

# World-Radio

THE BBC FOREIGN PROGRAMME JOURNAL ★ EVERY FRIDAY

*Programmes for June 19-25*

2<sup>D</sup>



A MANLY EXERCISE: members of a Czechoslovak Sokol Society—a remarkable national fitness movement—practising for the festival which will be held during July in the stadium at Prague. (See article on page 7.)

**Marconi's Chief Assistant: George Stephen Kemp**

**Principles of Pentode Valves**

**All-World Short-Wave Review**

**Pitcairn Island Station**

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# Your Visit to Scotland

This broadcast talks series, full of up-to-date and valuable information for the intending visitor, is now appearing in "The Listener"

\* \* \*

THIS WEEK (JUNE 16)

## "Travel & Hospitality"

by **MORAY McLAREN**

\* \* \*

NEXT WEEK (JUNE 23)

## "The People"

by **EDWIN MUIR**

\* \* \*

# The Listener

Threepence every THURSDAY

From newsagents, bookstalls and booksellers.



MME. ADAMSKA, who will give a 'cello recital in the Warsaw studio at 7 p.m. on Saturday.

**Light-Hearted Operas**

LAST week I made reference to the season's first broadcast from Scheveningen. This week I observe that the Italian stations announce the first of a series of open-air transmissions which have in past years invariably proved very enjoyable: those from the Basilica di Massenzio. Two of these concerts will be heard during next week, on Monday from the Rome group, when Gino Marinuzzi is to be the conductor; and on Friday from the Turin group, with Mario Rossi officiating. As in former years, these concerts begin at 9.30 p.m.

Next week's opera programme of the Italian stations is also in keeping with the season and on the lighter side. *The Barber of Seville*, for instance, will be broadcast twice: on Sunday from the Rome group, and on Tuesday from the Turin group; and Zandonai's comic opera *La via della finestra* will also be transmitted twice from Rome and Turin on Thursday and Saturday respectively. With the two operettas which will be heard during the week, the Italian programmes are assuredly good fare for summer evenings.

**Reynaldo Hahn**

THE composer of *Ciboulette*, the operetta which will be broadcast from the Paris (PTT) group and Sottens stations at 8.30 p.m. on Tuesday, though born in Venezuela, went to France as a small boy, and has made his home there since. Best known, both in his own country and abroad, as the composer of a number of really beautiful songs, Reynaldo Hahn has composed many operas, ballets, and choral and orchestral music. He is also a distinguished conductor, specialising in Mozart.

According to his own countrymen, "Hahn est tout charme," but his music is more than a mere catering for those who like their entertainment to be easily digestible: it is all masterly in its workmanship, and *Ciboulette*, popular as it has always been, is on a higher level than operetta usually reaches. Another operetta of his, *Beau Brummell*, will be broadcast on Thursday from the Eiffel Tower station.



**A Belgian Music Festival**

AN interesting transmission is announced from Brussels No. 1 for 8 p.m. on Wednesday, when listeners will hear a programme of music by contemporary Liège composers. The National Orchestra will be conducted by Armand Marsick, who ranks foremost as a creative Liège musician, and one of the principal items in the programme will be an excerpt from his opera *Lara*, the libretto of which is based on Byron's poem. Other items in the programme are *Six pièces brèves*, by Marcel Orban, and a symphonic poem, *Le Rêve plastique*, by Maurice Drogghmans.

Music by Henrietta van den Boorn-Coclet, Emile Mawet, and Jean Rogister will complete a broadcast that will bring before listeners the work of an active and virile group of contemporary artists.

**Midsummer Eve**

MIDSUMMER EVE will be widely celebrated this week in many parts of Europe, and especially in the Scandinavian countries and Germany. The symphony concert which will be broadcast from Radio-Paris at 8.30 p.m. on Thursday, and which will be conducted by Inghelbrecht, includes Mussorgsky's *St. John's Eve on the Mountain*.



D. E. INGHELBRECHT, the Director of Music of French broadcasting, who will conduct Reynaldo Hahn's "Ciboulette" from Paris (PTT) at 8.30 p.m. on Tuesday, and the symphony concert from Radio-Paris at 8.30 p.m. on Thursday.

This tone poem depicts the traditional unearthly revels which the folk-lore of many lands associates with the Eve of St. John's Day. There is a regular Witches' Sabbath and a glorification of the Evil One with the rites of the Black Mass. But, in the midst of the unholy orgies, the tolling of the church bell is heard in the distance, and the spirits of darkness disappear with daybreak. The piece comes to an end with a sense of serene peace, which is in striking contrast to the ghostly revelry of the main part of it.

**A Great German City**

UNDER the heading "Augsburg: vom neuen Werden einer alten Stadt" Deutschlandsender will broadcast a programme, from 8.0 p.m. on Thursday, that will, I have no doubt, appeal to many listeners. The microphones and a staff of reporters have been occupied for days in the ancient City of Augsburg taking impressions of life in the city to-day and tracing back events in its illustrious history.

The names of Fugger and (to a lesser degree) of Welser, the mediæval merchant-princes, come at once to the mind, and among the scenes that may be re-enacted on Thursday there will probably be the famous interview between Herr Fugger, the head of that family, and Charles the Fifth, the Emperor who boasted that "in his empire the sun never set." The merchant prince resolutely refused to call on the Emperor, and insisted that the latter should call on him—which he did.

