g. the opening of a contact and the closing of a contact on the same relay, this can be done by drawing a double line in the square.



U



V

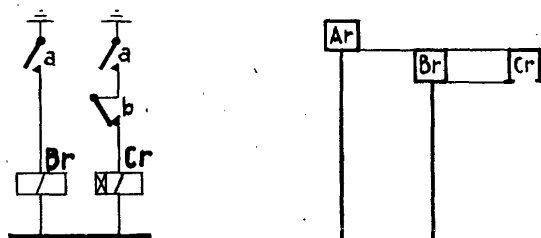


During the throw-over time of A, the energization of B is interrupted. The time is, however, too short to make B release.

### 3. Too short an energization.

An energization too short to make the relay operate is represented by an "operating square" of which the bottom (indicating the change-over of the contacts) is omitted.

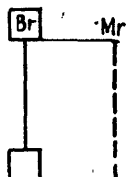
W



### 4. Insufficient current to make the relay operate.

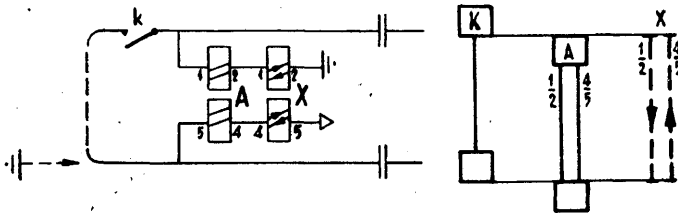
If the current flowing through the winding of a relay is insufficient to make the relay operate, this can be indicated by a line of dashes.

X

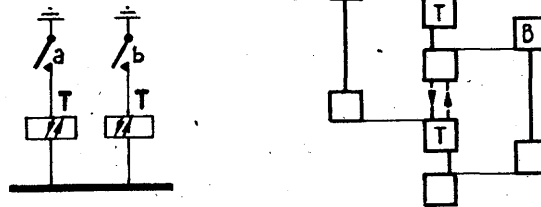


5. Differential relay.

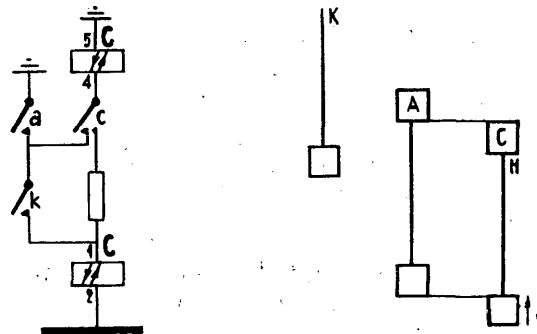
Y



Z

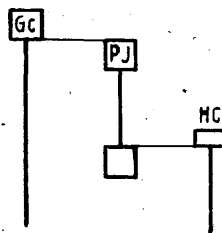


AA



6. Continuously hunting selector.

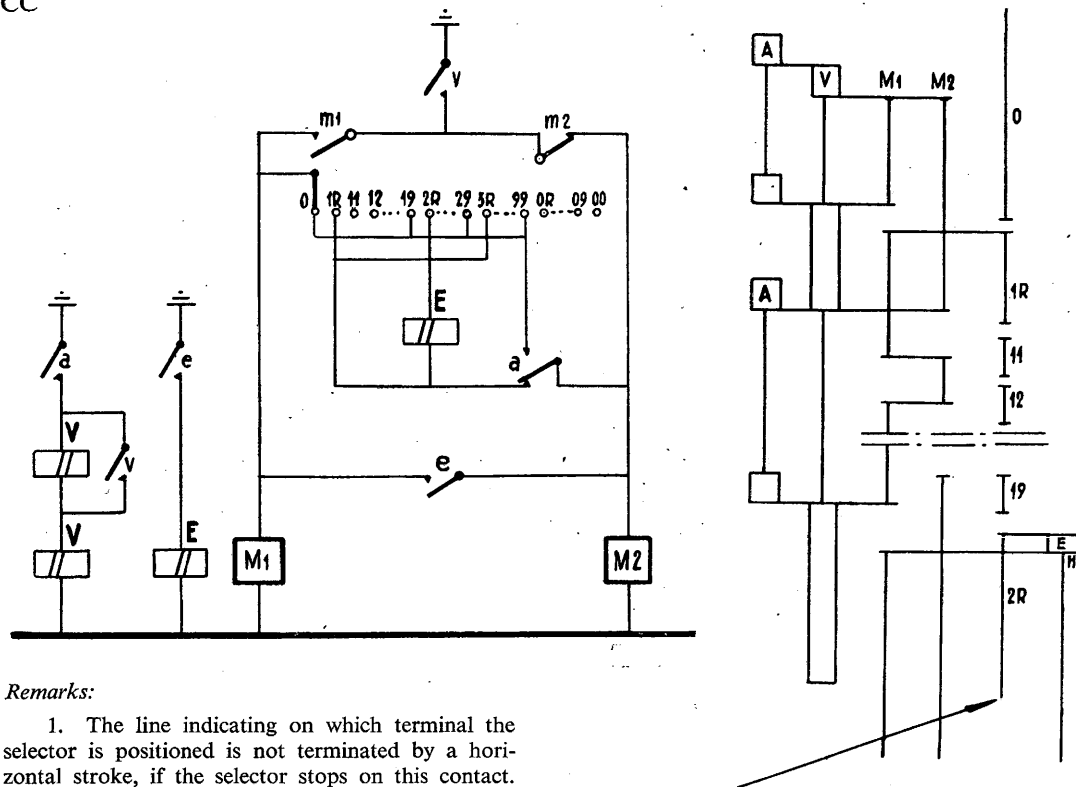
BB



When PJ is energized, the selector starts rotating.  
If the testing relay is operated over one of the terminals, the selector stops.

## 7. Motor-uniselector.

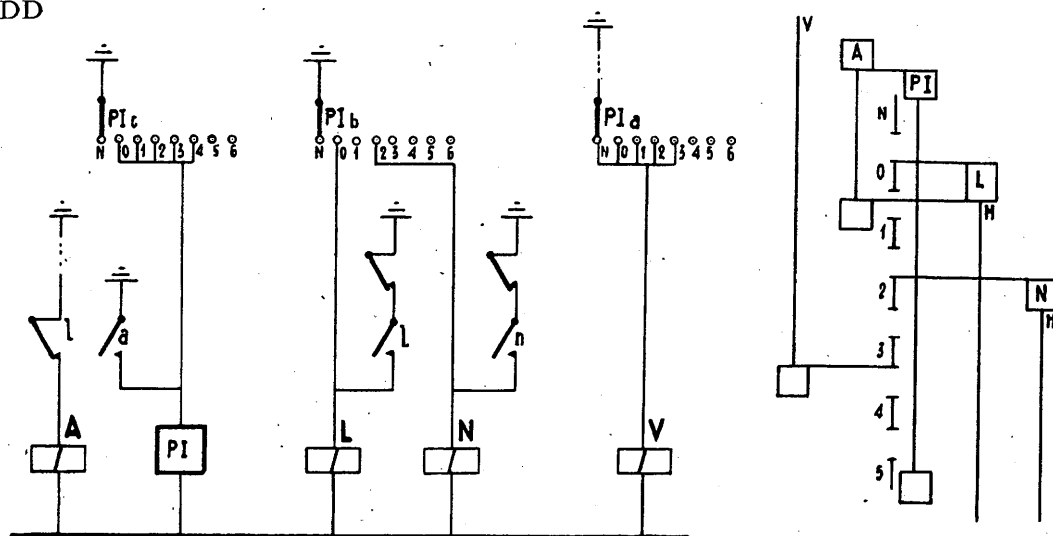
CC

*Remarks:*

1. The line indicating on which terminal the selector is positioned is not terminated by a horizontal stroke, if the selector stops on this contact.
2. If the position of the selector affects the further functioning, the thin line indicating this position *may* be extended to the bottom of the page.

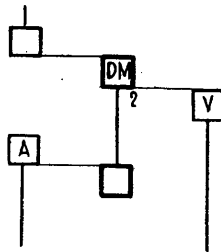
## 8. Continuously driven impulsing selector.

DD



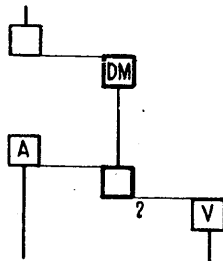
### 9. Step-by-step switch.

EE



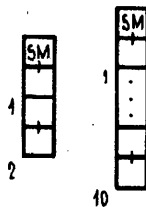
On energization, DM steps to position 2.

FF



On de-energization, DM steps to position 2.

GG



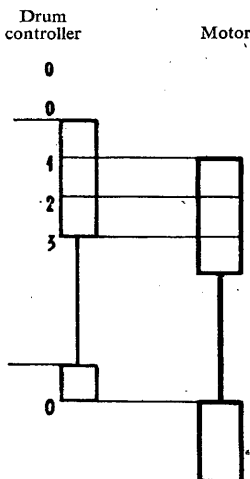
The energization of SM is interrupted and then restored by one of its own contacts.

The position is mentioned in the place in which that position has already been reached. So "2" is not mentioned before the stepping from 1 to 2 has already been effected, i.e. it is placed *under* the line indicating this changing of the condition.

The vertical stroke indicates the transition from the energized to the non-energized condition.

### 10. Motor.

HH

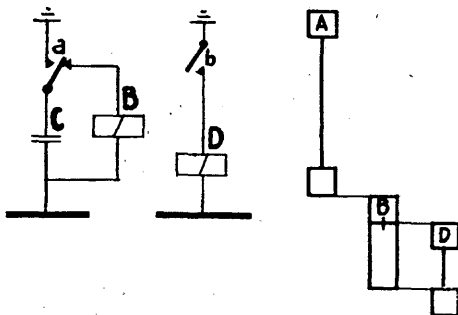


The motor is supposed to be started by a drum controller with 4 positions. (0,1,2 and 3)

When the motor is stopped, the drum controller directly returns to position 0. Other cases can be represented in an analogous manner.

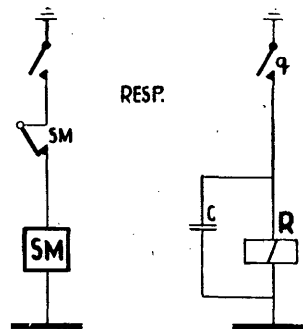
## 11. Energization by condenser discharge.

II



When relay A is operated, condenser C is charged. When A is being released, C is discharged via B. B operates and releases after some time when the voltage on the condenser is reduced too much.

Compare this case with the step by step magnet, which interrupts its own energization, and also with the slow releasing of a relay when a condenser is connected parallel to a winding:



## 12. Briefly interrupted energization.

If energization is briefly interrupted, so that it is doubtful whether the relay can just manage to remain operated or whether it is released for a short moment, this can be indicated in the following manner:

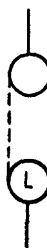
JJ



Relay A loses its energization for a short moment. It is of no importance whether A is released for a short moment or not.

Similarly, a very brief interruption of the current through a lamp can be indicated by:

KK

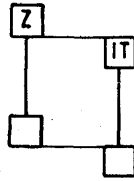


No current flows through the lamp for a short moment. It is of no importance whether this fact makes the lamp flicker or not.

### 13. Meter.

A meter is represented in the same manner as a relay.

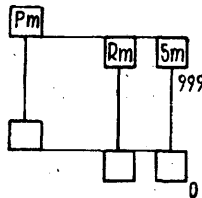
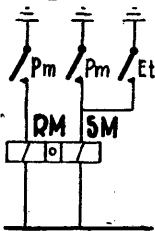
LL



Here IT is the meter.

If the position of a meter has to be indicated, it is done in the same manner as for the step by step switches. E.g. when the meter has to be re-set to zero:

MM

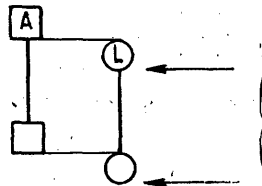


Both coils (RM and SM) of the meter are represented in the same manner as a relay. A short energization of the two coils brings the meter to the zero position. By means of a brief energization of the coil SM (via the Et contact) the meter steps on.

### 14. Lamp.

a) In the case of a lamp, a circle is used instead of a square. The top of the circle indicates the moment at which the lamp is switched on or off. The lower point can be used to indicate the beginning (or the end) of the lighting up.

NN

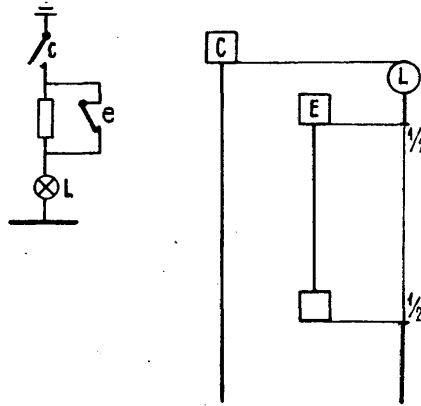


duration of the lighting up.

b) A dimly burning lamp is indicated by means of a thinner vertical line. At the beginning and the end of the thin line " $\frac{1}{2}$ " is placed.

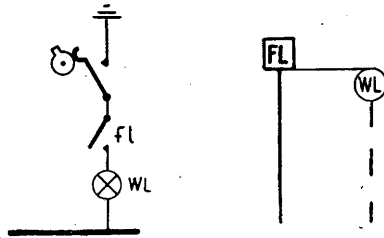
Example:

OO



c) Flickering of a lamp is indicated by means of a vertical line of dashes:

PP



### 15. Electronic valves.

The time during which an electronic valve is conductive is indicated by:

QQ



### 16. Voltage of a point.

If it has to be indicated whether the voltage of a point in a circuit-arrangement is high or low, and if only these two conditions are possible (electronic relays), it is recommended to indicate only the period during which the voltage is high, i.e. by:

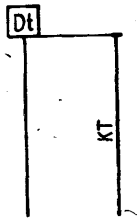
RR



## 17. Tones.

Interrupted or complex tones, such as interrupted ringing tones or tones referring to enquiries, are drawn as non-interrupted tones. The indication of the tone can be placed along the line.

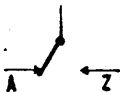
SS



The operation of the relay Dt causes the transmission of the dialling tone (KT).

## 18. Polarized relays.

TT



In the functional diagram, the positions of the contacts must be provided with an indication.

The C.C.I.T. recommends for teleprinter technique the indication A for start polarity and the indication Z for stop polarity.

The winding 1-2 supplies an energization of 10 ampère-turns. The contact is in the position, A.

The winding 3-4 (20 ampère-turns) is switched on. The indication on either side of the vertical line shows that the energizations of the two windings are opposed to each other. The contact changes over from position A to position Z.

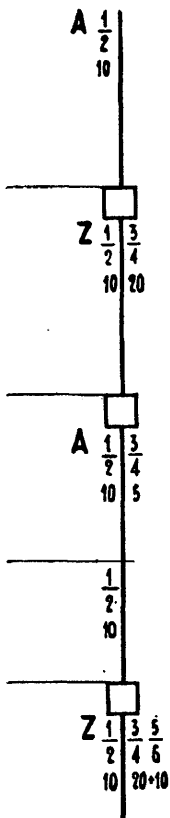
The energization of the winding 3-4 is reduced from 20 to 5 ampère-turns.

The contact is changed over to position A.

The winding 3-4 is switched off. The contact remains in position A.

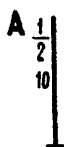
The windings 3-4 and 5-6 (20+10 ampère-turns) are switched on. The contact changes over to position Z.

The windings 3-4 and 5-6 support each other, the winding 1-2 opposes the energization of the two other windings.



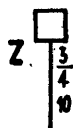


UU



The winding 1-2 supplies an energization of 10 ampère-turns.  
The contact in position A.

The winding 1-2 is switched off.  
The contact remains in position A.



The winding 3-4 is switched on and supplies an energization of 10 ampère-turns which is opposed to the first energization of the winding 1-2.

The contact is changed over to position Z.

On the left-hand side, the letters A and Z indicate the position of the contact. Near the vertical line, the windings through which current flows are indicated. If desired, the energization in ampère-turns can be shown under these indications.

Indications on the same side of the vertical line represent energizations which support each other; indications on both sides of this line represent energizations that are opposed to each other.

#### 19. Direction in which the motor is rotating.

If there are two directions of rotation possible, it is sometimes desirable to indicate the relevant direction. This can be done in the same manner as described above for polarized relays, by means of standardized letters or, even better, by symbols.

It is recommended to indicate the opening and closing of sliding doors by:

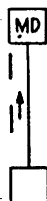
VV

WW



Example: Motor MD closing the door of a lift:

XX

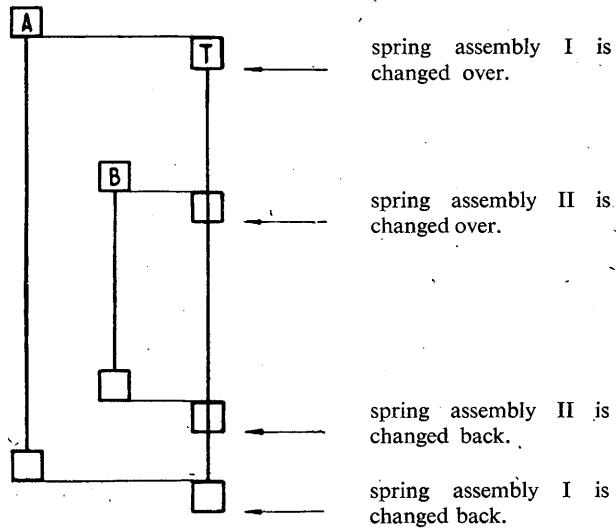
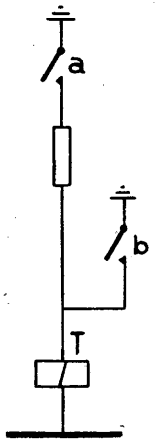


#### 20. Two-step relays.

Two cases can be distinguished, i.e.:

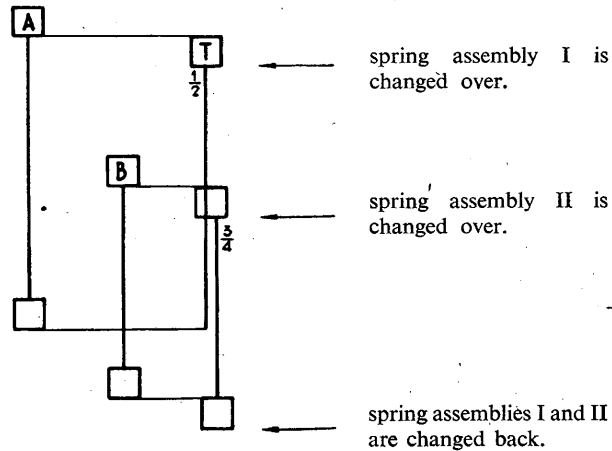
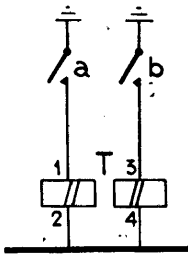
a) The relay has one winding. By varying the energizing current, one or both spring assemblies can be changed over:

YY



b) The relay has two windings and the current flowing through one of the windings develops more pulling force than the current flowing through the other winding.