**Swiss Folk Music**

WHEN Beromünster broadcasts a programme of Swiss folk music at 12.40 p.m. on Friday—a transmission which will be taken by the British Regional stations—listeners will hear songs and music that, but for the zeal and enthusiasm of a group of men in the latter half of the eighteenth and the early part of the nineteenth centuries, might never have been treasured as the valuable cultural possessions they have, in fact, become. The friends of folk music have continued their work throughout the decades and they have collected many thousands of songs and dances that have now been published in print.

The Beromünster station employs a staff of musicians who arrange periodical cycles of transmissions of folk music and dances. Their aim is, by means of broadcasting, to preserve Swiss national characteristics and traditions, side by side with broadening cosmopolitan outlook.

ALL-WAVE



**TRESI RUDOLPH**, who has recently become Germany's youngest Kammersängerin—a title granted by the State only to singers of the first rank. She is appearing in the Berlin programme at 8 p.m. on Sunday.

#### IRISH PRESIDENT'S PLAY

**T**HE *Twisting of the Rope*, a one-act comedy by Professor Douglas Hyde, the distinguished Gaelic scholar who has become Ireland's first President, was recently presented as an exclusive feature by the National Broadcasting Company. The play, which was trans-

# THE WORLD

## French Plans for Royal Visit

lated into English by the late Lady Gregory, was produced in Dublin on October 21, 1901, the first Gaelic play to be acted in any theatre.

Dr. Hyde is a scholar of great eminence, and as a boy he became fascinated with the Irish spoken by the people living around his father's Roscommon rectory. Later, as a brilliant honours graduate of Trinity College, Dublin, he became an ardent collector of Irish folk lore. For a short time, Dr. Hyde was Professor of Modern Languages at the State University in New Brunswick.

#### THE ROYAL VISIT TO FRANCE

THE State and private stations of Paris will be put to a severe test during the visit of the King and Queen, when, it is anticipated, they will have to cope with outside commentaries for their own listeners, and also be at the service of broadcasters from Great Britain, writes our Paris Correspondent.

The State station programmes covering the period of the Royal visit from June 26 to July 2 will include a Franco-British concert from the Salle Gaveau, by the National Orchestra under Inghelbrecht, on Sunday, the 26th; a Shakespearean evening on the 28th, from the Comédie Française; a *Soirée de Gala* in honour of the British sovereigns, from the Opéra, on the 29th; and *David Copperfield*, from the Odéon, on the 30th. French versions are being given of both Shakespeare and Dickens.

Throughout the week there will be outside commentaries on the official visits and banquets and the visit of the Queen to the British Hospital at Neuilly; Anglo-French concerts; a special feature, *La Naissance de l'Entente Cordiale*; and talks on British literature and other appropriate subjects.

#### HIGH-BROW MOUNTAINEERS

"KENTUCKY and Arkansas mountaineers dislike hill-billy music; they prefer symphony orchestration and opera. They disclaim utterly the

brand of savage discord which is described as mountain music." So states Col. William Bovey, of McGill University, who represented the CBC at the recent round-table conference on radio held under the auspices of the National University Extension Association at Hot Springs, Arkansas.

#### WEDNESDAY'S FIGHT

*The fight for the championship of the world between Joe Louis (the holder) and Max Schmeling in New York on Wednesday night will be relayed both in this country and Germany.*

*The ringside commentary by Bob Bowman will be radiated from the BBC Droitwich transmitter on Thursday at 2.45 a.m. B.S.T.; and a recording will subsequently be relayed in the Empire programmes.*

*It is probable that some of the American short-wave stations may also relay the fight.*

#### EXAMS FOR DEALERS

IN Switzerland, a wireless business cannot be exploited unless the owner or the chief assistant has passed an examination proving his technical knowledge in wireless questions. This examination is not easy. The candidate must undergo oral and written tests in electro-technique and measurement; in addition, he must speak for half an hour on his practical experiences, give in a written work on the same subject, and prove his ability by practical work lasting three hours. Each candidate must have completed a term of training and been employed for two consecutive years in the wireless business. The examiners are representatives of the P.T.T. Administration and of the Wireless Dealers' Association.

As a result of these strict measures, only persons who are really qualified can exercise the profession. Moreover, each candidate must have a fixed business address and pay a deposit of Fr. 1,000 as a guarantee of the quality of the technical work carried out.

### CUT THE CRACKLE OUT OF RADIO

Notes on Interference Suppression.—No. 23

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**YOUTH ON PARADE:** a striking picture of Sokol—the Czechoslovakian gymnastic movement—formations in the Stadium at Prague. (See article on page 7.)

# OF RADIO

## Excellent Fare from Denmark

### DENMARK'S GALA WEEK

DURING recent months the Danish State Broadcasting Service has, through talks and radio plays, aroused keen public interest in the summer's great event—the Agricultural Exhibition which is being held at Bellahøj, Copenhagen, from June 17 to 26, to celebrate the 150th anniversary of the abolition of villeinage. One hundred and fifty years ago the last remains of serfdom in Denmark were abolished. A year or two earlier a commission had been appointed to introduce reforms in one part of Denmark, as a result of which 3,800 peasant families were given their freedom. As an experiment this was so successful that in 1788 all forms of compulsion were removed, and the Danish peasant for the first time enjoyed his full personal freedom.

On Saturday, at 11.0-11.30 a.m., the opening of the Exhibition by H.M. King Christian will be relayed, and special broadcasts during the Exhibition will include, on Monday at 10.0 a.m., reception at the Copenhagen Town Hall, the people's procession to the Liberty Column, and the ceremony at the Column. The same afternoon a people's meeting will be relayed from the grounds of the Exhibition, with speeches by the Minister of Agriculture and other officials. Thursday's Midsummer Night's festival will include a torchlight procession, and a St. John's Fire speech by the Lord Mayor of Copenhagen. A choir of about 3,000 schoolchildren will sing national songs, accompanied by the orchestra of the Royal Life Guards.

### FREE SETS IN AUSTRIA

THE State distribution of 100,000 free radio sets to selected persons of sound Nazi principles who are infirm or crippled, or still unemployed, is proceeding rapidly. Those chosen, if they are not blind or victims of brain injury, must be either incapable of working and earning, or recipients of the dole, or existing on an income (as widows or former dependants upon pensioners) which does not exceed the amount of dole.

Those who receive such free sets have to pay no dues or preliminary fees, and have in most cases either never had a radio set before, or have had to cease being subscribers long ago through impoverishment.

### A TRIBUTE TO THE U.I.R.

AN American publication, *Education on the Air*, which contains the proceedings of the Institute for Education by Radio during 1937, includes a stimulating paper by Major Gladstone Murray, General Manager of the Canadian Broadcasting Corporation, on "Radio's Responsibility for National Culture." In the course of this paper Major Murray writes: "It is perhaps not generally realised that, with the exception of the Postal Union, the International Union of Broadcasters is demonstrably the most consistently and cumulatively successful international experiment so far undertaken. It enjoys the whole-hearted co-operation of the broadcasting

industry in the United States. Since it was formed in 1925, with headquarters at Geneva, the International Union of Broadcasters has established a working partnership among all the leading broadcasters of organised society.

"Adjustment of channels, exchange of ideas and programmes, co-operative experiments, the inception of a common pool of programme material—these and other tasks have been undertaken with a degree of success unusual in a generation which has witnessed the frustration of nearly every other attempt at international co-operation. It would seem that with radio, therefore, we are making a real effort to keep pace with progress."

### INTERNATIONAL CO-OPERATION

"THE possibilities of this international co-operation are hard to exaggerate," Major Murray continues. "Americans are already familiar with the voices and views of statesmen and thinkers in other countries, made available through the enterprise and efficiency of American broadcasters. Similarly, through radio, the authoritative voices of American leaders of thought have gained international audiences of startling dimensions. And we are only at the beginning. The broadcasting of the Coronation ceremonies was a perfect example of international co-operation: it was estimated that two hundred and fifty million people listened to it.

"I do not mention it as necessarily an example of cultural broadcasting, but I do quote it as an extraordinary and significant example of the efficiency of international co-operation in radio. It is proving beyond any question of dispute that the natural field of radio has become the whole world."

### IF YOU WANT TO MAKE RHYTHM...

AFTER reading a "price-list" of the instruments owned by NBC musicians, it seems to me no more than kind to warn any youthful listeners who may have become enamoured of orchestral playing as a potential career that they had better concentrate on the trumpet—unless they have capital behind them. A



GRACE MOORE, with André Kostelanetz, in whose programme she is now appearing (relayed from Wayne, Thursdays, 2 a.m. B.S.T.)

fine trumpet can be bought, I gather, for round about £30. When it comes to a violin, "the sky's the limit."

The fifty-odd musicians in the string section of the Symphony Orchestra represent more than £60,000 worth of instruments, with an aggregate age of something like 10,000 years.

### POLICE CARS AS TELEPHONE EXCHANGE

POLICE radio cars were used as an emergency alternative for a disrupted telephone system for several hours recently in New York when a workman accidentally pierced four telephone cables with a compressed air drill, and put out of action five telephone exchanges in a busy district. Hospitals and thousands of other places, including police stations, were "cut off."

To alleviate the situation twenty police cars equipped with short-wave apparatus, controlled from four principal stations, were commissioned to relay subscribers' calls, and particularly messages intended for the St. Cecilia Maternity Hospital. Two other hospitals also dependēd, while repairs affecting sixty trunk lines were being made, upon the prompt services of the police radio cars.

## DO YOU KNOW THE ANSWERS?

The following questions are all based on subjects which should be familiar to readers of *WORLD-RADIO*. They are intended not only to be a test of observation, but to provide some diversion for the family circle. The answers will be found on page 9.

1. (a) In which year did KDKA, Pittsburgh, begin regular broadcasts? (b) What is the present height of KDKA's recently installed aerial mast? (c) Give the name of the most powerful American station, its call-sign, and wavelength.
2. Which famous choir of to-day was conducted by Johann Sebastian Bach for 27 years?
3. Which American station has a woman manager?
4. Which was the first regular short-wave station and the first to relay a BBC programme to the Empire?
5. Which American actor is noted for his radio productions of "stream-lined" plays of Shakespeare over the American stations?
6. What length (app.) of wire would be required to make a half-wave aerial on 40 metres?
7. Which American station broadcasts Christian Science programmes regularly?

Questions 1 and 2 submitted by J. Parkin, 18, Rowley Grove, Cottingham Road, Hull.

Question 3 by J. F. N. Wedge, 6, Manor Court, Forest Hill, S.E.23.

Questions 4 and 5 by M. W. Lerner, 9D, Lyng Lane, West Bromwich, Staffordshire.

Questions 6 and 7 by Peter C. Shenton, The Rectory, Graveley, Huntingdon.