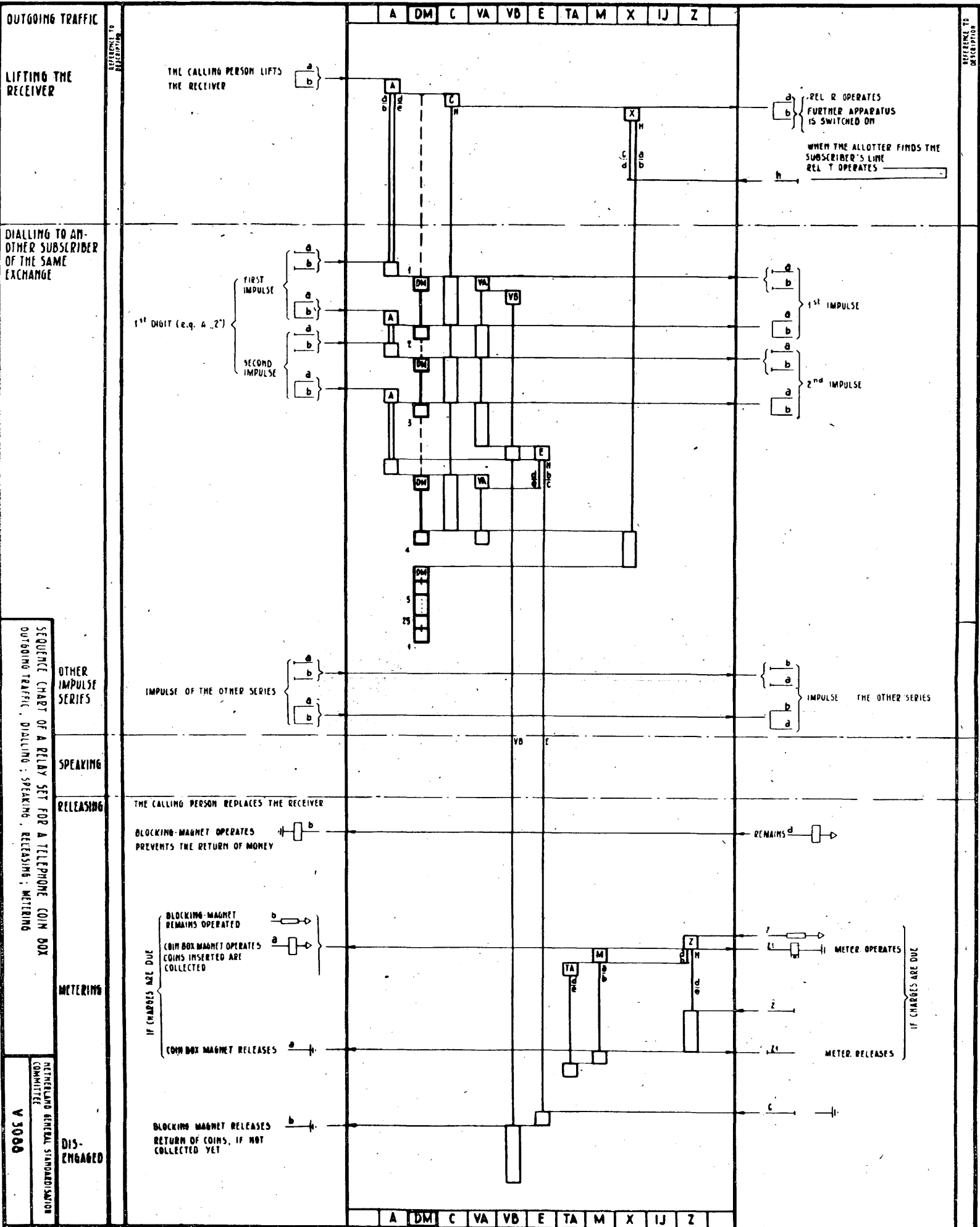
ZZ



## CHAPTER IV

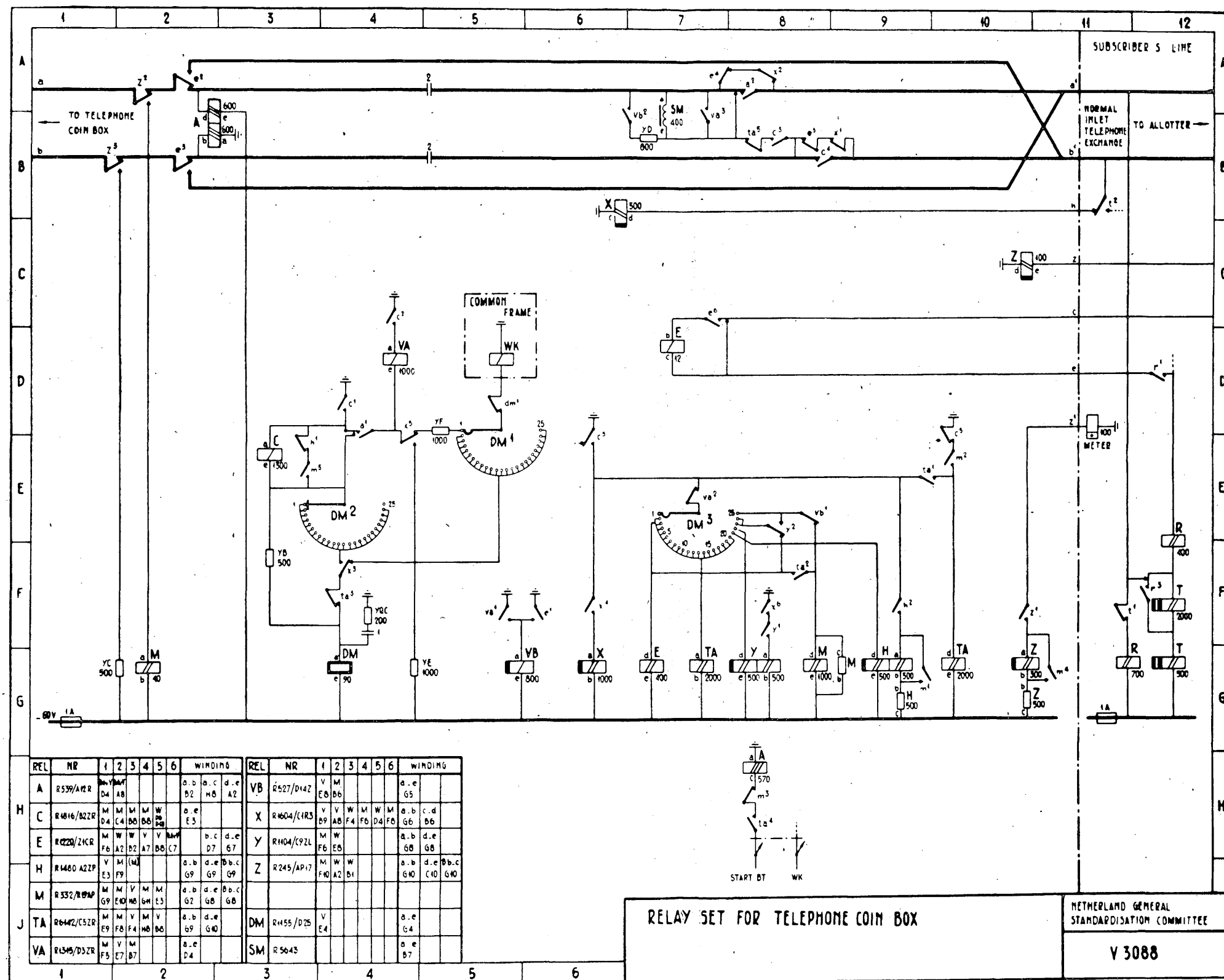
### EXAMPLE

To show the manner in which a sequence chart should be laid out, part of the sequence chart of a relay set for a telephone coin box is annexed hereto.



SEQUENCE CHART OF A RELAY SET FOR A TELEPHONE COIN BOX  
OUTGOING TRAFFIC, DIALING, SPEAKING, RELEASING, METERING

NETHERLAND GENERAL STANDARDIZATION COMMITTEE  
V 3066



**MODIFICATIONS TO VOLUME V  
OF THE GREEN BOOK**

**(Signalling and Switching)**

---

**1st Amendment.**

Replace Chapter II of Part 2, pages 13 to 17, by the following:

**CHAPTER II****GUIDING PRINCIPLES ON WHICH THE C.C.I.F. RECOMMENDATIONS  
RELATIVE TO INTERNATIONAL SIGNALLING AND SWITCHING  
SYSTEMS HAVE BEEN BASED****1. Unidirectional operation of the circuits**

To enable the equipment to be as simple as possible and to avoid double connections and lock-ups, the international fully-automatic or semi-automatic telephone circuits should be operated *in one direction only*.

**2. Transmission of signals in the 300/3400 c/s band**

The signals employed on international circuits must be transmitted within the band of frequencies used for speech.

*Note 1.* — In reaching this decision, account was taken of the following advantages of systems which use separate channels for speech and for signalling:

- (1) Freedom from disturbance due to speech currents and echo suppressors and also from disturbances which might arise from connections to other systems;
- (2) Possibility of using signals formed by short pulses or continuous transmission and the possibility of transmitting these signals during the actual period of conversation;
- (3) Simplicity of terminal equipment.

The following disadvantages of systems using a signalling channel, completely separate from the speech channel, have also been taken into consideration:

- (1) The need to transfer all signals from the incoming to the outgoing side of each transit centre;
- (2) The additional costs arising from the establishment of a separate signalling channel;
- (3) The possibility that a trunk connection may be set up, in which the speech channel (associated with the signalling channel) is faulty;
- (4) The distortions of signals due to additional repetitions at transit centres;
- (5) The increased difficulties when a defective section of the line has to be replaced.

*Note 2.* — Signalling systems not using frequencies within the speech band, and not presenting, or not presenting to the same extent, the disadvantages (2), (3) and (5) referred to above, have been developed for modern multi-circuit carrier cable systems.

If Administrations desire, by bilateral agreement, to use such systems for direct routes which would not carry transit traffic, it would be highly desirable, from the transmission aspect, to use one of the types of out-of-band signalling systems defined in the Appendix to this chapter.

### 3. *Maximum admissible power for signals transmitted over international circuits*

The power of signals for international signalling systems has been defined on the assumption that international circuits would be in accordance with the limits laid down by the C.C.I.F., particularly in respect of the power levels and stability of the transmission and based on the three following recommendations:

(1) The maximum signal energy transmitted in the course of the busy hour should not exceed a value of 9000 microwatts seconds at a point of zero relative level for one direction of transmission on a circuit.

*Note.* — This recommendation was made by the C.C.I.F. XIVth Plenary Assembly (Montreux 1946) which decided that, for signal constituted by a succession of trains of sinusoidal alternating currents, the mean power (during the busy hour) should not exceed a value corresponding to an absolute level of power of  $-3.0$  nepers or  $-26$  decibels at the point of zero relative level. This absolute level of power is that which should not be exceeded by a sinusoidal current at any voice frequency, continuously applied at the point of zero relative level.

The C.C.I.F. XVIIIth Plenary Assembly (Geneva 1956) specified the maximum limit of energy, not for the signals alone, but for signals and tones *together*. This maximum energy results from considerations relating to the possible overloading of amplifiers in coaxial carrier-current telephone systems and was fixed as 36 000 microwatts seconds during the busy hour for one direction of transmission of a circuit. In a multi-circuit carrier system, in order to obtain the value of the energy for unidirectional transmission, it will be permissible to take half of the energy relative to signal transmission in both directions.

(2) The absolute level of power admissible for each element of a signal of short duration, as a function of its frequency, should not exceed the values indicated in Table 1 which follows. This recommendation results from cross-talk considerations.

*Note.* — Following the studies made in 1955/1956, the C.C.I.F. XVIIIth Plenary Assembly (Geneva 1956) confirmed that the values in Table 1 were still valid in addition to the information appearing in the note following this Table which indicates how those absolute level values for each frequency have been decided.

TABLE 1

*Maximum admissible value (at the point of zero relative level)  
for the absolute level of power of a signalling pulse*

Signalling frequency c/s	Maximum admissible power for a signal at the point of zero relative level (microwatts)	Corresponding absolute level of power	
		Nepers with reference to 1mW	Decibels with reference to 1mW
800	750	$-0.11$	$-1$
1200	500	$-0.35$	$-3$
1600	400	$-0.45$	$-4$
2000	300	$-0.57$	$-5$
2400	250	$-0.7$	$-6$
2800	150	$-0.9$	$-8$
3200	150	$-0.9$	$-8$

*Note.* — If the signals are constituted by two different frequency components, transmitted simultaneously, the maximum admissible values for the absolute power levels are 3 decibels (or 0.35 nepers) below the above figures.

*Note.* — The values shown in Table 1 above have been obtained taking into consideration the limitation imposed by noise produced in an adjacent channel of a carrier-current system. This limit was determined on the following basis:

a) The psophometric E.M.F. (measured at the point of zero relative level) produced in an adjacent channel by signalling pulses on the signalling channel considered, is assumed to have a "median" admissible value of 0.5 millivolts (or an absolute level of -70 decibels) where the "median" value is defined as being the value in millivolts corresponding to the mean value of the psophometric E.M.F.s expressed in decibels.

b) A value of 62 decibels is assumed as the mean value of the difference of attenuation between the suppressed band and the pass band of a telephone channel filter of a carrier-current system.

c) The curve defined in Volume II of the C.C.I.F. Green Book (Recommendation No. 5, Vol. II) has been adopted as the characteristic curve of the psophometric filter network for commercial telephone circuits.

(3) In the case of a signal comprising a mixture of two sinusoidal currents at different frequencies, the maximum admissible power of each of these components must be half the admissible power of a signal with sinusoidal wave form in the steady state and of the same duration and transmitted at the same rate.

#### 4. *Choice of frequencies for the signalling systems recommended by the C.C.I.F.*

The results of tests carried out at London, Paris and Zurich, between 1946 and 1948, on the subject of the number of false signals due to speech currents (signal imitation) in relation to different values of signalling frequencies, led to the conclusion that, to obtain a relative immunity from false signals without excessively increasing the length of the signals used, it was desirable to use frequencies of at least 2000 c/s.

At this time and taking into account the conditions of the foreseeable future, a frequency of 2600 c/s seemed, from this point of view, to be the best for signalling over international circuits of modern carrier current types.

A frequency as high as 2600 c/s cannot, however, be used satisfactorily on a number of international circuits planned to remain in service for a long time and on which the rapid increase of attenuation with frequency in the higher range of frequencies prohibits the reliable use of this frequency.

#### 5. *Principles adopted for establishing the list of international signals.*

The principles on which the list of international signals has been based are as follows:

1. It is desirable to reduce the number of distinct signals to be transmitted over an international circuit to a minimum compatible with the essential needs of an international semi-automatic service effected with standard equipment and used for transit operation as well as terminal operation.

2. It is desirable to provide operators at the outgoing international terminal centre with the means:—



a) to obtain connection to any incoming operator at an incoming international terminal centre, who functions as an incoming "B" operator;

b) to obtain connection to any suspended-call operator at an international terminal centre;

c) to obtain connection to a particular suspended-call operator at an international terminal centre;

d) to cause an operator, speaking a particular language (assistance operator) to intervene on an established call.

3. It is desirable to consider the international service with remote selection as having its own characteristics and not to require with this method of operation *in normal service* all the advantages of obtaining the called subscriber directly and at the same time all the advantages resulting in manual service from the presence of an operator at the incoming end of the international circuit.

## APPENDIX

**Characteristics of out-of-band signalling systems whose use would be desirable from a transmission aspect, where such systems would be used by bilateral agreement for direct circuits, which would not carry transit traffic.**

### *Type 1 (discontinuous).*

Frequency: Virtual carrier (zero frequency).

Level: High, for example —3 db (at a point of zero relative level).

### *Type 2*

#### A (discontinuous).

Frequency: 3825 c/s.

Level: High, for example about —5 db (at a point of zero relative level).

#### B (semi-continuous).

Frequency: 3825 c/s.

Level: Low, for example —20 db (at a point of zero relative level).

The first type of signalling system is only compatible with group and supergroup reference pilots, where the displacement from the virtual carrier frequency (zero-frequency) is 140 c/s.

Types 2 A and 2 B are only compatible with group and supergroup reference pilots, where the displacement from the virtual carrier frequency (zero-frequency) is 80 c/s.

**2nd Amendment**

On page 20 of Volume V, replace paragraph 2 by the following:

**Power of signals transmitted on national circuits**

The C.C.I.F. hopes that Administrations and Private Operating Agencies will, as far as possible, take into consideration for their national signalling systems the following limits:

a) 36 000 microwatts seconds for the signalling currents (*electric signals and tones*) which must not be exceeded during the busy hour for one direction of transmission of a circuit (with the assumption that in a multichannel carrier system, the energy for one way transmission is half the signal energy for transmission in both directions);

b) the values in Table 1 on page 94, giving the absolute level of power (at the point of zero relative level) of a signalling pulse at a given frequency.

**3rd Amendment**

In the "Specifications", replace paragraph 2.9, page 55, by the following new text:

**2.9. Connection of the signal transmitter and signal receiver to the circuit.**

The signal receiver should be protected against disturbing currents (voice currents or possibly noise), coming from the near-end of the circuit, by a buffer amplifier or other arrangement. The arrangement used should introduce an appropriate supplementary attenuation in such a manner that, at the point where the signal receiver is connected, these disturbing currents are of such a level that they cannot:

- operate the signal receiver,
- or interfere with the reception of signals by operating the guard circuit of the signal receiver.

The supplementary attenuation introduced should in consequence take account:

a) of relative level  $n$  of the point where the signal receiver is connected (this relative level is obtained by taking as the zero relative level the origin of the circuit situated at the extreme end);

b) of the lowest signal level at the entry to the signal receiver, that is:

- $18+n$  db in the case of the 2 frequency system (see page 75 of Volume V of the Green Book);
- $15+n$  db in the case of the 1 frequency system (see page 65 of Volume V of the Green Book);

c) of the maximum admissible level for disturbing currents (voice currents and switching noise) coming from the near-end of the circuit. For the maximum level of voice currents, an assumption could be made which might be, for example, +10 db at the point of zero relative level in the direction *opposite* to that of the signals. The characteristics of the switching noises depend on the national systems used;

d) of the equivalent with which the international circuit is operated in terminal service;

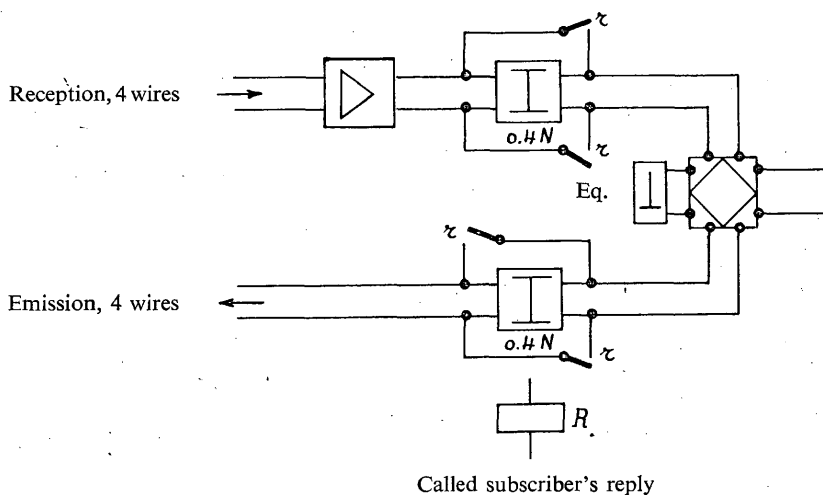
e) of a margin of security  $x$  corresponding to an appreciable reduction of the level of disturbing currents coming from the near-end as defined, with reference to the minimum level of the signal as defined in paragraph b).

#### 4th Amendment

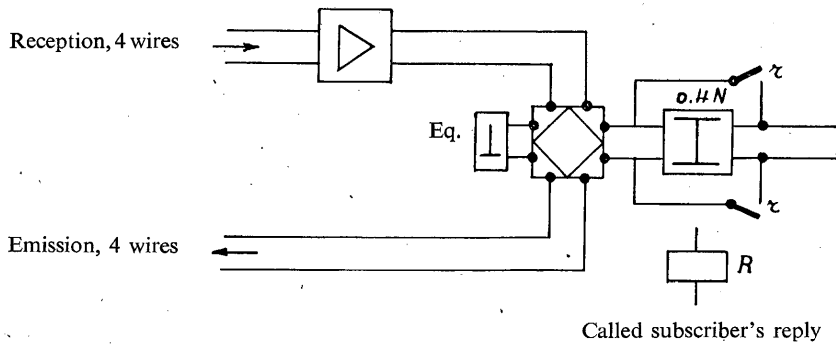
It would be useful, on the occasion of a reissue of Volume V of the Green Book, to introduce in the Appendix to the Specifications, diagrams illustrating the 3 methods indicated in the paragraph 2.4 previously mentioned. These diagrams could be as follows:

#### Diagrams

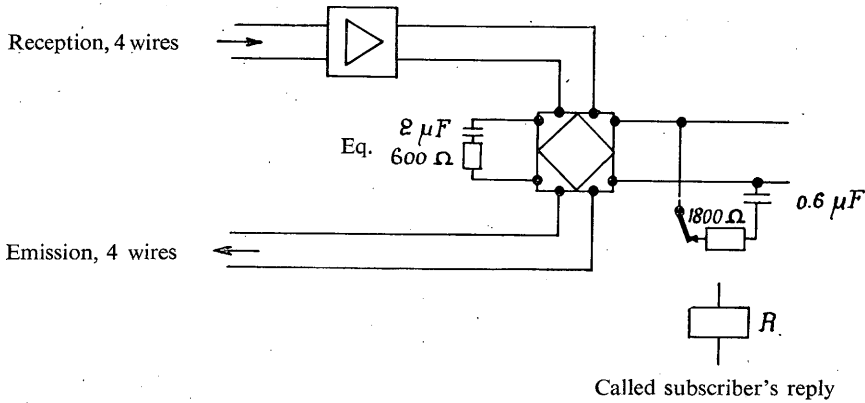
a) Insertion of a line attenuation on each of the channels of the 4-wire part of the connection.



b) Insertion of a line attenuation in the 2-wire part of the connection.



c) Insertion of a terminating impedance in parallel with the 2-wire part of the connection.



**5th Amendment**

*New Recommendation (of a general character) to be introduced as a new Part in Volume V of the Green Book*

(The title of this 5th Part, which has been placed at the end of the Book, so as not to alter the existing order of the parts in Volume V, would be "General Switching Recommendations of the C.C.I.F. ".)