## PIONEERS OF BROADCASTING—12

# George Stephen Kemp

*No name is more deserving of inclusion in this series than that of George Stephen Kemp, who became Marconi's lieutenant and collaborator in all his early experiments.*

THROUGHOUT the history of science there have been countless instances where the greatness of a master or the brilliance of his work has so overshadowed the efforts of his subordinates that their contributions, no matter how substantial, have failed to become linked historically with their names and have, as a rule, been credited entirely as the work of the master. An instance of this may be found in the case of George Stephen Kemp, whose wide practical experience was of such invaluable aid to Marconi in the early years of the latter's work in England.



George Stephen Kemp

Kemp was born in Kent in 1857 and spent most of his boyhood in Southampton. In 1874 he entered the Navy and, a few years later, took part in the famous bombardment of Alexandria in 1879, for a time working with Sub-Lieutenant (later Admiral) Jellicoe. On his return home, he decided to specialise and so underwent courses at the Torpedo and Gunnery Schools. At the Gunnery School he was for a time in the same class with Prince George (later King George V), who was taking the course at the same time. At the final passing-out examination from the Torpedo School, Kemp obtained 97 per cent, the highest aggregate of marks which had ever been obtained at that time, an indication of the remarkable ability which he was to show in later years.

In 1887 he was promoted Chief Torpedo Instructor, and took part with Lieutenant (later Admiral Sir) Henry Jackson in a great deal of experimental and development work on torpedo design. In the summer of 1891 a great naval exhibition was held in the grounds of Chelsea Hospital, and the greatest attraction of the exhibition was an immense lake which had been specially constructed and upon which model ships, steered and driven electrically from the shore, carried out the most complicated manoeuvres. Not only could the ships be made to manoeuvre in fleets, but they could fire miniature guns and carry out mine-laying attacks with miniature mines which exploded on contact with another ship. Kemp was responsible for the design and operation of this spectacular exhibit, which attracted vast crowds throughout the whole exhibition.

At about this period, electricity was beginning to be employed in naval vessels for lighting and other purposes, and Kemp took a leading part in the installation of the various electrical devices in a number of ships. During

experimental work with cables while serving with the Fleet on the West Indies Station in 1894, he invented a method of communicating over long distances by means of an ingenious adaptation of existing telegraph apparatus, and

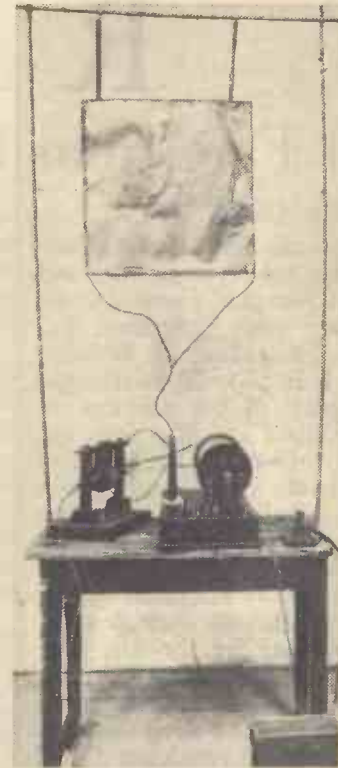
By G. R. M. GARRATT, M.A.

this work was acknowledged by the Admiralty as being of considerable value. During his years in the Navy, therefore, Kemp received an exceedingly wide experience in mechanical and electrical work of many different types, and, at the age of thirty-eight, when he retired from the sea, he was able to take up an appointment on the engineering staff of the Post Office.

He was straight away given charge of the laboratory of Sir William Preece, who was then the Engineer-in-Chief. His new post was one of considerable responsibility, as important developments were then taking place in the telephone and telegraph services. He had held this appointment for only a few months when one day, July 27, 1896, he was called by Sir William and introduced to a shy and somewhat reserved young man, Guglielmo Marconi, who, as Kemp recorded in his diary, had "a new instrument for communicating across space." Preece had been much impressed by what Marconi had told and shown him, and he realised that the Post Office, as the custodian of the communication services, would have to take a very close interest in Marconi's work. He therefore instructed Kemp to give Marconi all possible assistance and to co-operate with him as closely as possible.

## Kemp's Diary

Marconi, then only a lad of twenty-two and a stranger to England, was only too glad of such assistance, and he realised how invaluable a man of Kemp's age and experience would be to him. Kemp was one of the most methodical of men, and from the age of twelve he had kept a remarkable diary in which he recorded many details of his day-to-day activities. This diary he continued to keep until the day of his death in 1933. In later years the documentary evidence which the diary provided proved of immense value to Marconi, and more than one important lawsuit was won on the evidence contained in those little volumes, one case in particular being that in which the famous "Four Sevens" patent (so called because its number was 7777) was disputed. Extending as it does over a period of more than sixty years, the diary is one of exceptional interest, and as an historic record of the early development of wireless telegraphy it is almost priceless. Except in the earlier volumes there are exceedingly few personal references, and outstanding events in the life of the man himself—for example, the birth of his eldest son—are passed over with-



A reconstructed model employing the original apparatus which formed the transmitter used by Marconi and Kemp during their experiments in 1896

out mention. Technical details of experiments and equipment, however, are recorded with care, and it thus forms a perfect record of the progress and achievements in those early years.

After a little more than a year's association with Marconi as the representative of the Post Office, Kemp had become so enthusiastic about the future of wireless telegraphy that he resigned from the Post Office to become Marconi's personal assistant. For a man with heavy

responsibilities—he had three young children at the time—to resign a safe and permanent appointment in favour of a new and undeveloped science speaks highly, not only of his courage, but also of his judgment and conviction as to its future. During the ensuing years, Kemp and Marconi were to each other almost as father and son—the one an experienced engineer, the other a young man of remarkable ability—and the two formed excellent companions in all their work.

Within two months of his first meeting with Marconi, they were signalling over a distance of one and a half miles on Salisbury Plain, and by March of 1897 this distance had been increased to five miles by using kites and balloons to support the aerials. In May, 1897, they established communication across the Bristol Channel from Lavernock to Bream Down, and in December of the same year they were experimenting with small steamers in Bournemouth Bay. The results showed that they could maintain communication night and day between Bournemouth and Swanage. In January, 1898, they linked the Isle of Wight with the mainland by means of stations at the Needles and at Bournemouth; and in March, 1899, they established communication across the English Channel with two stations at South Foreland and Wimereux.

Step by step, the distances were increased until, in July, 1901, a service was established between the Lizard and Crookhaven in Ireland, a distance of two hundred and twenty-five miles, but this feat, however remarkable, paled into insignificance in face of their achievement in December of 1901 in transmitting the first wireless signals across the Atlantic.

Impossible as it is to apportion the credit between them, it is certain that Kemp's share  
(Continued in column 3, page 9)



A graceful exercise by Czechoslovak girls.

# A Czech Fitness Movement

may briefly be described as a "national fitness movement." It started in 1860, at a time when a national consciousness among the Slavonic races then incorporated in the Austrian Empire was awaking. The Czech nationalist group, led by a young Prague philosopher, Dr. Miroslav Tyrš, held the belief that to produce a free and virile people it was necessary to educate it physically, intellectually, and morally. They started with a physical culture association in 1861, and Dr. Tyrš gathered round him a band of able helpers, the most outstanding being Jindřich Fügner. In February, 1862, the latter became President of the Prague Physical Culture Unions, which afterwards became known as the Sokol Union. The growth of the movement was astonishing. Most towns in the Czech-speaking part of Bohemia had branches within a short time, and similar unions were formed among the Croats, Slovenes, and Poles living in the Austrian Empire.

For twenty years the Sokols grew steadily, and when in 1881 the organisation celebrated its twentieth anniversary, it was made the occasion of the first Sokol Festival. These festivals have been repeated every five or six years, and it is the tenth which is about to begin. In 1889 the name of the union was changed to the Czech Sokol Community, and in 1895 it was decided to admit women. The growth in the post-War years has been astonishing. By 1913 the number of branches had risen to 1,080, with a membership of 128,000; the membership to-day is 800,000.

The fundamental principle on which the Sokols are built may be briefly expressed as "equality of all among all," not merely in the matter of

physical drill, but in social life generally. In addressing one another members use the second person singular, "thou," and the words "brother" in the case of men and "sister" in the case of women. This form of address is not a mere outward token of equality; it is also the expression of a much more profound sentiment—brotherhood. Sokol brotherhood implies the conscious abandonment by its members of privileges arising from birth, property, and education.

## The Sokol Idea

The organisation on its administrative side is a most efficient one, and here is the most impressive fact of all. Members pay no subscription. The only payments made are (1) a fee paid to head office by each local branch for every one of its members, and (2) a fee of 8d. paid for every new member who joins that branch. The subscriptions include an insurance against accidents received during drill by individual members. For the rest, all work done by officials and instructors and in the Central Committee is entirely honorary. There are Sokol Houses in all the larger centres, and they are equipped with lecture and concert rooms and libraries. The Society's headquarters in Prague, the Tyrš house, is an old palace which was adapted to its present purpose at a cost of 25,000,000kc., the money being supplied entirely by the voluntary contributions of Sokol members.

The Sokol organisation, with its watchwords "equality, liberty, and brotherhood, discipline and morality," while striving to improve and uplift the national character, endeavours to engender international peace and good will. N. M.

(See pictures on cover and page 4)

DESPITE alarms and excursions in the political world, throughout Czechoslovakia the Sokol Societies—one of the most remarkable movements of modern times—are enthusiastically preparing for the Great Festival which takes place in Prague during July. From the Prague station, on one or two nights each week (as listeners may have heard), "Sokol exercises" are broadcast, enabling the societies in every part of the country to rehearse simultaneously. "Sokol" is the Czech word for Falcon, and it

# PITCAIRN ISLAND CALLING!

(From our New York Correspondent)

AS already reported in WORLD-RADIO, the inhabitants of Pitcairn Island, in the Southern Pacific, were brought into touch with the outside world—after nearly a century-and-a-half of almost complete isolation—on the evening of April 6, when short-wave messages from the island's new station, VR6AY, were relayed by the national network of the NBC and could be heard by a still wider group of listeners through the rebroadcast on the European beam of W3XAL, Bound Brook, the following morning.

Thus opened a new chapter in the strange sequence of events which began with the mutiny on H.M.S. *Bounty*. During the visit to the island of the American engineers who brought the necessary new equipment for an efficient station, additional network broadcasts were arranged; they were to occur at intervals of a few weeks, including one on April 29, when Tahitian and English traditional melodies were to be sung and played by the islanders on instruments of their own construction, and an attempt made to connect Pitcairn with members of the McGregor Arctic Expedition aboard the schooner *General A. W. Greely*, at Reindeer Point, near Etah, in Greenland—some 600 miles from the North Pole. On April 26, 10 p.m. to 10.30 p.m. E.D.S.T., NBC arranged to present two dramatised episodes from the story of Captain Bligh and the *Bounty*, and to make contact with the island, so that Robert L. ("Believe-It-Or-Not") Ripley might interview descendants of the principal historic figures concerned.