**METHODS OF IMPROVING THE RELIABILITY OF CONTACTS  
IN SPEECH CIRCUITS**

In order to improve the reliability of contacts in speech circuits, the following methods can be taken into consideration:

a) Use of precious metals such as platinum, palladium, gold, silver, or alloys of these metals. If, for one reason or another, it is not desired to wet the contacts, or if enough contact pressure cannot be provided, it is preferable to use the metals or alloys mentioned above, with the exception of pure silver.

b) Use of high contact pressure.

c) Double contacts.

d) Lubrication (with suitable oils) of certain non-precious metal contacts in the case of sliding contacts (e.g. wipers).

e) D.C. "wetting" of contacts, care being taken to avoid the introduction of noise due to transients when the contacts are made or broken.

f) Air filtration or other protective measures to avoid dust.

g) The maintenance of suitable humidity.

h) The use of protective covers.

i) Protection against fumes, vapours, and gases.

j) Avoidance of the use near contacts of materials likely to be detrimental to the contacts.

On the other hand, in the case of the application of voice-frequency signals to a transmission path, as it is not possible to use wetted contacts, due to the surges which occur at the time of the closing and opening of the contact, it is preferable to use static modulators with rectifier elements.

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# MODIFICATIONS TO VOLUME VI OF THE GREEN BOOK

## Operating and Tariffs

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### NEW RECOMMENDATIONS OR AMENDED RECOMMENDATIONS APPROVED BY THE XVIIIth PLENARY MEETING OF THE CCIF

Recommendation 12 <i>bis</i>	<i>Amended Recommendation</i>	Use of speech recording apparatus associated with subscribers' telephones
Recommendation 12 <i>ter</i>	<i>New Recommendation</i>	Essential clauses for a $\odot$ recording apparatus to substitute for the caller subscriber
Recommendation 21	<i>Amended Recommendation</i>	Lease of international communication channels for private service
Recommendation 31	<i>Deleted</i>	Telegraphic preparation of telephone communications
Recommendation 34 <i>bis</i>	<i>New Recommendation</i>	Semi-automatic transit traffic
Recommendation 37 <i>bis</i>	<i>New Recommendation</i>	Charging for calls to a device substituting for a telephone instrument for the purpose of answering in the subscriber's absence and, possibly, of recording a message
Recommendation 40 <i>bis</i>	<i>Amended Recommendation</i>	Time-to-answer of operators
Recommendation 41	<i>Amended Recommendation</i>	International telephone charges (Circuits of European Continental Type)
Recommendation 41 <i>bis</i>	<i>New Recommendation</i>	Charging in a fully automatic international telephone service
Recommendation 49	<i>Amended Recommendation</i>	Broadcast Transmissions
Recommendation 49 <i>bis</i>	<i>New Recommendation</i>	International Television Transmissions
Recommendation 63 <i>ter</i>	<i>New Recommendation</i>	Calculation of the best arrangement for alternative routing

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**RECOMMENDATION 12 bis****Use of speech recording apparatus associated with subscribers' telephones**

(Recommendation amended by the XVIIIth P.A., Geneva, 1956. For former text see *Vol. VI of the "Green Book"*, p. 36)

**THE INTERNATIONAL TELEPHONE CONSULTATIVE COMMITTEE,**

Considering,

That the existence of apparatus installed at a subscriber's premises, with the approval of an Administration or Private Operating Agency, and designed to substitute for the subscriber in his absence and to answer for him and as necessary to record a message, ought to be brought to the notice of persons likely to make a call to the subscriber concerned,

Unanimously issues the recommendation:

That the presence of such apparatus should be indicated by means of a special sign in the telephone directory (for this purpose the sign  $\bigcirc$  already used by certain Administrations should be employed).

That Administrations or Private Operating Agencies ought also to invite the owners or renters of such equipment to mention the fact on their letter-paper by means of a printed indication.

Considering, moreover, the need to facilitate the disposal of international traffic in the case where an international call terminates on a speech recording apparatus, placed at the premises of the called subscriber and substituting for him in his absence, to collect messages (that the called person could hear later) or transmit a message to the caller,

Unanimously issues the recommendation:

That the presence of such an equipment ought to be announced to the caller by means of a verbal announcement when a call terminates on such an equipment. This verbal announcement should quote the called subscriber's number, the exchange to which he is attached, his name and a clear indication of the moment at which the caller should speak. An international call terminating on such an equipment could take place under these conditions, since the caller will be informed either directly, or by means of an operator in the international service, of the conditions under which his message can be recorded.

**RECOMMENDATION 12 ter (New Recommendation)****Essential clauses for a  $\bigcirc$  recording apparatus to substitute for the called subscriber****A. OPERATING CONDITIONS****1. Delay in answering.**

The ringing current from the telephone exchange should be permitted to operate the telephone bell for at least 3 seconds but for not more than 10 seconds before the

call is answered by the apparatus. This will enable the call to be answered in the *normal way* in those countries which wish to provide for such a facility. The timing of this interval (3-10 seconds) should be independent of the periodicity or the duration of the ringing current.

2. *Normal conditions for metering and supervision.*

In answering a call the apparatus should loop the subscriber's line and should also give the normal conditions for control of metering and for supervision as with a normal subscriber's installation.

3. *Announcement of the presence of the apparatus.*

a) The presence of the apparatus should be indicated to the calling subscriber by means of a verbal announcement, following, in principle, immediately on the closing of the loop on the subscriber's line.

b) This verbal announcement should include, in particular, the following:

- first, whether the apparatus permits the recording of a message,
- the subscriber's name or business style,
- the subscriber's number and particulars of the locality (e.g., Geneva, St. Moritz, etc.),
- clear instructions as to the functioning of the apparatus (whether a message may be recorded, and if so, the moment when the message may be recorded and the maximum duration of a recording).

## B. SIGNALLING CONDITIONS

1. *Avoidance of interference from signalling frequencies.*

The correct functioning of the apparatus should not depend upon (nor be affected to any extent by) the sending or receiving of signalling frequencies (used in the telephone system or specially generated in the apparatus).

2. *Avoidance of interference with national signalling systems by the tones transmitted by the apparatus.*

To avoid interference with the national signalling system of a country by the tones transmitted by the apparatus over the network of that country, it is recommended that, in the case of the transmission of tones by the equipment:

- the transmission of tones should be in short pulses and not a continuous transmission;
- the tones should not be composed of a single frequency but should be a mixture of at least two frequencies, so that the guard circuit of the signal receiver of the corresponding country, where there would be a risk of interference, may operate (for this purpose, the choice of the following frequency-combinations should be avoided:



2040 and 2400 c/s;  
500 and 20 c/s;  
1000 and 20 c/s;  
600 and 750 c/s;  
1200 and 1600 c/s.)

### C. TRANSMISSION CONDITIONS

Any recording apparatus, which takes the place of the called subscriber, should give a level and quality of speech comparable with that given when the line is used by a physical person.

## RECOMMENDATION 21

### Lease of international communication channels for private service

(Amended, by the XVIIIth P.A., Geneva, 1956. For former text, see *Volume VI of the "Green Book"*, p. 61)

#### I. — CONDITIONS OF ADMISSION

THE INTERNATIONAL TELEPHONE CONSULTATIVE COMMITTEE,

Considering,

That, in several services, circuits are available in the international cables;

That the possible lease of international telephone communication channels should be organized by Administrations and Private Operating Agencies on comparable bases;

That it is desirable, however, to ensure that the nature of this leasing should not be such as to interfere with the service in general or to be open to abuse by the subscribers renting the circuits,

Unanimously issues the recommendation:

That the Administrations and Private Operating Agencies, who permit the full time leasing of international telephone communication channels, should be guided by the following principles:

1. An international telephone communication channel in a given service will be leased only if the number of circuits in the service makes this feasible.

2. The leasing of an international telephone communication channel having been agreed, the connection will be established once and for all in such a way that the telephone exchanges no longer have to intervene, but the technical arrangements should be such that the operating personnel are able (by means of appropriate switchings made at their request) to effect control of the calls exchanged over the leased circuit.

The stations connected in this way should in no circumstances be stations normally available to the public.

The calls exchanged must be concerned exclusively with the personal affairs of the subscribers or those of their firms. The line must in no way be made available to third parties.

It is desirable that the leased circuits should terminate at the subscribers' premises at installations which prevent these circuits being used under conditions other than those authorized.

3. In principle, the lease should be for a minimum of one month; however, by agreement between Administrations and/or Private Operating Agencies concerned, the lease may be for a period of less than one month. The lease is renewable month by month by implication, the notice of cancellation on either side to be given two weeks before the end of the current period of lease.

4. Administrations and Private Operating Agencies reserve the right to take back the leased communication channel if it is in the interest of the general service to do so, the appropriate notice being given as mentioned in § 3.

5. The rental is payable monthly in advance.

6. In the case of interruption due to a fault of the telephone service, the Administration or Private Operating Agency of origin grants a rebate at the request of the renter. The rebate is calculated in accordance with the provisions of Part II (Charging) below.

## II. — CHARGING

### THE INTERNATIONAL TELEPHONE CONSULTATIVE COMMITTEE,

Considering,

That the leasing of an international telephone communication channel is a great privilege for the renters;

That, however, the fact that the operating personnel of the Administrations and Private Operating Agencies do not have to assist in the establishment of calls should be taken into account,

Unanimously issues the recommendation:

1. That the rental for an international telephone communication channel should correspond to 6,000 minutes of ordinary conversation, during the period of heavy traffic, on the service concerned, per month. If an interruption occurs, due to the fault of the telephone service, and lasts for at least one day, the rebate should correspond to 200 minutes of conversation per day of interruption.

2. That for the collection and settlement of the amounts due in respect of rentals for leased circuits, several methods might be adopted, and in particular one or other of the following two methods:

- a) The Administration of the country of residence of the subscriber who ordered the leased circuit collects the rental due and enters the amount in the international accounts;
- b) the Administration of one of the terminal countries collects from the subscriber in its country the rental due for the section of the leased circuit in its own territory: the Administration of the other terminal country collects the balance of the rental and remunerates, when appropriate, the transit countries.

3. That in the case of a lease for a period of 10 days or less, the rental should be 80 units per day, or 240 ordinary call minutes in the service concerned in

the period of heavy traffic, per day of lease, plus a surcharge corresponding to 10 units or 30 ordinary call minutes in the period of heavy traffic, irrespective of the duration of leasing (thus, the charge for 3 days would be for  $3 \times 240 + 30 = 750$  minutes).

4. That in the case of a lease for periods exceeding 10 days and up to 25 days, the charge should be 80 units per day, or 240 minutes of ordinary conversation in the service concerned, in the period of heavy traffic, per day of lease, no surcharge being collected in this case (thus, for 11 days, the charge to be applied would be  $11 \times 240 = 2640$  minutes).

5. That in the case where the lease is extended beyond the 25th day, up to the end of the month, the charge will be fixed uniformly at 2,000 units, or 6,000 ordinary conversation minutes in the service concerned, in the period of heavy traffic.

6. That in the case of a lease for a period exceeding one month, the charge for the first month should be that indicated above and the charge for each additional day should be 200 ordinary conversation minutes in the service concerned, in the period of heavy traffic.

7. If an interruption occurs for which the telephone service is responsible, a rebate should be granted only if the telephone service has been completely interrupted for a continuous period of 3 hours or more. The maximum rebate allowable should not exceed one or other of the two following limits:

- 40 minutes of ordinary conversation for each continuous period of interruption of 3 hours duration,
- 200 minutes of ordinary conversation per day, for a continuous interruption of 24 hours, in the case of leases over 25 days (240 minutes use per day in the case of leases of 25 days or less).

8. That requests for reimbursement of the charges for the use of public telecommunication services—telephone or telegraph—incurred during the period of interruption should not in any circumstances be met.

### RECOMMENDATION 31

#### Telegraphic preparation of telephone communications

(Deleted by the XVIIIth P.A., Geneva, 1956)

### RECOMMENDATION 34 bis (New Recommendation)

#### Semi-automatic transit traffic

THE INTERNATIONAL TELEPHONE CONSULTATIVE COMMITTEE,

Considering Recommendation 63 *bis*, specifying the loss probabilities for calculating the number of circuits in semi-automatic or automatic operation (5% for terminal traffic and 3% for transit traffic),

Considering the net cost factors which have been determined for setting up a call by semi-automatic or automatic switching (net cost for an outgoing semi-

automatic exchange, an incoming semi-automatic exchange and automatic transit centre), which are contained in CCIF Recommendation 41,

Unanimously issues the recommendation

- that it is desirable to draw the attention of Administrations to the advantage, from the general economic point of view, of the transit routing of traffic in the two following cases:—

#### *Case 1*

Where there is a light traffic-load between two countries, it would appear to be advantageous, from a general economic point of view, to route this traffic through an automatic transit exchange, rather than to provide a small group of direct lines.

These considerations normally apply to the case where the introduction of semi-automatic operation is considered, but they should be equally valid for traffic which terminates on a manual international trunk exchange, reached throughout automatic transit exchange.

*Note.* — The purely economic point of view from which these conclusions are drawn excludes all other considerations, particularly the following:—

a) It is necessary that the transit exchanges through which it is desired to route the traffic should be prepared to accept the transit traffic which would be offered to them, and interested Administrations must accept the fact that the group of circuits taken up for this purpose should be calculated with a loss probability corresponding to transit operation (i.e. 3%) and not the loss probability estimated for terminal traffic (5%).

b) The provision of direct circuits may be preferred to a routing entirely via a transit centre for other reasons, e.g. the provision of broadcast programme circuits, control circuits for these transmissions, voice-frequency telegraph circuits, etc...

c) The routing of traffic passing through two transit centres cannot be anticipated if reference is made to the rule given in Volume V of the Green Book p. 55, second paragraph (revision of this rule is now under study).

#### *Case 2*

In certain cases, particularly where the traffic between two countries is heavy, and, for instance, if it may lead to the postponement of installing a new carrier group (12 circuits, perhaps six in either direction), it may be advantageous to route a certain proportion of the additional traffic (peak traffic) by way of a transit centre (subject to special agreement between the Administrations concerned for accounting purposes).

### **RECOMMENDATION 37 bis (New Recommendation)**

**Charging for calls to a device substituting for a telephone instrument, for the purpose of answering in the subscriber's absence and, possibly, of recording a message**

THE INTERNATIONAL TELEPHONE CONSULTATIVE COMMITTEE,

Considering,

- that the connection to a subscriber's line of a device in substitution for the telephone instrument, for the purpose of answering on behalf of the subscriber

in his absence and, possibly, of recording a message, is the equivalent of having a person to answer the telephone on the user's behalf and at his express request,

— that all possible precautions have been taken by the Administrations to warn callers of the presence of the device on the called subscriber's line, since:

*a)* a device of this type, installed at subscriber's premises, ought to be indicated in the telephone directories by means of a special sign  $\oslash$ ;

*b)* the owners or renters of such devices are invited to mention the fact on their letter paper by means of a printed indication alongside their telephone number;

— that a distinction can be drawn between the case where the caller can be considered to have been warned of the presence of such a device at the called subscriber's premises, and the case dealt with in Recommendation 37, where the subscriber's number is *temporarily* transferred to the absent subscribers' service, without it being possible to warn the caller in advance,

Unanimously issues the recommendation

— that any calls terminating on a device which substitutes for the telephone instrument, in order to answer on behalf of the subscriber in his absence and, possibly, to record a message (apparatus  $\oslash$ ), should be subject to the charging rules applicable to calls which are answered in the normal way, by a living person.

## RECOMMENDATION 40 bis

### Time-to-answer of operators

(Amended by the XVIIIth P.A., Geneva, 1956. For former text see  
*p. 87 of Volume VI of the "Green Book"*)

THE INTERNATIONAL TELEPHONE CONSULTATIVE COMMITTEE,

Considering,

— that a rapid answer to signals by the operators at an incoming international terminal exchange is essential to ensure a rapid service, and is also very important from the point of view of the efficient use of costly international circuits,

Unanimously issues the recommendation:

— that every endeavour should be made to provide for a sufficient number of operators, with team working between them, at the incoming positions in international terminal exchanges, so that the time-to-answer an incoming calling signal should not exceed 5 seconds for 80% of calls throughout the day.

### Note

This Recommendation applies not only to the manual service but also to the semi-automatic service.

The time—to—answer of incoming operators in the semi-automatic service, that is:

— code 11 operators,

— code 12 operators (operators at the incoming exchange called by the outgoing exchange to record particulars of calls which have been found difficult to set up),

should, accordingly, be the time-to-answer shown in the Recommendation.

Regular code 12 operators at the outgoing exchange (regular operators recalled by the incoming exchange operators, when the latter have been successful in obtaining the called subscriber) cannot, of course, be obtained until they are free.

The times-to-answer, in semi-automatic service, of assistance operators should be less than those of other operators. *In the busy hours* 80% of the calls should be answered in a time of about 5 seconds. This might be arranged, for example, by instructing operators who have the dual role of assistance operators and transfer operators, to give priority to assistance calls.

## RECOMMENDATION 41

### International telephone charges (circuits of European continental type)

(Amended by the XVIIIth P.A., Geneva, 1956. For former text, see  
p. 88 of Volume VI of the "Green Book")

#### THE INTERNATIONAL TELEPHONE CONSULTATIVE COMMITTEE,

Considering,

Article 32 (§ 1, 2 and 3) of the International Telephone Regulations which stipulates that the charges for international telephone calls are normally made up of terminal charges accruing to the Administrations or Private Operating Agencies of origin and of destination (terminal Administrations or Private Operating Agencies) and of transit charges accruing to intermediate Administrations or Private Operating Agencies if any (transit Administrations or Private Operating Agencies), the territory of the terminal Administrations or Private Operating Agencies being divisible into zones for charging purposes, and a uniform charge being adopted for a given zone,

Unanimously issues the recommendation:

that the Administrations and Private Operating Agencies should take into account:

- the following directives (see Section I) for the determination of international telephone charges,
- the elements of net cost of calls (see Section II) set up on international circuits,

when, in their full sovereignty, they negotiate between themselves agreements as to the telephone charges to be applied in their services.

## SECTION I

*Directives for the calculation of international telephone charges with circuits of the European continental type.*

1. The charges for international telephone calls are calculated according to the crowflight distance, taking as a basis the net cost.

2. *Charging zones.* — For calculating terminal charges, each country may be divided into charging zones. If need be, different charging zones may be fixed in a given country for traffic exchanged with different countries.

It is desirable that the number of charging zones for international traffic, in any one country, should be reduced to a minimum. As a general rule, in services

between non-adjacent countries, each country should constitute one single zone, provided no difficulties or anomalies in the establishment of tariffs would ensue.

In fact, a reduction in the number of charging zones, by simplifying tariffs, facilitates the calculation, by the operating services, of the charges applicable to the various types of calls and the settlement, by the accounting services, of international accounts. It is even more desirable that each country should constitute but one single charging zone when fully automatic international operation is in use and charges are recorded on the same devices as are used for national charges (including devices which may be installed in subscribers' premises to indicate charges).

All the international terminal exchanges should have detailed and up-to-date records showing, for the different countries with which telephone service is available, the charging zones to which the different localities, with which telephone service is open to the public, belong. With the aid of such records a large number of requests for information between operators, which occupy circuits unnecessarily, are avoided and the number of queries at the time of settlement of the international accounts is reduced.

3. *Terminal charge.* — The terminal charge for a charging zone in any country is calculated as a function of the distance between:

a) a point chosen as the 'mean charging point of that zone'. This mean point is left to be fixed by each Administration or private operating Agency on its own evaluation. In doing so the Administration or private Agency may take into account:

- the distribution of traffic,
- the layout of its national network,
- the routing of the international circuits which serve the charging zone under consideration,

and b) the point where the international circuits cross the frontier of the country, or, in the case where several frontier crossing points exist, a mean point representative of the various crossing points.

(Where the frontier is crossed by micro-wave radio-relay link, in order to take account of the division of net costs, a point mid-way between the two radio-relay stations situated on either side of the frontier may be chosen instead of the exact point where the radio-relay system crosses the frontier.)

4. The transit charges applied by the Administrations or Private Operating Agencies of the intermediate countries through which the circuits pass, are calculated, for each transit country, according to the average crowflight distance between the points of entry and exit of the international circuits.

5. *Notes about terminal and transit charges.* — In the case of mountainous countries, or countries with a peculiar geographical configuration, in which the actual route followed by the circuits is inevitably very circuitous, the distance on which the terminal charge is calculated may be appreciably greater than the straight-line distance between the frontier and the point in the zone in question which is the most distant measured on a crowflight basis; in the same way, in a mountainous country or one having an exceptional configuration, the crowflight distance between the points of entry and exit on which the transit charge is based, may be increased.

If there is a submarine section, the quota relative to the section should be agreed between the Administrations or Private Agencies concerned, taking into account the annual charges (including interest, depreciation and maintenance).

NEW TEXT.

## SECTION II

*Elements of net cost of calls set up on international circuits of the European continental type.*

The C.C.I.F. has made various studies of the net cost of calls set up on international circuits:

- in 1935, study of the net cost of telephone calls established over the European circuits then used (symmetrical pairs, coil-loaded pairs, pairs equipped with repeaters and pairs operated at voice frequencies only);
- in 1949, study of the net cost of telephone calls established over carrier current systems on symmetrical pairs in cables or on bare wire overhead lines, giving at least twelve telephone circuits;
- in 1954, study of the net cost of telephone calls established over carrier current systems on coaxial pairs;
- in 1956, study of the net cost of telephone calls established by means of microwave radio-relay links and study of the net cost of calls with semi-automatic operation.