Thousands of listeners heard the initial broadcast, which was evidently a thrilling occasion for the two hundred human beings who have survived on the island. Richard Edgar Christian,

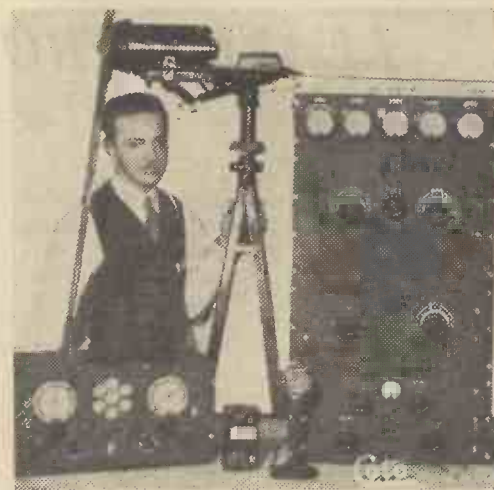
introduced as "Chief Magistrate of Pitcairn, representative here of his Majesty King George VI," and the great-grandson of Fletcher Christian, of the *Bounty*, said in fervent tones: "We appreciate more than words can express what this occasion means to Pitcairn Island. You cannot easily imagine what it means to be able to talk to the outside world."

Also heard was Andrew Young, direct descendant of Midshipman Edward Young, of the *Bounty*, who has served as radio operator on the island for several years, but who depended on an ancient Marconi spark transmitter which was strong enough only to reach ships which passed very close to Pitcairn. He, too, expressed the thankfulness of the islanders for the new order of things which has arrived in the shape of a wind-charged, up-to-date transmitter, of 75 watts power, by means of which a signal can be sent over many thousands of miles.

## Group Listening

In the inaugural broadcast, working in the 15 m. band, contact was made with the RCA station at Point Reyes, on the Californian coast, which relayed the programme to NBC's San Francisco station, after a first attempt earlier in the evening had been washed out by static.

The transmitter equipment is housed in a wooden shack, 10 ft. x 12 ft. in size, in the midst of one of the groves of cocoa-nut palms which break the rugged contours of the two-mile-long island, while a hundred feet away the wind-driven generator for the station has been put up. Near by are several of the island houses. A loudspeaker makes group listening possible over a considerable space, and there were rarely fewer than thirty inhabitants standing by while the station was in contact with the United



A section of the transmitting apparatus.

States, Australia, or Hawaii. Half a mile away is the base of a cliff rising eleven hundred feet, which, seen bathed in the evening light, led Mr. Lindley to remark in beginning the network broadcast: "We find it beautiful here. Pitcairn truly can be called a gem, set in the immensity of the Pacific."

The designation of the unique station is interesting. The first three symbols of VR6AY represent the radio belt in the Pacific in which Pitcairn is situated: "A" represents the first and only licence of the kind to be issued, and as it also happened to be the first of Andrew Young's initials, the "Y" was added as a distinguishing symbol for Radio Pitcairn's lone operator.

The station has been logged at a signal strength of R9 by many American and British amateurs; it operates on a frequency of 14,346 kc/s.

## READERS' FORUM

## Listening in the Car

SIR,—Seeing the considerable number of motor-cars nowadays which are fitted with wireless receiving sets, I feel rather behind the times in not possessing so apparently desirable an adjunct to my car. Before, however, giving serious consideration to the question of equipping myself with a car receiver I am anxious to know—since my interest in listening largely concerns certain foreign stations—whether:

(a) distant long and medium wave stations can be received with satisfactory strength and clarity, and

(b) whether short-wave listening is available if desired, and, if so, the nature of such reception.

I am assuming, of course, that I should be using the set in reasonably quiet conditions and not in crowded streets.

London, W.1, June 13. CAR OWNER.

### STATIONS' DECLINE IN POWER

Motala certainly used to be a very strong signal indeed, and it could be heard quite well on a crystal set when Daventry 5XX was not transmitting. I think this is the most outstanding example of decline in volume from any single station. Hilversum 1 and Kalundborg have been much the same over a number of years, and their power increases have not resulted in any noticeable increase in volume. Luxembourg seems to be much the same as when it first started transmissions. On the medium waves the most outstanding are Budapest, Rome, and Nürnberg; when the first two stations began operations with high power it was possible to

listen to them with a crystal set quite comfortably, but it is not the case now. In fact, when I compare their volume with some small stations, it seems doubtful whether they are using their full-rated power.

Taking the medium wave-band as a whole, my observations over the last ten years show that all the distant transmissions, with few exceptions, have tended to decrease in volume after their newness has worn off.

FRANCIS R. TIPLER.

Kidderminster, June 10.

### TIME-LAG

The problem raised in Mr. Edgar Jackson's letter is, I believe, answered fairly simply. He noticed that a programme which originated from WABC, New York, seemed to be heard a fraction of a second later from W3XAU, Philadelphia, than from W2XE, New York.

Any time-lag due to a difference in the paths

of the waves from the two short-wave stations would probably be so small as to be almost unnoticeable to the human ear. The reason for this phenomenon surely was that whereas the programme had possibly to travel only a few miles from the studios to the W2XE transmitter, it had to travel several hundred miles along telephone cable between New York and Philadelphia before it reached W3XAU. It was this, I think, which caused the time-lag heard by Mr. Jackson.

Acton, London, W.3 STANLEY C. ISAACS.

### HARMONICS

While "knob-twiddling" on the short waves one night recently I heard the news being broadcast from Radio Eireann on approximately 88.5 m. I confirmed this by switching on to the latter station direct. I understand little about the subject of harmonics but, presumably, this is the 6th harmonic of Radio Eireann.

Cork. HENRY SHANAHAN.

\* \* \* \* \*

Having recently acquired an all-waver, I find that I receive the stations W2XE, working on 19.65 metres on approximately 20.95 metres, and W2XAD, working on 19.57 metres, on approximately 20.9 metres. I have easily identified their call signs, as these stations are received at greater strength on these harmonics (if such they are) than on their fundamentals. Have any of your readers experienced this? I may say that none of my short-wave friends in this district have.

Regarding Mr. Jackson's query in to-day's WORLD-RADIO re time-lag between W2XE and W3XAU, both relaying WABC, would not the introduction of the land line between New York and Philadelphia account for the fraction of a second lag between the transmissions?

WINSTON JOHN CHRISTIE.

Dundee, June 10.

Letters should be addressed to the Editor, "WORLD-RADIO," Broadcasting House, London, W.1. Letters intended for publication should be as brief as possible, and should always be accompanied by the full name and address of the writer, though not necessarily for publication.

#### SUBSCRIPTION RATES

12 months Inland and Canadian, 13s.  
12 months (Foreign), 15s.

Other periods pro rata. Prices include postage.  
Subscriptions to Publications Dept., Broadcasting House, London, W.1, or 35, Marylebone High St., London, W.1.

## LEAVES FROM MY LOG

By "Log-Roller"

### SUNSPOTS AND WIRELESS

YOUVE no doubt seen that in future the Royal Observatory at Greenwich is to inform the General Post Office of the appearance of any sunspots or groups that are above a certain size. This co-operation should lead to the collection of some most useful data concerning the connexion of sunspots with magnetic disturbances on the Earth and the Effects produced upon long-distance wireless communications. In his report for the past year, the Astronomer-Royal stated that sunspots had been more numerous and more prevalent than at any time during the last 68 years. That takes us back to the maximum of 1870, since when there have been five maxima, the last occurring in 1927. It is difficult to realise that there hasn't yet been a single complete sunspot cycle from maximum to maximum in the whole history of short-wave wireless. The Astronomer-Royal seems to think that we are now very close to a maximum, if, indeed, it has not actually arrived. The next few months should be full of interest on the short waves and the ultra-shorts, for freaks and oddities of reception are bound to occur.

### WHAT IS THE CONNEXION?

There is no doubt that many wireless enthusiasts—perhaps, most of them—have the idea that the presence on the Sun's disc of very big spots must inevitably lead to magnetic disturbances, accompanied, according to their severity, by poor reception on the short waves, by occasional interruptions, or by complete black-outs. In point of fact, it doesn't seem to work out exactly in this way. In the past twelve months fourteen

sunspot groups have been observed with total areas of 1,000-millionths or more of the Sun's visible surface. And, believe me, anything of these dimensions is a whopper amongst sunspots! Yet of the fourteen, only seven appear to have been directly associated with recorded magnetic disturbances of any importance. When the terrific magnetic storm of April 16 occurred there was a very large sunspot group right in the middle of the Sun; but when a group double the size crossed the central meridian on January 18 no particular disturbance was recorded. Nothing, in fact, happened until January 25, when this gigantic group had almost entirely disappeared from view. A queer business!

### DO SUB-HARMONICS EXIST?

A fortnight ago I mentioned that there seemed to be no definite evidence that there were such things as radio sub-harmonics. We all know that it is quite common to receive stations, by means of harmonics of one-half, one-third, and so on of their wavelength or at twice, thrice, and so on of their fundamental frequency. Sub-harmonics, if there really are such things, would lead to just the opposite state of affairs—that is, stations might be heard on some multiple of their wavelength or some fraction of their frequency. Turning over an old diary the other day, I came across an entry in the memoranda pages at the end: "Twice during the year received short-wave Schenectady on double its wavelength." I don't seem to have attached any importance to this reception at the time, for there are no dates and no details. But that entry set me thinking,

and by a strange coincidence I had the next day a letter from a Rugby reader, who told me that a couple of years ago he had received an amateur station working in the neighbourhood of 60 metres on exactly four times and exactly eight times its real wavelength. He reminded me of the report published by Mr. Pedersen, of Copenhagen, three years ago of investigations which showed that sub-harmonics of sound waves could be produced. And if sound waves can do these things, why not wireless waves as well? I've said before that if you want to collect data on any queer happening in wireless, readers of WORLD-RADIO are the surest source. This subject of sub-harmonics is one of enormous interest, and I shall be glad to have reports of reception of stations on wavelengths longer than their own and particularly of those which are exact multiples of the fundamental. If you send them in, please say whether the set used was a "straight" or a superhet, so that we can see whether or not superhet beats could have been responsible.