The bases of the various studies were as follows:

### *1935 Study (voice frequency circuits):*

- average traffic carried per circuit: 200 minutes at the full tariff per working day and 300 working days per year, i.e. 60 000 chargeable minutes per year;
- proportion of reserve circuits in underground cables: an average of 40 % (that is, 60 working circuits and 40 spare circuits for each 100 in all);
- interest on capital invested: 6 %;
- average life of an underground cable: 35 years;
- average percentage difference between the actual length of international telephone circuits and the crowflight distance: 30 %;

### *1949 Study (carrier current systems on symmetrical pairs or on bare wire overhead lines):*

- average traffic carried per circuit: 180 chargeable minutes at the full tariff per working day and 300 working days per year; i.e. 54 000 chargeable minutes per year \*;
- proportion of spare capacity: an average of 40 % of the conductors in underground cables (that is, 60 working conductors and 40 spare conductors per 100 conductors);
- an average of 20 % of terminal equipments (that is, 80 working equipments and 20 spare equipments per 100 equipments);
- interest on invested capital: 5 %;
- average life of an underground cable: 30 years;
- average life of terminal equipment: 15 years;
- percentage difference between the actual length of international telephone circuits and the crow-flight distance: 30 %;

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\* At the time the 1955-1956 studies were made, the net costs for carrier current systems on symmetrical pairs were re-calculated, taking into account the same use of circuits as for the other studies then made, i.e. 40 000 chargeable minutes per year.



1954-1956 Studies (carrier current systems on coaxial cable pairs or on micro-wave radio-relay links) (circuits operated on a semi-automatic basis).

- average traffic per circuit: 135 chargeable minutes at the full tariff per working day and 300 working days per year, i.e. 40 000 chargeable minutes per year;
- proportion of spare capacity:
  - an average of 20% of terminal and automatic equipment (that is, 80 working equipments and 20 spare equipments per 100 equipments);
- interest on invested capital: 5%;
- average life:
  - of a coaxial cable: 30 years;
  - of aerials and radio equipment: 10 years;
  - of a terminal equipment: 15 years;
  - of automatic equipment: 15 years;
- percentage difference between the actual length of international telephone lines and the crowflight distance: 30%;

As a result of these several studies, the C.C.I.F. has fixed the following elements of cost price for the calculation of charges for calls set up on international telephone circuits. All values given in the following text are given again in a tabular summary at the end of the Recommendation.

These elements of net cost take account of general overhead costs (accounting costs, administrative costs, research costs, etc.) but not of the extension of international calls on the national (local or trunk) network beyond the international exchange.

#### A. FRONTIER RELATIONS

*Maximum frontier charge per three-minute call:* 0.60 gold francs for crowflight distances of less than 25 kilometres between networks and 1 gold franc for crowflight distances between 25 and 50 kilometres.

#### B. OTHER RELATIONS

The C.C.I.F. considers that a distinction should be made between three conditions in the development of existing communication channels:

a) *Old conditions.* — In certain relations no carrier current telephone systems are in use: calls are still set up over old type circuits, coil-loaded or equipped with repeaters, or over bare wire overhead lines worked at voice frequencies. In these relations, the values determined in the 1935 study can still be applied.

*Costs of depreciation, interest on capital involved and maintenance of the international circuit* (excluding any inland trunk circuit required to connect the international terminal exchange with the trunk exchange serving the subscriber):

0.60 gold francs per 3-minute call and per 100 kilometres of crowflight distance (each fraction less than 50 kilometres being rounded up to a maximum of 50 kilometres and each fraction between 50 and 100 kilometres being rounded to a maximum of 100 kilometres).

*Note.* — The studies carried out in 1935 had shown that in short distance services (up to about 300 kilometres) and in which traffic is routed over direct circuits, the portion of the net cost of the call proper to the international circuits is appreciably less than 0.60 gold francs per 100 kilometres.

*Operating costs of an international terminal exchange:* 0.60 gold francs per a 3-minute call (whether for a terminal exchange or a transit exchange).

b) *Modern Conditions.* — On the other hand, in certain relations the high speed transmission lines envisaged in the General Interconnection Plan have already been constructed, to the extent that the great majority of calls are set up over modern type carrier current routes, metallic lines or micro-wave radio-relay links, for which the studies of the net cost carried out in 1949-1956 are valid.

As a result of these studies the elements of net cost to be taken into account for the calculation of international telephone charges should be as follows:

*Cost of depreciation, interest on capital involved, and maintenance of the international circuit* (excluding any inland trunk circuit required for connecting the international terminal exchange with the trunk exchange serving the subscriber): 0.25 gold francs per a 3-minute call and 100 kilometres of crowflight distance (any fraction less than 50 kilometres to be rounded to a maximum of 50 kilometres and any fraction between 50 and 100 kilometres to be rounded to a maximum of 100 kilometres).

*Operating expenses of an international terminal exchange, including terminal equipments of the carrier current system:* per 3 minute call:

— per international manual exchange: . . . . .	0.80 gold francs
— per outgoing international semi-automatic exchange: . . . . .	0.80 " "
— per incoming international automatic exchange: . . . . .	0.30 " "
— per transit international automatic exchange: . . . . .	0.45 " "

c) *Transitional Conditions.* — In certain international relations, a transition stage has been reached, in that the work of carrying out the General Interconnection Plan has begun, but has not been completed. In this case, taking account of the existence of both old and new type circuits in similar proportions, the amount of 0.25 gold francs per 3 minute call and per 100 kilometres of crowflight distance intended to cover costs of depreciation, interest on capital involved and maintenance of the circuit concerned, should provisionally be increased to 0.40 gold francs until the relevant part of the General Interconnection Plan has been completed. The values, shown in b) above, for the operating expenses of an international exchange, are applicable in these transitional conditions.

Tabular Summary of the elements of cost price to be taken into account in the conditions indicated

	Old conditions (case <i>a</i> )	Modern conditions (case <i>b</i> )	Transitional conditions (case <i>c</i> )
— per 100 km of circuit . . . . .	0.60	0.25	0.40
— per international exchange *			
— manual . . . . .	0.60	0.80	0.80
— outgoing semi-automatic . . . . .	—	0.80	0.80
— incoming automatic . . . . .	—	0.30	0.30
— transit automatic . . . . .	—	0.45	0.45

<i>Example :</i> Total charge (s.m. = manual service 1/2 <i>a</i> = semi-automatic service) for relations in which the crow-flight distance is:	s.m.	1/2 <i>a</i>	s.m.	1/2 <i>a</i>	s.m.	1/2 <i>a</i>
less than 100 kilometers . . . . .	1.80	—	1.85	1.35	2.00	1.50
less than 200 kilometers . . . . .	2.40	—	2.10	1.60	2.40	1.90
less than 300 kilometers . . . . .	3.00	—	2.35	1.85	2.80	2.30
less than 400 kilometers . . . . .	3.60	—	2.60	2.10	3.20	2.70
less than 500 kilometers . . . . .	4.20	—	2.85	2.35	3.60	3.10
less than 600 kilometers . . . . .	4.80	—	3.10	2.60	4.00	3.50

\* It is to be understood that the elements of calculation applying to manual, outgoing semi-automatic and incoming automatic international exchanges take no account of use which may be made of any national circuit or exchange to connect the international exchange concerned to the calling or called subscribers.

### Note

When Administrations, in their full sovereignty, negotiate between one another agreements with a view to reduction in the charges (in gold francs) in force, they should take into consideration the suggestions below:

1. When envisaging a reduction of the charge applied in a telephone service, it is necessary to make sure that a sufficient number of circuits will be available to deal with additional traffic which may result from this reduction in charge.

2. In order to change from the old conditions (case a) to the transitional conditions (case c), it is sufficient if, in the international service concerned (case of a service between adjacent countries, that is to say without transit), about 50% of the circuits are of the modern type.

If in the service concerned, one or several transit countries are involved, it will be desirable to initiate discussions with a view to reducing the charges when all the Administrations concerned have put into service on this route about 50% of the modern type international circuits.

3. If it happens that, in the case of an international route to be set up between neighbouring countries, one of the countries has completed the section on its territory before the other country has done the same, the first country has the right to maintain its quota at the amount determined under the old conditions in the table until the second country has completed its part of the project. If, on the other hand, in order to increase traffic, the second country agrees to reduce its quota, a reduction in charges could be envisaged, because each will have made its share of the sacrifice towards the reduction.

4. Until more precise recommendations can be made by the C.C.I.F. (as a result of studies currently being made) the Administrations and Recognized Private Operating Agencies should agree between themselves as to the principles to be adopted when:

- a particular service is operated on a different basis (manual, semi-automatic or automatic) in one direction and in the other;
- in a particular service and in a given direction of operation, circuits operated manually, semi-automatically or automatically are used at the same time.

*Note 1.* — The Administrations concerned should enter into direct correspondence with one another for the application of the above suggestions.

*Note 2.* — The standards in the table above do not apply to countries in which the telephone system is less highly developed.

#### **RECOMMENDATION 41 bis (New Recommendation)**

##### **Charging in a fully automatic international telephone service**

THE INTERNATIONAL TELEPHONE CONSULTATIVE COMMITTEE,

Considering,

1) that in accordance with the provisions of Article 31, paragraphs 179 and 180 of the International Telephone Regulations, international calls should be charged for on the basis of minimum indivisible period of 3 minutes, and then by whole minutes;

2) that these provisions were made at a time when fully automatic international operation was not envisaged;

3) that many Administrations have adopted for use, with their national fully automatic service, methods of charging in which the charges are recorded on subscribers' meters, but based on two different principles:

- a) some countries have, for many years, used a system based on trains of meter-pulses, issued at the start of each period of 3 minutes, the number of pulses in the train depending on distance;
- b) other countries use, or intend to use, a system based on single meter-pulses issued at short intervals of time, the length of the interval depending on the distance;

4) that certain countries which have adopted the system of charging by periodic pulses in their national services have made it known that it will not be possible for them to use a different system of charging for fully automatic international calls;

5) that the use, at the two ends of the same international relation:

- a) on the one hand, of a 3 minute + 3 minute method of charging (national type) or of a 3 minute + 1 minute method of charging (the type prescribed in the International Regulations);
  - b) on the other hand, of a periodic pulse method of charging (national type);
- would lead to a grave dyssymetry in the charges made to users in the two countries concerned;

6) that this serious dyssymmetry would be likely to provoke adverse reactions from the subscribers of one country, who would be less favourably treated than their correspondents in the other country;

7) that this serious dyssymmetry would be likely to create certain financial difficulties for one of the countries;

a) as a result of changes which may possibly take place in the orientation of traffic;

b) as a result of the fact that the country which charged on the basis set out in 5a) above would receive, in respect of the use of its system for "incoming" traffic, substantially less than it would collect from its own subscribers;

Unanimously issues the recommendation

— that it is desirable, in order to avoid too great a dyssymmetry in the charges collected, to recommend that either of the two following methods of charging may be used in the international fully automatic service:

a) charging minute by minute;

b) charging by periodic pulses, of the type used in the national automatic services.

\* \* \*

#### THE INTERNATIONAL TELEPHONE CONSULTATIVE COMMITTEE

Considering on the other hand,

— that the use of two methods a) and b) face-to-face in any service, will still leave a dyssymmetry in the charges made at the two ends, which will not be negligible;

— that this dyssymmetry cannot be corrected by the use of a fixed initial charge with periodic charging systems used for international charging, since it has been established that the use of a fixed charge would involve the Administrations who charge by periodic pulses in considerable difficulties either for reasons arising from the technical arrangements for their systems, or for administrative reasons, or for both;

Unanimously issues the recommendation

— that the remaining dyssymmetry might be reduced by appropriate administrative measures to be agreed between the Administrations concerned.

*Note.* — Until such time as the results of a study of this problem, now being undertaken by the C.C.I.F., are available, the Administrations who wish to reduce the amount of dyssymmetry referred to, might, if they found it necessary to reach agreement on the subject, be guided by the following considerations:

- 1) The net costs of operating should diminish noticeably in charging from manual or semi-automatic operation to fully automatic operation: it follows therefore that a reduction in charges ought logically to be expected at the time of introducing fully automatic operation.
- 2) The foreseen changes in charging methods, when this happens (charging minute by minute or by periodic pulsing, instead of charging 3 minutes + 1 minute) will lead to an appreciable reduction in receipts for a given traffic.
- 3) If for a given service the charge (or quota) is fixed, using the periodic pulse method, at T (cost of a 3 minute call), the amount T should be reduced, when used with the minute by

minute method, so as to take account of the difference of receipts with one method by comparison with the other.

- 4) If for a given service the charge (or quota) is fixed, using the minute by minute method, at T (e.g. cost of a 3 minute call), the amount T should be increased when used with the periodic pulse method (for example by reducing the interval between two successive meter pulses) so as to take account of the difference in receipts with one method in comparison with the other.

## RECOMMENDATION 49

### Broadcast transmissions

(Amended by the XVIII PA, Geneva 1956. For former text,  
see *Volume VI of the Green Book*, p. 98)

#### SECTION I — CONDITIONS OF ADMISSION

##### THE INTERNATIONAL TELEPHONE CONSULTATIVE COMMITTEE,

##### Considering

that requests for the use of circuits to effect these broadcast transmissions should continue to necessitate the intervention of the central Administrations or of the "controlling services" to whom the Administrations and Private telecommunication Operating Agencies \* have delegated their authority in this matter,

##### Unanimously issues the recommendation

that broadcast transmissions should be admitted under the following conditions:

1.1 Requests for the use of circuits for broadcast transmissions should be addressed by the Broadcasting Organization (or Organizations) which control the broadcast receiving station (or stations) to the "controlling service" of its country (or their countries).

The list of controlling services in the different countries to which the Broadcasting Organizations should apply to obtain circuits (a list containing the names, exact postal addresses, telegraphic addresses and also telephone numbers of these various services) has been forwarded to the Administrations belonging to the C.C.I.F. by the Secretariat of the C.C.I.F., these Administrations undertaking to pass this list on to the Broadcasting Organizations of their respective countries.

Requests for the use of circuits for broadcast transmissions should always be made at the earliest possible moment and in any case with sufficient notice to allow the telephone Administrations to take the necessary measures to arrange the broadcast transmission in question. These requests should be complied with if no inconvenience to the general telephone service is likely to result and if technical considerations permit.

1.2 For each international broadcast relay affecting only receiving radio stations situated in one country, the Broadcasting Organization which controls the receiving radio station or stations, after preliminary agreement with the Broadcasting Organization controlling the transmitting microphone, should make, to the controlling

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\* In the rest of this Recommendation "telecommunication Administration" or, simply, "Administration" will be taken to mean both a state Administration and a recognized Private Operating Agency.

service of its country, a request for the use of the necessary circuits, accompanied by an undertaking to pay the whole charge in respect of the use of these circuits.

1.3 For each international broadcast relay affecting broadcast receiving stations situated in several countries, the procedure is as follows:

The list of broadcasting stations which are to receive the transmission (showing the telephone exchange to which the transmitting microphone is connected) is sent to each of the Broadcasting Organizations concerned, by the broadcasting organization controlling the transmitting microphone; each Broadcasting Organization should send this list to the controlling service of its own country, after having added thereto the additions or modifications which it considers necessary. This list should include the designation of all control circuits required and, where necessary, of all the reserve circuits requested.

The controlling services appoint, by mutual agreement, a controlling service for the relay in question.

The controlling service should inform each of the controlling services concerned at the earliest possible moment of the circuits to be used and of the special repeater station or stations with which the Broadcasting Organizations may communicate if any unforeseen incident, which must be rectified urgently, arises in the course of the broadcast transmission.

As soon as it has received the necessary information concerning the circuits for the use of which it will have to pay, each Broadcasting Organization controlling one or more broadcast receiving stations should forward *without delay* to the controlling service of its country a request for the use of these circuits with an undertaking to pay the whole charge in respect of their use.

To facilitate this procedure it is desirable that the Broadcasting Organizations should study in advance the cases of multiple relays which are likely to occur frequently (see the following Annex).

## SECTION II — CONTROL CIRCUITS

### THE INTERNATIONAL TELEPHONE CONSULTATIVE COMMITTEE,

Unanimously issues the recommendation that the following Directives should be observed for the constitution of control circuits in connection with the use of broadcast circuits:

#### 2.1 Definitions.

2.1.1 A *control circuit* (circuit de conversation) is a telephone circuit which provides a direct connection between the place where a transmitting microphone is installed and the point where the broadcast programme is used (recording apparatus or radio broadcasting station). This connection is used to supervise the transmission of the programme broadcast and it enables any necessary remedial measures to be taken quickly in case any difficulties or interruptions occur during the transmission; it also permits the broadcast transmission circuit to be released at the

right moment and it provides, therefore, the appropriate means by which the chargeable duration of the broadcast transmission can be precisely determined.

2.1.2 For the setting-up of control circuits, the following distinctions should be drawn between "regular" and "occasional" broadcast transmissions.

a) *Regular transmissions* are those which are ordered once for all because they take place at regular intervals, at the same times, over the same routes, always between the same points.

b) *Occasional transmissions* are all transmissions which do not fall within the above definition.

## 2.2. Constitution of control circuits.

It is desirable to distinguish between the following cases:

- simple broadcast transmissions;
- multiple broadcast transmissions.

### 2.2.1 Simple broadcast transmissions.

In the case of regular transmissions, especially if the programme transmitted is of such a nature that the broadcasting organization is ready to tolerate any incident which might occur because of the absence of a control circuit during the transmission of the programme, the use of a control circuit should be obligatory only during the "preparatory period" \*.

For certain regular transmissions effected over a long period, the use of a control circuit might even be dispensed with during the preparatory period if the broadcasting organizations so request.

In the case of an occasional transmission, the use of a control circuit should in principle be obligatory during the preparatory period and should be earnestly recommended throughout the broadcast transmission; indeed, the Broadcasting Organizations are interested in reducing as much as possible the duration of any incidents which occur during the transmission of the broadcast programme and, on their part, the Administrations should watch that too great a power is not employed in the course of the transmission such as to cause a risk of troubles on telephone circuits in the same route.

### 2.2.2. Multiple broadcast transmissions (or multiple relays). — 2.2.2.1. Multiple broadcast transmissions in which the sound is picked up at one point only:

a) If the first distribution point of the broadcast transmission circuits serves a broadcast transmitting station in the same town and participating in the multiple transmission, it is strongly recommended that control circuits should be envisaged, at least:

- between the studio where the transmitting microphone is installed and the distribution point of the broadcast transmission circuits;
- between the first distribution point and the various broadcast transmitting stations.

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\* The preparatory period is defined under 3.1.2.



b) When the above conditions do not apply, it is recommended that, as far as possible, control circuits should be envisaged between the studio where the microphone is installed, on the one hand, and the various broadcast transmitting stations on the other hand.

In the two cases indicated above, control circuits should always be provided during the preparatory period and their use should be recommended throughout the transmission of the programme.

#### 2.2.2.2. *Multiple broadcast transmission with several sound pick-up points.*

A preliminary study should be carried out between the broadcasting organizations and the Administrations concerned in order to determine what control circuits should be insisted upon during the preparatory period \* and which control circuits should be recommended for use during the transmission of the broadcast programme.

Experience has shown that in the case of two-way multiple broadcast transmissions with several sound pick-up points, in order that the programme concerned shall proceed satisfactorily, it is desirable to have control circuits between the studio directing the transmission and the various sound pick-up points.

2.2.3. *General remarks.* — The Broadcasting Organizations should be informed that when they decide to dispense with the use of a control circuit during the transmission of a broadcast programme, they are not entitled to claim a reduction of the charge on account of some incident occurring during the course of the transmission, even if the incident is due to a breakdown in the broadcast transmission which could not be remedied quickly because of the absence of a "control circuit".

### SECTION III. — CHARGING

#### THE INTERNATIONAL TELEPHONE CONSULTATIVE COMMITTEE,

Considering,

that, although ordinary telephone circuits might be used, if need be, for broadcast transmissions, it is necessary, in order to be able to transmit music, and even speech perfectly, to arrange for the use of circuits in which cross-talk is reduced to the lowest possible level and which effectively transmit a frequency bandwidth wider than with ordinary telephone circuits;

that the types of circuits can be distinguished as indicated in the following table:

Type of circuit	Audio frequency bandwidth effectively transmitted
Ordinary telephone circuit . . . . .	300 to 3 400 c/s
Old type broadcast transmission circuit . . . . .	at least 50 to 6 400 c/s
Normal type broadcast transmission circuit . . . . .	at least 50 to 10 000 c/s

\* The preparatory period is defined under 3.1.2.

that the net costs of "broadcast transmission circuits" are much higher than those for ordinary telephone circuits;

that the costs of supervision and maintenance of broadcast transmission circuits are much higher than those of ordinary telephone circuits;

Unanimously issues the recommendation

that, when "broadcast transmission circuits" are available, they should be used in all cases for broadcast transmissions instead of ordinary telephone circuits;

that it is appropriate to make higher charges for the use of such circuits for broadcast transmissions than are made for the use of ordinary telephone circuits;

that telecommunication Administrations should take the following directives as guidance when charging for broadcast transmissions:

### 3.1. Preliminary.

3.1.1. A broadcast transmission circuit is a uni-directional transmission channel. If a broadcast transmission takes place simultaneously in both directions, thus requiring the use of two special circuits, it should count as two distinct broadcast transmissions.

3.1.2. For each international broadcast transmission a distinction is made between:

a) the *line-up period*, in which the telecommunication Administrations proceed to line up the international broadcast line before handing it over to the Broadcasting Organizations;

b) the *preparatory period*, in which these Broadcasting Organizations effect their own line-ups, tests and various manœuvres before carrying out the actual broadcast transmission;

c) the actual broadcast transmission.

The chargeable duration begins at the moment when the circuit for broadcast transmissions is handed over to the Broadcasting Organizations, i.e. at the start of the preparatory period.

3.1.3. For charging purposes no distinction is made between periods of light and heavy traffic in the use of "circuits for broadcast transmissions".

3.1.4. The use of "control circuits" in broadcast transmissions is liable to the same charge as an ordinary telephone circuit, i.e. there is no surcharge, and periods of light and heavy traffic may be taken into account \*.

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\* In order to avoid variations in interpretation, which may have occurred in the past, the "tariff for ordinary telephone calls" should provisionally be understood to be as follows (pending further examination of the matter by the C.C.I.F.):

a) For the part of the broadcast transmission in the period of heavy traffic, the charge to be collected is that appropriate to ordinary calls during the period of heavy traffic;

b) for the part of the broadcast transmission in the period of light traffic:

— one half (1/2) the charge appropriate to ordinary calls during the period of heavy traffic, for a transmission of which the duration (during the period of light traffic) is at least an hour;

— three-fifths (3/5) of the charge appropriate to ordinary calls during the period of heavy traffic, in other cases.

Legal time in the country receiving the broadcast transmission will be used in order to determine the period of heavy traffic or the period of light traffic.

3.1.5. A *surcharge* is applied in respect of each broadcast transmission without regard to the type of circuit used, to cover the expenses incurred in:

- the technical preparation of international circuits by way of special equipment or lining-up,
- the exchange of telegraph and telephone messages for the preparation of a broadcast transmission,
- the setting up and testing of the chain of circuits to be used for the transmission.

This surcharge is shared between the Administrations concerned on the same basis as the charge for the broadcast transmission itself. The surcharge is equal to the charge for *8 minutes of broadcast transmission* over the same circuit between the terminal points concerned. The surcharge is not payable if the broadcast transmission does not take place due to circumstances under the control of the telephone service.

It is to be understood that the surcharge covers the charges which would otherwise be made for the telegrams and telephone calls exchanged in the preparation of the broadcast transmission. The surcharge does not apply to the so-called "control" circuits.

3.1.6. When the transmitting microphone is not connected directly to the network of broadcast transmission circuits, and a special junction circuit has to be provided between the location of the transmitting microphone and the point of junction with the network of broadcast transmission circuits, the Administration responsible for the broadcast transmission station should forward to the Administration responsible for the broadcast receiving station particulars of the special expenses incurred in the setting up, alignment and recovery at the end of the transmission of the junction circuit in question. These expenses are debited by the latter Administration to the Broadcasting Organization controlling the broadcast receiving station.

3.2. *Charges in the normal case (use of "international broadcast circuits").*

In fixing the following tariff of charges for international broadcast transmissions in the *normal case* in which broadcast transmissions are effected by means of "*broadcast transmission circuits*", account has been taken of the elements of net cost established by the C.C.I.F., as the result of several studies, the last as recently as 1955. These elements of net cost are given in the following Table.

Reserve circuits are not normally necessary, but if the Broadcasting Organizations deem it necessary to have at their disposal such circuits for a given international broadcast relay, they should be charged for at the same rates as would have been applied had they actually been used for the relay in question and for its full duration.

TABLE

## Bases for the calculation of charges applicable to broadcast transmission circuits

		Old type circuit (effective bandwidth transmitted: at least 50 to 6 400 c/s (Note 1))	Normal type circuit (effective bandwidth transmitted: at least 50 to 10 000 c/s)
Charge for 33 minutes of broadcast transmission	per 100 km (crowflight) of circuit (Notes 2 and 3)	0.75 gold fr.	0.75 gold fr.
	for each international terminal exchange (at the extremities of the connection)	0.75 gold fr.	2.40 gold fr.
Fixed surcharge, independent of the duration of the broadcast transmission.		Equal to the charge for 8 minutes of <i>broadcast transmission</i> , in the <i>relation</i> in question and by the <i>circuit</i> in question.	
If, for their own purposes, Administrations wish to apply tariffs lower than those based on the above standards, this may be done by special agreement.			

*Note 1.* — If a broadcast transmission circuit includes even one section only of old-type circuit the transmission in question is charged for at the tariff applicable to old-type circuits; but it is recommended that an international connection for a broadcast transmission should not be set up with one single section of old-type circuit in an otherwise complete chain of normal type circuits, since the Administration which furnishes the section of old-type circuit occasions a considerable loss to the other Administrations participating in the international connection.

*Note 2.* — The part of the charge relating to the line is calculated, by each country taking part in the international broadcast transmission, on the basis of crow-flight distance:

- for the terminal countries, between the extremity of the circuit and the point of entry into (or exit from) national territory,
- for a transit country, between the points of entry into, and exit from, national territory.

*Note 3.* — In applying the above tariff, any residual distance of less than 50 km may be rounded up to a maximum of 50 km and any residual between 50 km and 100 km may be rounded up to a maximum of 100 km. Moreover, Administrations should examine the possibility of having the smallest possible number of charging zones for each country, so as to obviate difficulties and anomalies in fixing charges applicable to international broadcast transmissions.

*Note 4.* — The part of the charge relating to the international exchange does not take into account any trunk circuits which may be provided between:

- the international exchange, on the one hand, and
- the transmitting microphone at the receiving Broadcasting Station, on the other.

3.3 *Charge applicable when an ordinary international telephone circuit is used for a broadcast transmission.*

In the exceptional case in which a broadcast transmission takes place over *ordinary international telephone circuits*, the "rates for ordinary calls" will apply, together with a surcharge corresponding to 8 minutes of ordinary telephone conversation in the charging period (period of heavy or light traffic) in which the broadcast transmission begins\*.

3.4 *Charge to be applied when the circuit for a broadcast transmission is of mixed setting-up.*

When a broadcast transmission takes place over a *circuit* made up partly of an "international broadcast transmission circuit" and partly of an "ordinary international telephone circuit", the whole circuit is charged for on the basis of the *tariff for ordinary telephone calls in the period of heavy traffic* and the surcharge is equal to the charge applicable to 8 minutes of ordinary conversation during the period of *heavy telephone traffic*.

3.5 *Charge to be applied in the case of multiple broadcast transmissions.*

If the transmission is intercepted, at intermediate centres, by other broadcasting stations, the broadcast transmission is, from the point of view of the charge, considered as several distinct calls: the one between the origin and the first intermediate broadcasting station; the others between the consecutive broadcasting stations or between a distribution point and an intermediate broadcasting station, or between the last intermediate broadcasting station (or the last distribution point) and the terminal broadcasting station.

3.6 *Charges in the case of broadcast transmissions over circuits with special itineraries.*

3.6.1. In the case where a Broadcasting Organization considers the quality of transmission to be unsatisfactory on a direct broadcast transmission circuit and requests the use of an indirect circuit made up of broadcast transmission circuits passing through countries other than those through which the direct broadcast transmission circuit passes, the charge applicable is based on the sum of the broadcast transmission charges in respect of each of the interconnected circuits.

3.6.2. If two Broadcasting Organizations have not been able to modify their programme schedules by mutual agreement, and if both ask for the use of a direct broadcast transmission circuit at the same time, the second Organization to make its application will use a specially composed indirect link formed by interconnection of broadcast circuits and will pay a charge based on the sum of the broadcast transmission charges payable for each of the interconnected circuits.

3.6.3. If a complete breakdown or a serious interruption occurs on a direct broadcast transmission circuit at the time arranged for the transmission, and if an indirect circuit passing through countries other than those through which the direct circuit passes has been set up for handling this transmission, the Broadcasting Organization shall nevertheless pay the same total charge as if the direct circuit had been used; this total charge is divided among all the countries traversed by the indirect circuit in the manner indicated in Recommendation 11 entitled "Emergency routes".

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\* See the note two pages above.

*Note.* — The list of normal and emergency routes to be used for broadcast transmissions, in international relations between European countries and African and Asian countries bordering on the Mediterranean Sea, was specified by the " Study Group for the General Switching Plan in Europe and in the Mediterranean Basin " at its meeting in Florence, October 1951. When the list was prepared, the principle was adopted that normal and emergency routes for broadcast transmissions should follow the same routes as normal and emergency routes used for passing international telephone traffic in Europe and the Mediterranean Basin.

3.6.4. Where the Broadcasting Organizations request control circuits following the same route as the indirect broadcast transmission circuits mentioned above, the charge applied for the use of these control circuits is calculated on the same basis as the charge for indirect broadcast transmission circuits.

3.7. *Determination of the chargeable duration : beginning and end of a transmission.*

3.7.1. Personnel responsible for the supervision of and charging for international broadcast transmission in the European system should act in accordance with the " Instructions for personnel responsible for the supervision of and charging for broadcast transmissions in the European system " published by the C.C.I.F.

3.7.2. The supervision of an international broadcast transmission is generally effected by the terminal repeater stations of the broadcast transmission circuit concerned.

It is possible that the equipment at the international telephone centres will permit the operating personnel, already responsible for fixing the chargeable duration of ordinary telephone calls, to be entrusted with the task of determining the chargeable duration of a broadcast transmission and in that case this chargeable duration should be fixed with the same precision as for a telephone call.

In the case where the equipment of the telephone centres in question does not permit this procedure, the technical officers of the terminal repeater stations should come to an arrangement between themselves, for fixing accurately at the end of the broadcast transmission:

a) the time at which the circuit was placed at the disposal of the Broadcasting Organization (beginning of the chargeable duration);

b) the time at which the circuit was released by the Broadcasting Organization (end of chargeable duration);

c) when necessary, the time and duration of any interruption or incident which may have occurred (in order to determine the rebate).

3.7.3. The time at the beginning and end of the chargeable duration, as well as the time of occurrence and duration of any breakdowns which may occur, are entered on a daily report conforming to the specimen reproduced in the annex below. This daily report is sent on the same day to the office responsible for co-ordinating all the details necessary for the establishment of the international accounts. In addition, the details relative to interruptions are noted on the report sent periodically to the technical services concerned.

When the officials at the two terminals of a circuit have agreed on the chargeable duration of a broadcast transmission, the official situated nearest the Broadcasting Organization which has to pay for the use of the circuit concerned, should notify that Organization of the number of chargeable minutes.

### 3.8. *Rebates in the case of faulty transmissions.*

If during the course of a broadcast transmission a fault or interruption even of short duration occurs, it is necessary to consider whether this fault or interruption has, depending upon the nature of the programme relayed (play, talk, high-quality music, etc.), rendered the remainder of the broadcast difficult for the listeners to understand or has reduced considerably the pleasure given to the people listening to high-quality music. It is necessary therefore to make a special examination each time in order to determine the corresponding rebate, which should take account of the trouble actually caused (by any incidents which may occur) to the Broadcasting Organization which receives the transmissions. It is for the Administration of the country in which the controlling station is situated (this is generally the terminal station nearest the Broadcasting Organization which receives the transmission) to assess the reduction to be made, and the opinion of this Administration should prevail over the opinion of the other Administrations involved in the international broadcast transmission. It goes without saying that it is only if the interruption or incident has been caused by a fault of the Administration that such a reduction of charge should be applied (see in particular the case mentioned under 2.2.3.).

### 3.9. *Levying of charges.*

The charges and surcharge for the use of a circuit are levied on the Broadcasting Organization (State or private) which undertook to pay for the use of the circuit in question; they are due for the full period during which the circuit has been put at the disposal of that Broadcasting Organization, before the transmission proper.

The charges and surcharge for the use of a circuit are always indivisible and should be paid in their entirety by one Broadcasting Organization.

### 3.10. *Sharing of the total charge between Administrations.*

3.10.1. When an international broadcast connection is constituted entirely of circuits of one type only (old type or normal type) the share due to each Administration furnishing a circuit is equal to the charge fixed for the use of that circuit.

3.10.2. Provisionally, a section of "normal type circuit" incorporated in a chain of mixed circuits is treated as an "old type circuit". When such a mixed chain is used, the total charge is divided as though all the circuits in question were of old type.

3.10.3. When an international connection includes broadcast transmission circuits and ordinary telephone circuits, "hypothetical charges" are calculated on the following basis, to determine the sharing of the total charge for the broadcast transmission, failing agreement to the contrary between the Administrations concerned:

# SPECIMEN OF DAILY REPORT

International Broadcast Transmissions completed on

London Exchange

Subject of the broadcast transmission	Circuits or sections of circuits used for the transmission		Type of circuits used		Time at which circuit was		Duration not counted (faults, interruptions, etc.)	Number of		Unit charge	Amount of charge	Name of Broadcasting Organization which should pay the charge or the administration which should collect it
	from	to **			put at disposal of broadcasting organization	released by broadcasting organization		chargeable minutes	chargeable units			
Concert from London broadcast by Bruxelles, Berlin, København (See following diagram) *	London	Bruxelles										
* In the case of a multiple relay using a number of circuits simultaneously, it would be advantageous to attach to the daily sheet a diagram of the multiple relay. ** The receiving broadcast stations are underlined.												



- on the basis of the charge for ordinary calls (in the charging period in question) for the countries which provide a section including one, or more, ordinary telephone circuits;
- on the basis of the charge for broadcast transmission circuits of old-type for the countries which provide broadcast transmission circuits (of old type or normal type) throughout the entire section within their territories.

The total charge is divided in proportion to these hypothetical charges.

### 3.11. *Accounting.*

3.11.1. The office responsible for coordinating all the details necessary for accounting for international broadcast transmissions:

*a)* groups all information in respect of the international broadcast transmissions supplied either by the coordinating service of its own country, or by the repeater stations (daily reports) and it checks this information by comparing the various particulars;

*b)* undertakes the collection of the charge from the Broadcasting Organization of its own country;

*c)* enters the international broadcast transmission on the monthly statements which will permit the subsequent sharing of the charge;

*d)* sends these statements every month to the accounting service responsible for actually dividing the charge between the different countries concerned.

3.1.1.2. The monthly telephone accounts exchanged between the telecommunication Administrations include a special column for international broadcast transmissions and in this special column distinction is made between broadcast transmissions:

*a)* over ordinary telephone circuits,

*b)* over broadcast transmission circuits (old type),

*c)* over broadcast transmission circuits (normal type).

The use of control circuits should also be indicated.

## SECTION IV — LEASE TO BROADCASTING ORGANIZATIONS OF INTERNATIONAL CIRCUITS FOR BROADCAST TRANSMISSIONS

### THE INTERNATIONAL TELEPHONE CONSULTATIVE COMMITTEE,

Considering,

— that the conditions of lease of circuits for broadcast transmissions ought to be identical with those already fixed for the lease of ordinary telephone circuits, and that to do so will also avoid any difficulty when the lease of a broadcast transmission circuit is accompanied by the lease of a corresponding control circuit;

Unanimously issues the recommendation

— that Administrations should be guided by the following principles when leasing international broadcast transmission circuits:

#### 4.1. *Conditions of acceptance.*

4.1.1. An international broadcast transmission circuit will be leased only if spare ones exist in the relation in question.

4.1.2. In principle a lease should be for an initial period of one month; nevertheless leases for periods shorter than one month may be arranged by agreement between the Administrations concerned. Leases continue, after the initial period, month by month, until terminated by one party or the other by at least two weeks notice expiring at the end of a monthly period of lease.

4.1.3. Administrations reserve in full the right to take back for their own use a leased international broadcast transmission circuit, if the exigencies of the general service so demand.

4.1.4. Rental is payable monthly in advance.

4.1.5. If an interruption occurs for which the telephone service is responsible, the originating Administration makes a rebate if requested to do so by the lessee. The rebate is determined on the basis indicated in Part 4.2. (Charging) below.

#### 4.2. *Charging.*

4.2.1. The charge for the lease of an international broadcast transmission circuit should correspond to that for 6000 minutes of use of the broadcast transmission circuit in question per month.

4.2.2. The charge for leases for periods of 10 days or less should be that corresponding to 240 minutes use for each day of lease of the broadcast transmission circuit in question, together with a surcharge corresponding to 30 minutes use of the broadcast transmission circuit in question, no matter what the actual period of lease may be.

4.2.3. The charge for leases exceeding 10 days, but not exceeding 25 days, should be that corresponding to 240 minutes of use of the broadcast transmission circuit in question, per day of lease, without surcharge (thus for 11 days lease the charge is equal to that for  $240 \times 11 = 2640$  minutes).

4.2.4. If a lease is extended beyond the 25th day so as to last one month, the charge should be that for 6000 minutes of use of the broadcast transmission circuit in question.

4.2.5. If a lease is for a period exceeding one month, the charge for the first month should be that indicated above, and the charge for each additional day should be that corresponding to 200 minutes of use of the broadcast transmission circuit in question.

4.2.6. If an interruption occurs for which the telephone service is responsible, a rebate should be granted only if the international broadcast transmission circuit has been completely interrupted for a continuous period of 3 hours or more. The maximum rebate allowable should not exceed one or other of the two following limits:

- 40 minutes use for each continuous period of interruption of 3 hours duration.
- 200 minutes use per day for a continuous interruption of 24 hours in the case of leases over 25 days (240 minutes use per day or per continuous 24-hour interruption in the case of leases of 25 days or less).

4.2.7. Several methods may be used in collecting and accounting for the total amounts due in respect of a lease. In particular one or other of the following two methods might be used:

a) The Administration of the country in which the ordering Broadcasting Organization is situated collects the full rental and makes the appropriate entries in the international accounts.

b) The Administration of one of the terminal countries collects from the Broadcasting Organization in its country, in national currency, the share of the rental for the circuit on its territory; the Administration of the other country collects the balance of rental due and, when appropriate, makes any necessary payments to transit countries.

## ANNEX

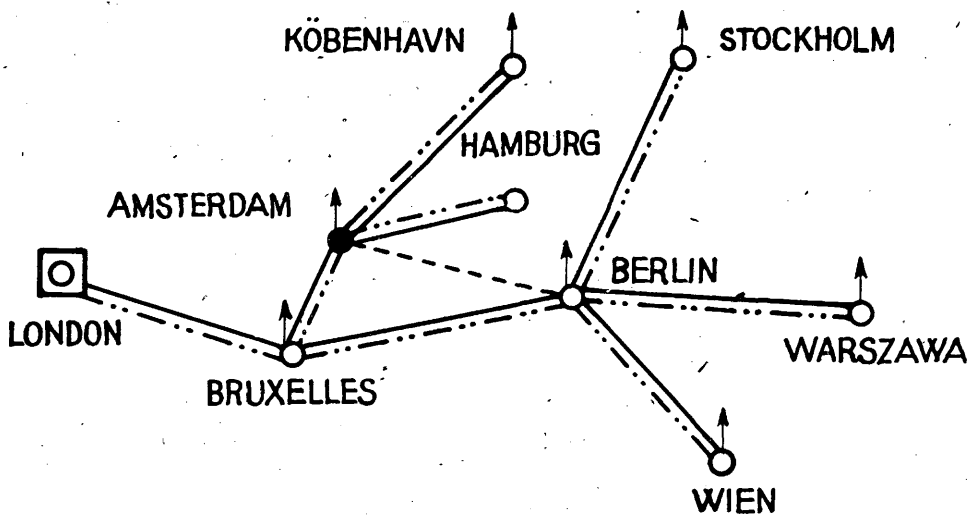
### *Example of a multiple Broadcast Relay*

In the following diagram, it is assumed that the Broadcasting Organization in Brussels which broadcasts the emission coming from London, pays the charge for the Brussels-London circuit; that the Broadcasting Organization in Berlin pays the charge for the Berlin-Brussels circuit, while the Broadcasting Organizations in Stockholm, Warsaw and Vienna pay for the Berlin-Stockholm, Berlin-Warsaw and Berlin-Vienna circuits respectively.

As Amsterdam is not broadcasting the transmission, the Broadcasting Organizations in Hamburg and Copenhagen should arrange in advance which Organization will pay the charge for the Brussels-Amsterdam circuit.

If, for example, the Broadcasting Organization in Hamburg agrees to pay the charge for the Brussels-Amsterdam section, because Amsterdam is not broadcasting the programme, the charges to be collected in Hamburg and in Copenhagen respectively should be based on a transmission from Brussels to Hamburg and a separate transmission from Amsterdam to Copenhagen.

Similarly, prior agreement between the Broadcasting Organizations concerned is necessary as regards payment for the control circuits and, if necessary, for the reserve circuits.



Circuits	Circuit ordered by (i.e. Broadcasting Organization to pay for circuit used)	Special repeater station which should be notified if any fault occurs on the circuit
London-Brussels . . . . .	Brussels	
Brussels-Amsterdam . . . . .	The Broadcasting Organizations of Hamburg and Copen- hagen should arrange beforehand which is to pay for the Brussels- Amsterdam circuit.	
Amsterdam-Copenhagen . . . . .	Copenhagen	
Amsterdam-Hamburg . . . . .	Hamburg	
Brussels-Berlin . . . . .	Berlin	
Amsterdam-Berlin (reserve) . . . . .	The Broadcasting Organizations concerned should decide which one of them will pay for the re- serve circuit Amsterdam-Berlin.	

Circuits	Circuit ordered by (i.e. Broadcasting Organization to pay for circuit used)	Special repeater station which should be notified if any fault occurs on the circuit
Berlin-Stockholm . . . . .	Stockholm..	
Berlin-Warsaw . . . . .	Warsaw	
Berlin-Vienna . . . . .	Vienna	
London-Berlin (control) . . . .	Berlin	

### RECOMMENDATION 49 bis (New Recommendation)

#### International television transmissions

THE INTERNATIONAL TELEPHONE CONSULTATIVE COMMITTEE,

Considering,

that in the present state of development of the television network in Europe the national circuits which are used for the transmission of international television programmes are owned in most cases by the Administrations and/or private operating Agencies \*, but in others by the national Television Organizations;

that the television circuits may also be used for both national and international transmissions;

that on the contrary the international broadcast transmission circuits and telephone circuits associated with the television circuits, either for the transmission of the sound part of the programme or for control purposes, are owned by the Telephone Administrations and are more liberally used than the vision circuits, and that the number of such circuits used in connection with a given television transmission may be substantial;

that, moreover, the extension of a sufficient number of such circuits to a point of origination of a transmission remote from the international telephone terminal in the country of origin of the programme may require special construction to be undertaken, particularly when there is also national television transmission of the event or a simultaneous national or international sound broadcast transmission of the event;

that it is desirable in certain respects to distinguish between international television transmission used by a single country only and those in which two or more countries participate;

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\* Hereinafter the expression "Telephone Administrations" is used to cover both government departments and private operating Agencies.

that it is desirable to ensure that satisfactory arrangements are made for the preparation, setting-up, preliminary adjustment and operation of the complex network of television circuits, broadcast transmission circuits and control circuits necessary for a given television transmission;

and hence that the closest co-operation is necessary between:

- the Television Organizations concerned in a television transmission, either as users or as owners of television links or both,
- and the Telephone Administration concerned.

Considering, moreover,

that the Television Organizations may agree to appoint a Coordinating Centre for a given international television transmission \*,

Unanimously issues the recommendation,

that the following conditions should be observed for international television transmissions:

## SECTION I. — GENERAL AND DEFINITIONS

### 1.1. *Constitution of an international television link.*

1.1.1. In considering an international television transmission it is necessary to distinguish between (see figure 1):

a) the point to be regarded as that of the origin of the television transmission (Point A). This point is either the actual place of origin of the programme (a studio or an outside broadcast point) or a switching centre or the location of a standards' converter,

b) the outgoing local end which connects point A to the first repeater station (Point B),

c) the *international* (long distance) *television line* (line BC) which, in principle, consists of a chain of national and international television transmission circuits, in which the national circuits are of the same quality as international circuits,

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\* The purpose of this centre is to:

- co-ordinate the requirements of the Television Organizations participating in the transmission in question,
- make all necessary enquiries as to the availability of television circuits,
- draw up the plan of television broadcast transmission and telephone circuits required for the transmission in question,
- ensure that the programme transmission proceeds normally once the television circuits are handed over to the Television Organization for the relay in question.

d) the incoming local end which connects the last repeater station (Point C) to point D,

e) point D, the point of destination of the television transmission. This point may be a television centre, a television transmitting station, a switching centre, or the location of a standard's convertor.

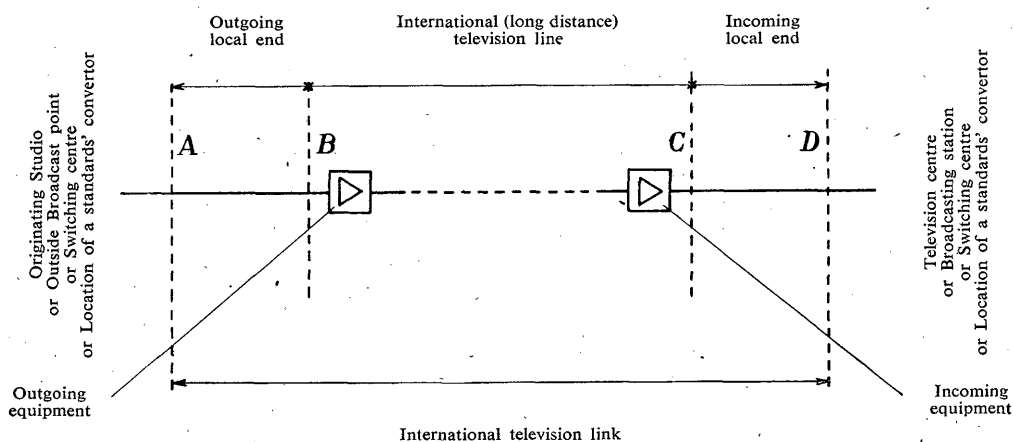


FIGURE — *Diagram of an international television link*

1.1.2. The complete line between A and D, including the international (long distance) television line BC and the local ends (AB and CD) is the *international television link*.

1.1.3. Points A and D are, as a general rule, under the control of the originating and receiving television organizations \*.

Points B and C are, in principle, under the control of the Telephone Administrations of the corresponding countries.

In certain cases the exact location of point B and C may not be clearly evident. In such cases the point to be regarded as the end of the long distance line for a particular television transmission should be fixed by agreement between the Telephone Administrations and the Broadcasting Organizations concerned.

\* If a Telephone Administration takes responsibility for a standards convertor, or for a television switching centre, or for a television broadcasting station, it is to be treated as a Television Organization for the purpose of this Recommendation.

The international (long distance) television line BC is, in practically every case, under the control of the Administrations, but certain of its component parts (which may be national or international circuits) may be owned by Television Organizations.

The local ends may either be under the control of a Telephone Administration or of a Television Organization, or of both jointly, according to the actual arrangements in the countries concerned.

*Note.* — The term "long distance line" is used here in a very general sense, applying equally to metallic lines (in cables or wave guides) and to micro-wave radio links.

### 1.2. *Categories into which television transmissions may fall :*

Distinction is made between the following categories of television transmission:

1.2.1. Regular television transmissions, which are ordered once for all because they take place at regular intervals, at fixed times, over the same routes and between the same points.

1.2.2. Occasional television transmissions being all those which do not fall within the definition of regular transmissions.

1.2.3. Simple television transmissions which are transmissions between points in two different countries, the programme being originated in one country and broadcast either in the other only, or in both.

1.2.4. Duplex simple television transmissions, being transmissions between points in two different countries, the programme being originated at the same time in both countries and broadcast in both. So far as this Recommendation is concerned, these transmissions are treated as two separate simple television transmissions.

1.2.5. Multiple television transmissions, with one point of origin of programme only, being transmissions in which a programme originates in one country and is transmitted simultaneously to two or more other countries (in addition, as may be, to being broadcast in the country of origin).

1.2.6. Multiple television transmissions with several points of programme origination, in which the programme originates from different points either in one country or in different countries and is broadcast in two or more other countries (in addition, as may be, to being broadcast in the country of origin).

### 1.3. *Circuits used in a television transmission.*

The following different classes of circuit are used in each international television transmission:

a) *Television Circuit.* — A circuit, either in a cable or a microwave radio link, which transmits the vision signal from one point to another.



b) *Broadcast Transmission Circuit*. — A special circuit for the transmission of the sound component of the television programme as dealt with in C.C.I.F. Recommendation 49.

c) *Control circuit*. — As defined in C.C.I.F. Recommendation 49.

*Note*. — The Informatory Note at the end of this Recommendation indicates the different ways in which broadcast transmission circuits and control circuits can be used by Television Organizations.

#### 1.4. *Testing period and preparatory period*.

Distinction is made, for each international television transmission, between:

a) the *testing period* during which the Telephone Administrations carry out the adjustment of the international television line before handing it over to the Television Organizations;

b) the *preparatory period* during which the Television Organizations carry out their own adjustments, tests and various operations before proceeding to the actual television transmission;

c) the *television transmission* itself.

## SECTION II. — CONDITIONS OF ADMISSION

2.1. Requests for the use of circuits for television transmissions must be addressed by the Television Organization or Organizations, to which the Television transmitting station or stations belong, to the Co-ordinating Service of its (or their) country (or countries), this Co-ordinating Service being the same as that designated for broadcast transmissions.

Requests for the use of circuits for television transmissions, (television circuits, broadcast transmission circuits and control circuits) must be made as soon as possible, and in any case at least four working days before the transmission, in order to allow the Telephone Administrations concerned to take the necessary steps to organize the television transmission in question. Each request for circuits for a television transmission must be accompanied by an undertaking to pay the charges relating to the use of the circuits, as well as any special expenses which may be incurred. These requests will be met provided the general telephone service does not suffer and the prevailing conditions allow.

#### 2.2. *Transmissions with one participating broadcasting organization*.

For each international television transmission which is broadcast by the Television Organization of one country only, the organization which controls the television station *receiving* and broadcasting (or recording) the international transmission should, after preliminary agreement with the Television Organization originating the programme, make a request to the Co-ordinating Service of its country to place at its disposal the necessary:

- television circuits,
- broadcast transmission circuits,
- control circuits.

However, subject to agreement between the Telephone Administrations concerned and to the receipt of a general notification to that effect by the Television Organizations concerned:

- in the case of a transmission between adjoining countries, each Television Organization may order the part of the television line in its own national territory from its own Administration,
- in the case of a transmission with transit, the same procedure may be followed, but one or other of the Television Organizations (by prior agreement amongst themselves) should also order from the Co-ordinating Service of its own Administration the part of the television line in the transit country.

### 2.3. *Other television transmissions (several participating Television Organizations).*

#### 2.3.1. *General procedure.*

For international television transmissions serving television transmitter stations situated in several countries, the procedure is as follows:

The Television Organization which is to originate the programme sends to each of the Television Organizations concerned a list of the television stations which are to receive the programme: each Television Organization forwards this list to the Coordinating Service of its own country after having added to it any changes or additions it considers necessary. This list should include particulars of all the circuits required (television circuits, broadcast transmission circuits and control circuits) and, as appropriate, of any reserve circuits which may be required.

The Coordinating Services designate, by mutual agreement, a Directing Service for the transmission in question.

This Directing Service should inform each of the Coordinating Services concerned, at the earliest possible moment, of the circuits to be used, together with particulars of the repeater stations (on cables or on microwave radio links) with which the Television Organizations may communicate, if any unforeseen incident which must be dealt with urgently arises during transmission.

As soon as each Television Organization responsible for one or more points of destination of the programme receives the necessary information about the circuits for the use of which it will have to pay, it should send *without delay* to the Coordinating Service of its own country a request for the use of these circuits.

To facilitate this procedure it is desirable that the Television Organizations should study in advance the cases of multiple transmissions which are likely to occur frequently.

#### 2.3.2. *Procedure to be followed when there is a Coordinating Centre:*

When the Television Organizations agree to set up a Coordinating Centre for a given television transmission, the procedure should be as follows:

The Coordinating Centre set up by the Television Organizations concerned, first finds out which Television Organizations intend to participate in the transmission. The Centre then finds out, by enquiry of the Telephone Administrations

and of the Television Organizations concerned whether the circuits required for the transmission are likely to be available on the date and at the time required. After having established all the details of the circuits to be ordered by each participating Organization, the Coordinating Centre publishes and distributes as early as possible, and at least 14 days before the date of the transmission, to all the Television Organizations and Coordinating Services concerned, a complete schedule of circuit requirements for the transmission.

During this phase of exchange of information the Television Organizations are not placed under any obligation to pay for any expenses incurred, but the Telephone Administrations are under no obligation to put in hand any of the special work which may be necessary when orders are received.

### 2.3.3. *Television circuits.*

At least 4 working days before the date of the transmission, each participating Television Organization should forward to the Coordinating Service of its country a request for the use of the television circuits for which it will have to pay.

Any television transmission circuits required for use by one participating Television Organization only should be ordered by that Organization from its national Coordinating Service.

Television transmission circuits which are required for the use of more than one participating Television Organization are ordered as follows:

Each of the Television Organizations concerned orders from its own Coordinating Service the section of the international line (s) between:

- the point on the international (long distance) television line serving its participating broadcasting station which is furthest “downstream”, and
- the point “upstream” on the line serving the last participating station in the preceding participating country.

The participating country nearest to the country of origin orders the remaining section from the Coordinating Service of the country of origin.

Where a bifurcation of the international television line occurs in a given transmission, the Television Organizations jointly served by the section of circuit prior to the point of bifurcation should agree amongst themselves which should order that section: in such a case, therefore, one Television Organization should order the section between its participating station and the nearest participating station “upstream” in the preceding participating country, and each of the other Television Organizations should order the section between its participating station and the point of bifurcation.

When, by prior general notice to the Coordinating Service of its country, a Television Organization which owns an international television circuit has announced its intention to charge for the use of the circuit for international transmissions, the Telephone Administration receiving an order collects the appropriate charges and enters them in the international accounts. The creditor Administrator makes an appropriate settlement with the Television Organization which owns the circuit.

#### 2.3.4. *Broadcast transmission circuits.*

Requests for broadcast transmission circuits should be made in accordance with procedure set out in C.C.I.F. Recommendation 49.

#### 2.3.5. *Control circuits.*

Control circuits should be ordered according to the same principles as for the television circuits and broadcast transmission circuits with which they are associated.

As regards the number and setting up of the control circuits to be provided, the following directives should be observed:

##### 2.3.5.1. *Control circuits associated with television circuits.*

2.3.5.1.1. *Simple television transmissions.* — At least one control circuit must be provided between points A and D of figure 1 for a simple television transmission, whether occasional or regular.

2.3.5.1.2. *Multiple television transmissions.* — a) Multiple television transmissions in which there is only one point of origin: If the first point of bifurcation of the television circuits feeds a television transmitting station (or a switching centre or a telerecording centre) in the same town and participating in the multiple transmission, it is recommended that control circuits should be provided at least:

- between the point of origin of the pictures and the first point of bifurcation of the television transmission circuits,
- between this first point of bifurcation and the various television transmitting stations (or switching centres or telerecording centres).

Where this is not the case, it is recommended that control circuits should be provided, as far as possible, between the point of origin of the picture on the one hand and the various television transmitting stations (or switching centres or telerecording centres) on the other.

In the two cases described above these control circuits should be prescribed not only during the preparatory period but also during the whole programme transmission.

b) Multiple television transmissions with several points of origin: A preliminary study should be made between the Television Organizations and the Telephone Administrations concerned in order to determine what control lines are necessary.

##### 2.3.5.2. *Control circuits associated with broadcast transmission circuits.*

The rules given in C.C.I.F. Recommendation 49 are applicable.

2.3.5.3. *Note 1.* — In cases where a "Coordination Centre" exists for the international exchange of television programmes, this Centre having been set up by agreement between the various Television Organizations concerned, the requirements for control circuits terminating at this Centre are determined by agreement between the Television Organizations and the Telephone Administrations.

2.3.5.4. *Note 2.* — If the Television Organizations elect to dispense with:

- the control circuits, which normally must be associated with broadcast transmission circuits,
- or with the control circuits which normally must be associated with television circuits,

these Organizations shall not be entitled to claim any reduction of charge on account of any fault or interruption occurring on the broadcast transmission or television circuits either during the preparatory period or during the transmission of the programme proper, if such fault or interruption could not be quickly remedied because of the absence of the control circuits.

### SECTION III — CHARGING

#### 3.1. THE INTERNATIONAL TELEPHONE CONSULTATIVE COMMITTEE

Considering

— that the broadcast transmission circuits and telephone circuits used in connection with international transmissions of television programmes are circuits which can also be used by users other than the Television Organizations;

Unanimously issues the recommendation

— that the use of such circuits in connection with the transmission of television programmes should be charged for as follows:

##### 1. Broadcast transmission circuits

— in accordance with the rules set out in C.C.I.F. Recommendation 49, subject to what follows herein as to rebates for faults and interruptions.

##### 2. Control circuits

— as for the use of ordinary telephone circuits, without surcharge.

\* \* \*

#### 3.2. THE INTERNATIONAL TELEPHONE CONSULTATIVE COMMITTEE

Considering

— that the provision of television circuits for international television transmissions involves the Telephone Administrations in the construction of special and costly plant set aside for the purpose;

— that the studies of net costs of international television circuits carried out in 1955/1956, took into account the costs of lines and of terminal stations;

— that the costs of television lines on micro-wave radio-relay links and in coaxial cables are sufficiently close to enable one amount to be used for either type of circuit;

— that the amounts of net cost resulting from the studies in 1955/1956 were based on the hypothesis of an average use of international television circuits corres-

ponding to an exchange of programmes (in both directions of transmission) between the two centres served by a circuit, of 500 hours per annum;

— that this hypothetical duration of use is very much greater than the use actually made of television circuits in 1956 (almost double);

— that, nevertheless, it is desired to give the maximum encouragement to the development of international television exchanges by keeping the charges for them as low as possible;

Unanimously issues the recommendation

— that the use of international television circuits should be subject to the charging rules which follow;

— that the charge for 3 minutes use of an international television circuit, given below (being a charge somewhat less than the net cost on the basis of 500 hours use per annum), could be revised when the use of television circuits increases substantially above an average of 600 hours use per annum for programme exchanges in both directions of transmission between two centres.

#### CHARGING RULES

The use of international television circuits is subject to a charge and a surcharge.

3.2.1. The charge for each three minutes of use of such a circuit is 20 gold francs per 100 kms. of television line (crow-flight).<sup>\*</sup> For each minute, or fraction of a minute, after the first 3 minutes of use, the charge is one third of the above charge.

In determining the distances, the *international television circuit itself* only should be taken into account, any extension of the circuit which may be necessary in setting up an international television link being excluded. The distances should be taken as:

— in the case of the *terminal charge*, the crow-flight distance between the point of origin fixed for the circuit <sup>\*\*</sup> and the point where the circuit crosses the frontier. (In order to take better account of the cost actually incurred with a micro-wave radio-relay link, the point *mid-way* between the two stations on either side of the frontier may be used, instead of the actual point of crossing of the section of the link straddling the frontier);

— in the case of the *transit charge*, the crow-flight distance between the points of crossing of the frontiers by the international circuit. (As in the case of the terminal charge, the point of crossing of the frontier by a micro-wave radio-relay link can be taken as the mid-point between the two stations situated on either side of the frontier.)

Crow-flight distances should be rounded-up as follows:

- each fraction less than 50 kms. is rounded-up to 50 kms. maximum,
- each fraction between 50 and 100 kms. is rounded-up to 100 kms. maximum.

<sup>\*</sup> This figure takes into account the costs relating to two terminal stations.

<sup>\*\*</sup> The Administrations concerned should fix by mutual agreement the points at which each international television circuit begins and ends.

When the actual route of an international circuit is very much greater than the crow-flight distance as defined above, the country concerned may increase the charge (terminal or transit) which it makes, by an appropriate factor.

3.2.2. A *surcharge* is collected for each television transmission corresponding to 30 minutes use of each television circuit actually used in the transmission in question. The surcharge is made to take account of the costs incurred in setting up, testing and regulating the international television link, as well as of the supplementary expenses for personnel and material arising from the exchange of telegraph and telephone orders for the preparation, setting up and testing of the link. This surcharge is shared between the Telephone Administrations concerned on the same basis as the charge for the television transmission itself.

The surcharge is due if, for reasons not within the responsibility of the Telephone Administrations, the Television Organization which ordered the circuit requests the Co-ordinating Service from which it ordered the circuit to cancel the television transmission in question at less than 12 hours notice before the transmission is due to start.

The surcharge is not payable if the television transmission does not take place for reasons within the control of the telephone services.

3.2.3. In addition any *special expenses* which may be incurred by a Telephone Administration in extending international television circuits from the international terminal are also payable.

### 3.3. *Calculation of charges.*

3.3.1. The charges (charge and surcharge) relative to the use of the television circuits in a transmission are debited to the Television Organizations according to their undertaking to pay for the circuits in question on ordering them. They are due for the whole period during which the international telephone line is placed at the disposal of the Television Organizations concerned; the period of preparation before the start of the transmission proper is included in the period.

3.3.2. The supervision of an international television transmission is effected by a repeater station designated by the Telephone Administration. When a television circuit is owned by a Television Organization, this station is designated by that Organization.

The technical officers of the designated repeater stations should come to an arrangement between themselves so as accurately to fix at the end of the television transmission:

a) the time of handing over the television line to the Television Organization (beginning of chargeable duration);

b) the time at which the television line is released by the Television Organization (end of chargeable duration);

c) where appropriate, the times and durations of every interruption or incident which may have occurred (in order to determine whether a rebate is due, and if so, its amount).

The times of the beginning and of the end of the chargeable duration, as well as the time of occurrence and duration of any breakdowns which may occur, are entered on a daily report.

This daily report is sent on the same day to the service responsible for coordinating all the details necessary for the establishment of the international accounts.

3.3.3. The amount of any special expenses incurred by the Telephone Administration in the country of origin of the programme should be notified by that Administration by telegram to the Co-ordinating Service of the participating Television Organization which has ordered the long-distance line or the local ends. The Co-ordinating Service concerned should inform the Television Organization of its country of the amount of special expenses payable and should pass the appropriate credits to the Telephone Administration of the country of origin of the programme through the international accounts.

3.3.4. *Interruptions. — Rebates.*

If during the course of an international television transmission a fault or interruption, even of short duration, occurs:

- whether on the television link as a whole,
- or in a section of that link,
- or on one or more of the broadcast transmission circuits associated with the television transmission circuits,

it is necessary to consider to what extent the value of the relay has been reduced to the Television Organization or Organizations affected by the fault or interruption.

Telephone Administrations should adopt, provisionally, the following principles in dealing with faults or interruptions.

In general, if a Television Organization continues to broadcast or to record the transmission received either over the television line or over a broadcast transmission circuit, the charges in respect of all circuits of which it makes use remain payable in full. If, however, as a result of a fault or interruption on the television circuit, broadcast of the relay is necessarily discontinued by one or more participating Television Organizations, a rebate in respect of any sections of the television and broadcast transmission circuits which served that Television Organization (or those Television Organizations) exclusively may be allowed on request from the Organization(s). Any sections of international television and broadcast transmission lines used by any television station which continues to broadcast the received transmission remain payable in full. Similarly, if in such circumstances broadcasting of either the television or the sound programme (but not both) is necessarily discontinued by a participating Television Organization, a rebate in respect of the sections of either the international television lines, or of the broadcast transmission circuits concerned (but not both) may be made on a request being received.

It will be for the Telephone Administration of the country of the receiving Television Organization to assess the validity of any claim for rebate; and to assess the rebate to be made, where necessary, in consultation with the other Telephone Administrations concerned. In the event of disagreement, the opinion of the former Administration should prevail over that of the other Administrations or private operating Agencies concerned.



## ANNEX

## INFORMATORY NOTE

Extract from the list of terms adopted by the European Broadcasting Union (E.B.U.) for international television transmissions

1. *Vision Circuit.*

A cable or radio link which carries the vision signal from one point to another.

2. *Sound circuit.*

A circuit, preferably of music quality, which carries the programme sound, or a component part of this, from one point to another.

Special cases of such circuits are:

- 2.1. *Effects circuit* — a circuit carrying exclusively the ambient sounds of a programme;
- 2.2. *Commentary circuit* — a circuit carrying a commentary (without ambient sounds);
- 2.3. *Complete programme circuit* — a circuit carrying mixed effects and commentary.

3. *Control circuit.*

A point-to-point speech circuit associated with a vision circuit or with a sound circuit.

Special cases of such circuits are:

- 3.1. *Vision Control Circuit,*
- 3.2. *Effects Control Circuit,*
- 3.3. *Commentary Control Circuit,*
- 3.4. *Complete Programme Control Circuit.*

4. *Guide Circuit.*

A speech circuit carrying information from the source of the programme for the benefit of commentators who cannot themselves be at the source.

10. *Types of programmes.*

- 10.1. *Unilateral Programme* — a programme, not broadcast in the country of origin, which is fed to one or more other countries, for broadcasting or recording.
- 10.2. *Bilateral Programme* — a programme, broadcast in the country of origin, which is at the same time fed to another country, for broadcasting or recording.
- 10.3. *Multilateral Programme* — a programme, broadcast in the country of origin, which is at the same time fed to two or more countries for broadcasting or recording.

*Note.* — Any programme may consist of contributions taken successively from a number of different countries.

**RECOMMENDATION 63 ter (New Recommendation)****Calculating of the best arrangement for alternative routing**  
(New recommendation)

THE INTERNATIONAL TELEPHONE CONSULTATIVE COMMITTEE,

Considering

- the advantages offered by the use of alternative routing for the handling of traffic;
- the difficulties experienced in calculating the number of circuits necessary in the case of alternative routing;

Unanimously issues the recommendation

- that for calculating the number of circuits in the case of alternative routing, reference should be made to one or the other of the two following methods which were selected by the C.C.I.F. because of their ease of application and reasonable degree of accuracy obtained with the calculations.

The first of these methods is concerned with the equivalent pure chance traffic obtained by a weighted choice process. It enables the number of circuits on the alternative route to be calculated when the number of circuits on the direct route is fixed. To determine the most economical arrangement, it is necessary to calculate the annual charges of the whole of the network with the different arrangements. However, to reduce the number of tests, it is recommended in the first place to proceed with an approximate determination of the most economic arrangement as is indicated in the example on page 16.

The second method will be designated under the name of "Swedish method". It comprises two parts:

1. determination of the number of direct circuits for the most economic arrangement;
2. calculation of the number of circuits on the overflow group.

\* \* \*

The basis of these two methods is described in the following, together with an application of these two methods to a concrete case (routings between Stockholm, Copenhagen, Amsterdam and Paris); also given in the appendix are the detailed calculations for the two methods in this concrete case.

In these two methods it is assumed:—

- that full availability groups are concerned,
- that in the case where there is a possibility of alternate routing, the circuits of the direct route are always tested first.

The two methods recommended by the C.C.I.F. require only standard tables and curves derived from the Erlang formula.

The diagrams used with these two methods are those giving, as a function of the traffic offered:

- the traffic overflowing from a circuit of the  $n$ th choice, i.e. the traffic offered to a circuit of  $(n+1)$ th choice,
- the traffic carried by a circuit of the  $n$ th choice.

These diagrams can be presented in different forms of which examples are given in the following appendix (x) for values of traffic reaching 40 erlangs and for up to 75 circuits. These diagrams can be used indiscriminately for either of the two methods described. The use of one or other of these types of diagrams depends on the practices generally followed in the countries concerned.

#### *First method*

##### *Description of the method "equivalent pure chance traffic" obtained by a weighted choice process*

It is accepted that overflow traffic cannot be considered as pure chance traffic (*trafic aléatoire*) and if a group of overflow traffic is combined with a group of pure chance traffic, there is some difficulty in determining the number of circuits to be provided to ensure that a specified loss percentage will not be exceeded. Among the methods which have been proposed for determining the number of circuits necessary in these conditions, certain methods seek to define the combined traffic in such a way that the volume of traffic carried by each of these circuits tested in a fixed sequence can be read directly from standard curves derived from the Erlang formula.

\* \* \*

a) One method: "Equivalent Random (ER) theory" (in French "Théorie du trafic aléatoire équivalent") has been described in detail in the Bell System Technical Journal by R.I. WILKINSON (B.S.T.J. March 1956, page 421). In this method, for a combined overflow group each sub-group is assigned both "mean volume" and "variance" values. The values of these two parameters for the different constituent traffic elements can be added and, with the aid of *special* curves, which have been prepared for the purpose, it is possible to determine an equivalent value of pure chance traffic (Equivalent Random traffic) which is offered to a circuit of  $n$ th choice; this hypothetical choice being determined, in principle, to approximately 1 decimal place. From these standard curves giving the overflow traffic can be read the number of circuits necessary to fulfil a specified loss requirement and from this figure it is necessary to deduct the hypothetical choice number mentioned above.

\* \* \*

b) An analogous process\*, which is designated under the name of "weighted choice method"\* is simpler to calculate and avoids the use of the special diagrams mentioned above and of delicate interpolations between two families of curves. A brief description of this method follows.

---

\* See "Electrical Communication", article by E. P. G. WRIGHT, March 1947, page 42.

As in method *a*), mentioned in the paragraph above, the traffic offered, resulting from the total sub-group overflow traffic, is defined as the overflow from a pure chance traffic offered to a circuit of the calculated hypothetical choice. These particulars, equivalent random traffic and hypothetical choice being obtained, the subsequent operations are then, for process *b*), the same as in method *a*):

- read on the standard curves giving the overflow traffic, the number of circuits necessary for a specified loss probability,
- from the value found deduct the number corresponding to the hypothetical choice.

The difference between process *b*) and method *a*) rests in:

- the determination of the equivalent random traffic,
- the determination of the hypothetical choice value of the circuit (*n*th choice circuit) to which this traffic is offered.

The hypothetical choice value is obtained in process *b*) by a simple weighting. This is effected:

- by calculating the sum of the products of the “traffic volume” and choice of each sub-group overflowing,
- then dividing this total by the sum of the sub-group traffic.

In process *b*) the equivalent random traffic is derived directly from the *standard* curves giving the overflow traffic from a circuit of the *n*th choice (see for example diagram 1 at the end of these notes). The traffic to be considered as overflow traffic is the arithmetical sum of the sub-group traffic overflowing. From the curves on diagram 1 can be read, with respect to the specified hypothetical choice, the random traffic which gives rise to this value of overflow traffic.

Process *b*) has an empirical basis and does not present the mathematical justifications of method *a*). Nevertheless, it leads to sufficiently accurate results as is shown by the results of a series of tests carried out with artificial traffic and it enables a simplification of the calculations to be made.

The simplicity of the calculations is illustrated by the following example:

#### *Example*

It is required to find how many circuits are needed to ensure a loss not exceeding 5% for a composite group collecting the following amounts of sub-group traffic:

- 1.41 E offered to a circuit of the 4th choice (i.e. overflowing from 3 circuits),
- 1.39 E offered to a circuit of the 7th choice (i.e. overflowing from 6 circuits),
- 0.45 E offered to a circuit of the 10th choice (i.e. overflowing from 9 circuits).

The weighting is calculated as follows:

$$1.41 \text{ E} \times 4 = 5.64$$

$$1.39 \text{ E} \times 7 = 9.73$$

$$0.45 \text{ E} \times 10 = 4.5$$

$$\frac{3.25 \text{ E}}{19.87 : 3.25 = 6.1 \text{ choice (i.e. traffic overflowing from 5.1 circuits).}}$$

$$\text{Permitted loss } 3.25 \times \frac{5}{100} = 0.16 \text{ E.}$$

From the overflow curves (see following figure) it can be read that the random traffic corresponding to 3.25 E and to a choice of 6.1 is 7.5 erlangs. It follows that a traffic of 0.16 E will overflow to the 14th choice. In deducting from this value of 14 the hypothetical choice value, it will be seen that 7.9 circuits are required.

If, on the other hand, it is required to know what traffic will overflow say 5 common circuits, it can be read from the curves that, with a total traffic of 7.5 erlangs, the overflow from 5.1 circuits (traffic flowing to the 6.1 choice) is 3.25 erlangs and that the overflow from 10.1 circuits (5.1 + 5), which is the traffic flowing to the 11.1 choice, is 0.72 erlangs.

The calculations for the first example can be written briefly as follows:

$$\begin{array}{rcl} 1.41 \times 4 & = & 5.64 \\ 1.39 \times 7 & = & 9.73 \\ 0.45 \times 10 & = & 4.5 \\ \hline 3.25 & & 19.87 : 3.25 = 6.1 \end{array}$$

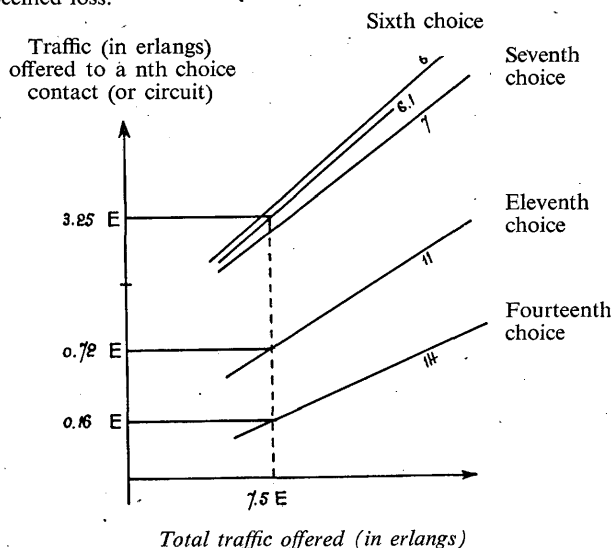
$$p = 3.25 \times \frac{5}{100} = 0.16$$

Number of circuits read: 14.0

Less: 6.1

Circuits needed: 7.9

The value 7.5 E does not need to be read and made to figure in the calculations as it is only necessary to determine on the diagrams the appropriate vertical line, to find how many circuits are required for a specified loss.



## 2nd Method

### Description of the Swedish method

In the Swedish method account is not taken of the particular statistical characteristics of overflow traffic but is based on a method of reasoning and then on a hypothesis for the calculation, which provides the desired guarantee of security for the flow of traffic.

In the first place an explanation is given of the method of reasoning adopted with the Swedish method followed by an explanation of the hypothesis which gives the desired margin of security.

### Method of reasoning.

To determine the number of circuits of the alternate route, two reasonings are possible:

*Reasoning a).*

It is assumed that the alternate route is intended initially to carry only its own traffic and that the overflow traffic from the direct route is added to this traffic. It is then necessary to *add* a number of circuits to the alternate route, according to the amount of overflow traffic. This is the assumption generally made with the different methods of calculation for alternative routing.

If account is not taken of the particular statistical characteristics of overflow traffic, the calculations for the alternate route give a number of circuits which is, in every case, slightly less than is actually needed. On the other hand, the methods which take account of the particular statistical characteristics of overflow traffic enable the number of circuits to be determined with sufficient accuracy. This is the case with the two methods *a)* and *b)* which are described in the first part.

*Reasoning b).*

It is assumed that the alternate route is initially intended to carry all the traffic and that the part of the traffic to be passed over the direct route is deducted from this traffic. Consequently, the number of circuits on the alternate route can be *reduced* to an amount corresponding to the traffic deducted. This reasoning is the basis of the Swedish method.

To determine the number of circuits that can be subtracted from the alternate route as a function of the traffic to be carried on the direct route, it is necessary to know the traffic carrying capacity of the circuits deducted from the alternate route, i.e. the rate of occupation of each of these circuits. This traffic carrying capacity depends on the position of the circuits deducted (supposing that the circuits are tested in a specified order: convention accepted for calculations with the Swedish method).

*Hypothesis giving the desired margin of security.*

To effect this deduction, three hypothesis can be made according to deducted circuits being taken amongst those:

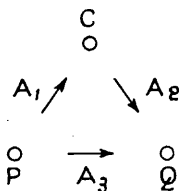
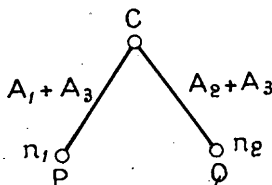
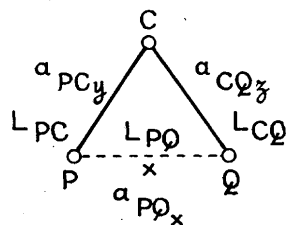
- A: of the last position (choice) circuits (having the lowest occupation),
- B: of an intermediate position (choice),
- C: of the first position (first choice circuits having the highest occupation).

Proceeding according to hypothesis A (which seems at first sight the most natural) it is certain that too many circuits will be deducted from the alternate route. Hypothesis B could permit the optimum number of circuits to be found. However, the number of choice possibilities is very great and the choice should be made in the absence of any procedure with a mathematical basis. With hypothesis C it is certain that the number of circuits deducted from the alternate route will be very small. This is the hypothesis which is adopted in the Swedish method and which constitutes the guarantee that the circuits remaining on the alternate route will, in all cases, be sufficient. In other words, the reduction in the traffic carrying capacity of the circuits on the alternate route, when *y* circuits are deducted, will, *by convention* in the Swedish method, be equal to the traffic carried by the *first y* circuits of the group.

\* \* \*

After these explanations, which are intended to describe the spirit of the Swedish method, a brief description is given of the different phases of the calculations involved with this method. A more detailed description of the basis of this method is given in pages 442 and 453 of Volume I of the *Green Book*.

The notation employed in the following and the numbering of the formulae will be the same as in the text of Volume I of the *Green Book* and are followed for the three centres P, C and Q; C being the transit centre (see figures 1, 2 and 3):

FIGURE 1. — *Traffics offered*FIGURE 2. — *All traffic passing in transit by the alternate route*FIGURE 3. — *Price of circuits and traffic handled on each route by a xth, yth, or zth circuit*

$A_1$  = Volume of traffic offered outgoing from P to C (in erlangs)

$A_2$  = Volume of traffic offered outgoing from C to Q (in erlangs)

$A_3$  = Volume of traffic offered outgoing from P to Q (in erlangs)

$L_{PC}$  = Annual charges of a circuit on the route PC

$L_{CQ}$  = Annual charges of a circuit on the route CQ

$L_{PQ}$  = Annual charges of a circuit on the route PQ

$n_1$  = the number of circuits necessary to carry the traffic  $A_1 + A_3$  outgoing from P (case where the direct route does not exist)

$n_2$  = the number of circuits necessary to carry the traffic  $A_2 + A_3$  outgoing from C (case where the direct route does not exist)

$x$  = the number of circuits on the direct route

$y$  = the number of circuits of the alternate route which can be deducted from group  $n_1$  carrying  $A_1 + A_3$  to take account of the constitution of  $x$  circuits on the direct route

$z$  = the number of circuits of the alternate route which can be deducted from the group  $n_2$  carrying  $A_2 + A_3$  to take account of the constitution of  $x$  circuits on the direct route.

\* \* \*

With the hypothesis mentioned above that the  $y$  or  $z$  circuits deducted are the first circuits tested (circuits of which the occupation is very high) of group  $n_1$  (Group PC) and  $n_2$  (Group CQ) of the alternate route,  $y$  and  $z$  are determined, as a function of  $x$ , by the relation:

$$\left. \begin{array}{l} \text{Traffic carried by the } y \text{ (} z \text{) first circuits of group } n_1 \text{ (} n_2 \text{)} \\ \text{to which is offered the traffic } A_1 + A_3 \text{ (} A_2 + A_3 \text{)} \end{array} \right\} = \left\{ \begin{array}{l} \text{Traffic carried by the } x \text{ circuits} \\ \text{of the direct route to which is} \\ \text{offered the traffic } A_3 \end{array} \right.$$

that is to say by the two equations:

$$A_1 + A_3 - (A_1 + A_3) E_{1,y} (A_1 + A_3) = A_3 - A_3 E_{1,x} (A_3) \quad (4)$$

$$A_2 + A_3 - (A_2 + A_3) E_{1,z} (A_2 + A_3) = A_3 - A_3 E_{1,x} (A_3) \quad (5)$$

(See the note on the bottom of this page \*.)

\* \* \*

\* Note :

Instead of considering the traffic carried, the overflow traffic which is the complement of this, can be considered, resulting with equations (4') and (5') which can be more practical to handle:

$$(A_1 + A_3) E_{1,y} (A_1 + A_3) = A_1 + A_3 E_{1,x} (A_3) \quad (4')$$

$$(A_2 + A_3) E_{1,z} (A_2 + A_3) = A_2 + A_3 E_{1,x} (A_3) \quad (5')$$

These equations (4) and (5) express, for example, in the case of group PC, that:

$$\left. \begin{array}{l} \text{traffic overflowing from the first } y \text{ circuits} \\ \text{of PC when all the traffic } A_1 + A_3 \text{ passes} \\ \text{over the alternate route} \end{array} \right\} = \left\{ \begin{array}{l} \text{traffic proper to PC or } A_1 \\ + \\ \text{traffic overflowing from the direct route PQ.} \end{array} \right.$$

To determine the optimum economic constituent arrangement, the annual charges per erlang are compared:

- on the one hand, on the circuit last tested of the direct route PQ (xth circuit) and,
- on the other hand, on the circuit last tested *among those which are deducted* from the alternate route, yth circuit on the group PC, zth circuit on the group CQ.

It is then a matter of comparing:

$$\frac{L_{PQ}}{a_{PQx}} \text{ with } \frac{L_{PC}}{a_{PCy}} + \frac{L_{CQ}}{a_{CQz}}$$

the designation being:

$a_{PQx}$  = the traffic carried by the xth circuit of the group PQ

$a_{PCy}$  = the traffic carried by the yth circuit of the group PC

$a_{CQz}$  = the traffic carried by the zth circuit of the group CQ.

The optimum economic arrangement is:

$$\frac{L_{PQ}}{a_{PQx}} = \frac{L_{PC}}{a_{PCy}} + \frac{L_{CQ}}{a_{CQz}}$$

To finish quickly, an approximation is made and instead of considering in equation (2) the traffic carried by circuits of y outlets and z outlets, this traffic is replaced by the traffic carried by a circuit of the first choice, that is to say,  $a_{PCy}$  and  $a_{CQz}$  are replaced by values a little greater =  $a_{PC_1}$  and  $a_{CQ_1}$ . The direct route is then submitted to conditions a little more severe. There is also:

$$a_{PQx} = \frac{L_{PQ}}{\frac{L_{PC}}{a_{PC}} + \frac{L_{CQ}}{a_{CQ_1}}} \quad (2)$$

This enables the value of traffic  $a_{PQx}$  to be determined assuming  $L_{PQ}$ ,  $L_{PC}$  and  $L_{CQ}$  is known. The value of x, number of circuits of the direct route, can be derived from  $a_{PQx}$ ; then from equations (4) and (5) [or from equations (4') and (5')], the values of y and z corresponding to the value of x thus found.

It is sufficient then to subtract from the number of circuits  $n_1$  or  $n_2$  (calculated for carrying  $A_1 + A_2$  and  $A_2 + A_3$ ) the numbers y and z to find the number of circuits of the groups PC and CQ.

*Note.* — If it is desired to have a greater accuracy in these calculations, it is possible to proceed by successive approximations, replacing y and z in equation (2) by the values obtained from x derived from (2). As a general rule this accuracy does not lead to any change in the number of circuits and therefore this correction is not normally made.

#### *Application of the methods of calculation to a concrete case.*

#### I. Particulars of the problem (see figure below).

I.1. Centres: — Stockholm, Copenhagen, Amsterdam and Paris.

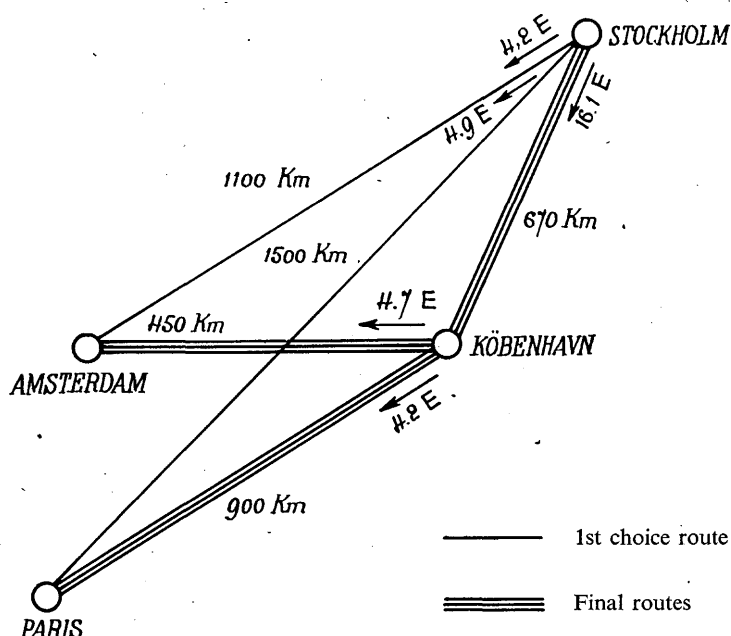
I.2. Routes overflowing: — Stockholm to Amsterdam  
Stockholm to Paris

I.3. Traffic: — S-A (Stockholm-Amsterdam) 4.2 E  
S-P (Stockholm-Paris) 4.9 E  
S-K (Stockholm-Copenhagen) 16.1 E  
K-A (Copenhagen-Amsterdam) 4.7 E  
K-P (Copenhagen-Paris) 4.2 E

I.4. Grade of service: — Permitted loss on direct circuits 5%  
Permitted loss on transit circuits 3%

I.5. Distances: — S-A 1 100 km  
S-B 1 500 km  
S-K 670 km  
K-A 450 km  
KP 900 km





## II. Elements derived from the information.

### II.1. Total transit route traffic.

S-K (including S-A and S-P)	25.2 E
K-A (including S-A)	8.9 E
K-P (including S-P)	9.1 E

### II.2. Circuit annual charges.

The following values are taken from the minutes of the Committee for the Revision of International Tariffs.

- Transmission and switching termination 0.22 gold franc per circuit per 3 minutes of conversation.
- Circuit 0.25 gold franc per 100 km per 3 minutes of conversation.
- 40 000 minutes of occupation per annum.

The following values are obtained:

$$\begin{aligned}
 L_{S-A} \text{ (direct)} &= (2 \times 0.22 + 11 \times 0.25) \times \frac{40\,000}{3} = 3.19 \times \frac{40\,000}{3} = 42\,530 \text{ gold fr.} \\
 L_{S-P} \text{ (direct)} &= (2 \times 0.22 + 15 \times 0.25) \times \frac{40\,000}{3} = 4.19 \times \frac{40\,000}{3} = 55\,860 \text{ „ „} \\
 L_{S-K} &= (2 \times 0.22 + 6.7 \times 0.25) \times \frac{40\,000}{3} = 2.115 \times \frac{40\,000}{3} = 28\,200 \text{ „ „} \\
 L_{K-A} &= (2 \times 0.22 + 4.5 \times 0.25) \times \frac{40\,000}{3} = 1.565 \times \frac{40\,000}{3} = 20\,870 \text{ „ „} \\
 L_{K-P} &= (2 \times 0.22 + 9 \times 0.25) \times \frac{40\,000}{3} = 2.69 \times \frac{40\,000}{3} = 35\,860 \text{ „ „}
 \end{aligned}$$

The prices have been rounded to about 10 gold francs.

*Note.* — For the calculation of the best arrangement with alternative routing, it is necessary to have an annual charge basis for international circuits and for their transmission and switching terminations.

The basic values taken are those which are used to determine cost price elements for 3 minutes telephone charges in C.C.I.F. Recommendation 41. The value for transmission and switching terminations 0.22 gold francs per 3 minutes corresponds to the cost price elements for semi-automatic centres, less operating expenses: 0.22 = 0.80 — 0.58 for an outgoing centre,  
= 0.30 — 0.08 for an incoming centre.

The annual charge values per circuit are restored by multiplying the values indicated in Recommendation 41 by  $\frac{40\,000}{3}$ .

The actual number of minutes of conversation during the year will vary the cost per 3 minutes but not the annual charges.

### III. Results of the calculations.

#### III.1. The calculations given in the following appendix and carried out

— by the “weighted choice” method,

— by the Swedish method,

leading respectively to the following values of numbers of circuits representing the optimum economic arrangement.

Group	“Weighting of the choices”	Swedish method
S-A	1	1
S-P	1	1
S-K	30.6	30.6
K-A	13.1	13.2
K-P	13.5	13.6

It will be seen that there is a perfect convergence of results.

III.2. In the calculations made by the “weighted choice” method different arrangements are calculated to find the economic optimum. It is interesting to compare the annual charges of these different arrangements which are:

Arrangement . . . .	SA = 1 SP = 1	SA = 0 SP = 0 (all passed in transit)	SA = 0 SP = 1
Cost . . . . .	1 718 820	1 721 520	1 722 540

SA = 1 SP = 2	SA = 3 SP = 3	SA = 5 SP = 5	SA = 7.6 all the traffic passed direct
1 723 432	1 738 970	1 777 720	1 909 590

## APPENDIX 1

*Calculations made by the "weighted choice" process*1. *Approximate determination of the most economical arrangement*1.1. *Occupancies for first choice circuits on direct routes :*

$$S-A \text{ (direct)} \frac{4.2}{5.2} = 0.81$$

$$S-P \text{ (direct)} \frac{4.9}{5.9} = 0.83$$

The corresponding occupancies for the second choice circuits are approximately 0.75 and 0.78 respectively.

1.2. *Transit route traffic addition per circuit :*

$$S-K + A + P \text{ at } 3\% \quad \begin{array}{ll} 33 \text{ circuits carry } 25.84 \text{ E} \\ 32 \text{ circuits carry } 24.91 \text{ E} \end{array}$$

$$\text{difference } 0.93 \text{ E}$$

$$K-A \text{ (incl. S-A) at } 3\% \quad \begin{array}{ll} 14 \text{ circuits carry } 8.8 \text{ E} \\ 13 \text{ circuits carry } 7.97 \text{ E} \end{array}$$

$$\text{difference } 0.83 \text{ E}$$

$$K-P \text{ (incl. S-P) at } 3\% \quad \begin{array}{ll} 15 \text{ circuits carry } 9.65 \text{ E} \\ 14 \text{ circuits carry } 8.8 \text{ E} \end{array}$$

$$\text{difference } 0.85 \text{ E}$$

1.3. *Economic comparison.*1.3.1. *A.C. (annual charges) by direct route for first circuit of group:*

$$\text{A.C. per erlang S-A} = \frac{42,530}{0.81} = 52,510 \text{ gold francs}$$

$$\text{A.C. per erlang S-P} = \frac{55,860}{0.83} = 67,310$$

1.3.2. *A.C. by overflow route for first circuit of group:*

$$\text{A.C. per erlang S-K-A} = \frac{28,200}{0.93} + \frac{20,870}{0.83} = 55,470 \text{ gold francs}$$

$$\text{A.C. per erlang S-K-P} = \frac{28,200}{0.93} + \frac{35,860}{0.85} = 72,510 \text{ „ „}$$

*Note.* — A comparison between sections 2.1 and 2.2 shows an apparent economic advantage with one direct circuit on each of the routes S-A and S-P. However, the additional traffic per circuit in paragraph 1.2 is for random traffic, whereas the traffic in paragraph 1.1 is selected calls which are better distributed than random traffic. On this account, the occupancies in paragraph 1.2 are relatively low and the charges in paragraph 1.3.2 are relatively high.

In particular, the figures in paragraph 1.2 are a little lower than those used for the economic calculation in the Swedish method where the traffic carried by the first circuit of the alternate route is taken into consideration where all the traffic is offered to it (this, however, is also an approximation).

1.3.3. The occupancy values for the second choice circuits on the direct route S-A and S-P are not sufficiently high to provide an annual charge figure which will compare favourably with the charges via transit given in paragraph 1.3.2. For the first choice circuits it is easier to calculate

the number of circuits required and to evaluate the annual charges than to attempt to reach an accurate estimate of the optimum arrangement by comparing the route charges.

1.3.4. Existing plant or operational conditions may make it advantageous to adopt an overflow arrangement which is not the best theoretical solution. For information purposes, therefore several possible combinations are worked out in section 2.

## 2. Computation of number of overflow circuits.

### 2.1. Arrangements to be considered:

- 2.1.1. S-A 1 direct circuit  
S-P 1 direct circuit
- 2.1.2. S-A 3 direct circuits  
S-P 3 direct circuits
- 2.1.3. S-A 5 direct circuits  
S-P 5 direct circuits

### 2.2. Overflow traffic as read from curves.

Arrangement considered:

	1 + 1	3 + 3	5 + 5
S-A (4.2 E offered)	3.4 E	1.98 E	0.92 E
S-P (4.9 E offered)	4.07 E	2.55 E	1.36 E

### 2.3. Calculation of overflow circuits S-K.

Arrangement considered:

	1 + 1	3 + 3	5 + 5
S-K	$16.1 \times 1 = 16.1$	$16.1 \times 1 = 16.1$	$16.1 \times 1 = 16.1$
S-A	$3.4 \times 2 = 6.8$	$1.98 \times 4 = 7.9$	$0.92 \times 6 = 5.5$
S-P	$4.07 \times 2 = 8.2$	$2.55 \times 4 = 10.2$	$1.36 \times 6 = 8.2$
	<hr/>	<hr/>	<hr/>
	23.57 E	20.63 E	18.38 E
3% loss	0.71 E	0.62 E	0.55 E
Weighted choice	<hr/>	<hr/>	<hr/>
	1.3	1.6	1.6
Hypothetical choice read from curve to give stated loss	<hr/>	<hr/>	<hr/>
	31.9	29.1	26.4
Less	<hr/>	<hr/>	<hr/>
	1.3	1.6	1.6
Circuit quantity needed	<hr/>	<hr/>	<hr/>
	30.6	27.5	24.8

### 2.4. Calculation of overflow circuits K-A.

Arrangement considered:

	1 + 1	3 + 3	5 + 5
K-A	$4.7 \times 1 = 4.7$	$4.7 \times 1 = 4.7$	$4.7 \times 1 = 4.7$
S-K-A	$3.4 \times 2 = 6.8$	$1.98 \times 4 = 7.9$	$0.92 \times 6 = 5.5$
	<hr/>	<hr/>	<hr/>
	8.1 E	6.68 E	5.62 E
3% loss	0.24 E	0.2 E	0.17 E
Weighted choice	<hr/>	<hr/>	<hr/>
	1.4	1.9	1.8
Hypothetical choice read from curve	<hr/>	<hr/>	<hr/>
	14.5	13.5	12.2
Circuit quantity needed	<hr/>	<hr/>	<hr/>
	13.1	11.6	10.4

## 2.5 Calculation of overflow circuits K-P.

Arrangement considered:

	1 + 1		3 + 3		5 + 5	
K-P	$4.2 \times 1 =$	4.2	$4.2 \times 1 =$	4.2	$4.2 \times 1 =$	4.2
S-K-P	$4.07 \times 2 =$	8.1	$2.55 \times 4 =$	10.2	$1.36 \times 6 =$	8.2
	<hr/>		<hr/>		<hr/>	
	8.27 E	12.3	6.75 E	14.4	5.56 E	12.4
3% loss	0.25 E		0.2 E		0.17 E	
Weighted choice		1.5		2.1		2.2
Hypothetical choice						
read from curve	}	15.0	}	13.9	}	12.5
Circuit quantity needed		13.5		11.8		10.3

## 3. Results.

## 3.1. Summary of A.C. of different arrangements with overflow as calculated by taking the product of annual charges and the quantities of circuits found.

Arrangement considered:	1 + 1	3 + 3	5 + 5
A.C. of route S-A	42 530	127 590	212 650
A.C. of route S-P	55 860	167 580	279 300
A.C. of route S-K	862 920	775 550	699 360
A.C. of route K-A	273 400	245 100	217 050
A.C. of route K-P	484 110	423 150	369 360
	<hr/>	<hr/>	<hr/>
Total	1 718 820	1 738 970	1 777 720

## 3.2. All traffic via transit.

S-K = 25.2 E needing 32.3 circuits	A.C. = 910 860
K-A = 8.9 E needing 14.1 circuits	A.C. = 294 270
K-P = 9.1 E needing 14.4 circuits	A.C. = 516 390
	<hr/>
	1 721 520

## 3.3. S-A and S-P traffic direct.

S-A = 4.2 E needing 7.6 circuits (5% loss)	A.C. = 323 230	} = 1 117 640
S-P = 4.9 E needing 8.4 circuits (5% loss)	A.C. = 469 220	
S-K = 16.1 E needing 22.4 circuits	A.C. = 631 680	
K-A = 4.7 E needing 9.0 circuits	A.C. = 187 830	
K-P = 4.2 E needing 8.3 circuits	A.C. = 297 630	
	<hr/>	
	1 909 590	

From these results it is possible to determine that the annual charges for the traffic S-K, K-A and K-P, which is not subject to overflow, is 1 117 640 and the difference in charge between the first arrangement with alternative routing (1 718 820 — 1 117 640 = 601 180) and all traffic direct (1 909 590 — 1 117 640 = 791 950) represents approximately 24% on the traffic concerned (S-A, S-P). The difference between alternative routing and all traffic via transit is only 0.5%.

## 4. Analysis of Results.

## 4.1. Circuit occupancies.

With S-A = 1 and S-P = 1, the traffic from S-K is 23.57 E requiring 30.6 circuits (see paragraph 3.3). When all traffic is via transit, the traffic from S-K is 25.2 E which needs 32.3 circuits. The difference 1.635 E needs only 1.7 circuits showing that the extra circuits are operating at a higher occupancy (0.96) than can be justified by the tables as mentioned in paragraph 1.2 above.

4.2. It is quite possible that a more economical arrangement might be produced with  $S-A = 0$  and  $S-P = 1$  or with  $S-A = 1$  and  $S-P = 2$ . These possibilities can be quickly established by calculating the quantities.

#### 4.3. Further Computation.

Arrangement considered:	0 + 1	1 + 2
S-A (4.2 E offered)	4.2 E	3.4 E
S-P (4.9 E offered)	4.07 E	3.3 E
Computation for S-K		
S-K	$16.1 \times 1 = 16.1$	$16.1 \times 1 = 16.1$
S-A	$4.2 \times 1 = 4.2$	$3.4 \times 2 = 6.8$
S-P	$4.07 \times 2 = 8.2$	$3.3 \times 3 = 9.9$
	<hr/> 24.37 E	<hr/> 22.8 E
3% loss	0.73	0.68
Weighted choice	1.2	1.5
Hypothetical choice read from curves	32.7	31.3
Circuit quantity needed	31.5	29.8
Computation for K-A		
K-A	14.1 circuits	13.1 circuits as in
S-K-A		section 2.4
Computation for K-P		
K-P	13.5 circuits as in	$4.2 \times 1 = 4.2$
S-K-P	section 2.5	$3.3 \times 3 = 9.9$
		<hr/> 7.5 E
3% loss		0.23 E
Weighted choice		1.9
Hypothetical choice read from curve		14.6
Circuit quantity needed		12.7

#### 4.4 Further Summary.

Arrangement considered:	0 + 1	1 + 2
A.C. of route S-A	—	42 530
A.C. of route S-P	55 860	111 720
A.C. of route S-K	888 300	840 360
A.C. of route K-A	294 270	273 400
A.C. of route K-P	484 110	455 422
	<hr/> 1 722 540	<hr/> 1 723 432

#### 4.5. General Comments.

It should be observed that the effective grade of service is not similar in all examples taken. The 5 + 5 and 3 + 3 arrangements would be capable of taking a considerable overload with less serious upset than the other arrangements.

It has been assumed for this study that the loss on the transit routes should be not greater than 3% because certain other traffic from Stockholm uses København as a transit without overflow. As a general case, in which the only consideration is the loss on the routes S-A, S-P, S-K, K-A and K-P, the 3 + 3 and 5 + 5 arrangements have special merit because with circuits S-K at 5% loss there is a saving of 1.8 circuits and on the K-A and K-P routes there is also a saving of 1 circuit. The revised figures are then:

3 + 3 . . . . .	1 631 470
5 + 5 . . . . .	1 670 220

These totals are markedly less than the other combinations.

## APPENDIX 2

*Calculations by the Swedish method*1. *All the traffic is passed over the alternative route (via K).*1.1 *Traffic offered.*

S-K (including S-A and S-P): 25.2 E  
 K-A (including S-A): 8.9 E  
 K-P (including S-P): 9.1 E

1.2. *Number of circuits necessary.*(loss probability  $p = 3\%$ )

$n_1 = 32.3$   
 $n_2 = 14.1$   
 $n_3 = 14.4$

1.3. *Occupation of the first circuit at each group.*

$a_{SK_1} = 0.96 E$   
 $a_{KA_1} = 0.90 E$   
 $a_{KP_1} = 0.90 E$

2. *Most economic arrangement — Number of direct circuits.*

In the most economic arrangement, the occupation of the last circuit of the direct groups Stockholm-Amsterdam and Stockholm-Paris is

$$a_{SA} = \frac{L_{SA}}{\frac{L_{SK}}{a_{SK_1}} + \frac{L_{KA}}{a_{KA_1}}} = \frac{3.19}{\frac{2.115}{0.96} + \frac{1.565}{0.90}} = 0.82 E$$

and

$$a_{SP} = \frac{L_{SP}}{\frac{L_{SK}}{a_{SK_1}} + \frac{L_{KP}}{a_{KP_1}}} = \frac{4.19}{\frac{2.115}{0.96} + \frac{2.69}{0.90}} = 0.81 E$$

The last circuit of the direct group S-A should carry a minimum traffic of 0.82 E when the traffic offered to this group is 4.2 E.

One direct circuit is then required for the group S-A (occupation of the first circuit S-A for 4.2 E offered; 0.81 E, of the second circuit; 0.75 E).

The same for the group S-P.

— traffic offered: 4.9 E,

— minimum traffic carried by the last circuit: 0.81 E,

it must therefore have 1 direct circuit (occupation of the first circuit S-P for 4.9 E offered: 0.83 E, of the second circuit: 0.78 E).

3. *Number of circuits on the overflow groups.*3.1. *Group S-K.*

To carry the total traffic of 25.2 E, with a loss probability of 3% would require 32.3 circuits. This number of circuits should be reduced by the quantity  $r$  obtained from the relation:

$$25.2.E_{1,r}(25.2) = 25.2 - [4.9 - 4.9.E_{1,1}(4.9)] - [4.2 - 4.2.E_{1,1}(4.2)]$$

or:

$$25.2.E_{1,r}(25.2) = 25.2 - 0.9 - 0.8 = 23.5$$

where  $r = 1.7$

resulting in:  $32.3 - 1.7 = 30.6$  circuits.

3.2. *Group K-A.*

The total traffic 8.9 E would require 14.1 circuits.

This number of circuits should be reduced by a quantity  $r$  obtained from the relation:

$$8.9.E_{1,r}(8.9) = 8.9 - [4.2 - 4.2.E_{1,1}(4.2)] = 8.1$$

where  $r = 0.9$

resulting in:  $14.1 - 0.9 = 13.2$  circuits.

3.3. *Group K-P.*

The total traffic 9.1 E requires 14.4 circuits.

This number of circuits should be reduced by a quantity  $r$  obtained from the relation:

$$9.1.E_{1,r}(9.1) = 9.1 - [4.9 - 4.9.E_{1,1}(4.9)] = 8.2.$$

where  $r = 0.8$

resulting in:  $14.4 - 0.8 = 13.6$  circuits.

#### 4. Conclusion.

Finally the following arrangement is obtained:

Stockholm-Amsterdam	1 circuit
Stockholm-Paris	1 circuit
Stockholm-København	30.6 circuits
København-Amsterdam	13.2 circuits
København-Paris	13.6 circuits

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Diagrams giving traffic overflowing from a  $n$ th choice circuit  
(diagrams quoted on page 146)



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