### MORE INDIAN STATIONS

Last week I mentioned the coming of the new short-wave stations VUD3, of Delhi, and VUC2, of Calcutta. There are several other Indian stations whose construction is now well advanced. The opening of the Madras 0.25 kW medium-wave station is expected to take place this month, and either at the same time or very shortly afterwards the 10-kW short-wave transmitter at Madras will make its bow. The broadcasting system of All India Radio is now rapidly nearing completion. Between December last and the end of next month seven stations will have been brought into operation, and the only three outstanding will be finished before the end of 1938. AIR's rapid development of a system to cover the whole Indian sub-continent must be something of a record in broadcasting.



TELEVISION NOTES AND PROGRAMMES

# Wimbledon Again

By "THE SEER"

WITH few exceptions, serials have not been an outstanding success in broadcasting. The trouble seems to be that, no matter how intriguing each instalment may be, and how skilfully the author leaves his audience "in the air," listeners either forget to tune in the following week or are prevented from so doing by some other engagement. And, having missed one instalment, they lose interest.

The staff at Alexandra Palace would like to think that television serials would be so compelling, so dazzlingly effective, that viewers would forget all else, watching the calendar and clock from one week to the next, and trampling on all engagements that threatened to interfere with their supreme pleasure. Alexandra Palace would like to think this, but the stake is too dangerous, and the first adventure on serial lines will be a compromise. Beginning on July 12, the first of six episodes in the lives of *Ann and Harold* will be presented. The series, based on a play by Louis Goodrich, has a thread of continuity which sustains the story throughout, but each episode is self-contained, and no viewer need fret if he misses one. These glimpses into the lives of a young London couple begin with their chance meeting in Hyde Park through the important agency of a Sealyham terrier (Lanham Titchener, the producer, is now looking for an appropriate dog actor), their engagement, marriage, life in Bayswater, and their only quarrel. Louis Goodrich, the author, is already familiar with the television medium as an actor. During a varied life he has been successively a hog-raiser, farm hand, hop-grower, tea-

planter, soldier, playwright, and again a soldier.

The Wimbledon tennis pictures last year were startlingly good, especially as this was the first distant outside broadcast of a sporting event by television, but this year they should be even better, as Super-Emitron cameras will be in use. On June 30, after an interval for the Second Test Match at Lord's, the cameras will show the Finals on the Centre Court from 2.30 to 3.40 and again from 4.0 to 5.0 p.m. On the concluding days, July 1 and 2, the television unit will be working continuously from 2.30 to 5 p.m.

Alfred Reynolds, who composed the music for A. P. Herbert's *Derby Day*, has produced a comic opera for television, the libretto being provided by A. J. Talbot's amusing little play *The Old Firm's Awakening*, and the opera will be presented by Stephen Thomas on June 24. The story revolves around three characters: a bookmaker and his clerk, and Little Nell, who on the eve of a race wishes to place her savings and those of her poor little sick brother on Angel Face, an outsider. Even the hardened "bookies" demur at robbing the child, but she insists, whereupon the two men resolve to reform and quit this manner of living. Their good resolutions are short-lived, however, for Angel Face comes in first; Little Nell takes her winnings and the "bookies" only succeed in defrauding her of the stake money.

George Baker and James Topping will be seen as the bookmaker and his clerk, and Olive Dyer as Little Nell.

## PROGRAMMES

Vision : 45 Mc/s (6.67 m.) ; Sound : 41.5 Mc/s (7.23 m.). All programme times shown below are approximate. From 11.0 a.m. to 12.0 noon each weekday, except Friday and Saturday, films intended for demonstration purposes will be shown.

### SUNDAY, June 19

8.50 p.m.—News Bulletin.  
9.5—Irene Prador.  
9.10—Cartoon Film : "Mickey Steps Out."  
9.20-10.30—"A Hundred Years Old," comedy by Serafin and Joaquin Alvarez Quintero.

### MONDAY, June 20

2.30-4.30 p.m.—Tennis from Wimbledon.  
9.0—Cabaret. 9.35—Cartoon Film : "China Plate."  
9.45—"The Old and the Young," comedy by Louis Goodrich.  
10.0—British Movietonews. 10.10—Agnes de Mille.  
10.20-10.40—News Bulletin.

### TUESDAY, June 21

2.30-4.30 p.m.—Tennis from Wimbledon.  
9.0—Starlight : Hildegarde.  
9.10—Gaumont-British News.  
9.20—"Le Médecin malgré lui" (Molière).  
10.0-10.20—News Bulletin.

### WEDNESDAY, June 22

3.0-4.15 p.m.—"Badger's Green," comedy by R. C. Sherriff. 9.0—Yours Faithfully : Marcella Salzer.  
9.10—British Movietonews.  
9.20—See Sunday 9.20 p.m. 10.30-10.50—News Bulletin.

### THURSDAY, June 23

3.0 p.m.—Cabaret. 3.25—British Movietonews.  
3.35-4.0—"Picture Page."  
9.0—Swing Music. 9.20—Gaumont-British News.  
9.30—"Picture Page." 10.0-10.20—News Bulletin.

### FRIDAY, June 24

11.30 a.m.-12.30 p.m.—Lord's : Test Cricket.  
2.30—See 11.30 a.m. 3.30—See Wednesday, 9.0 p.m.  
3.40—Gaumont-British News. 3.50-5.0—See 11.30 a.m.  
9.0—Hans Andersen Stories. 9.5—British Movietonews.  
9.15—A.R.P. : demonstration of gas-proofing a room.  
9.30—Film : "Stairway to Heaven."  
9.45—"The Old Firm's Awakening," comic opera in one act. 10.5-10.25—News Bulletin.

### SATURDAY, June 25

11.30 a.m.-12.30 p.m.—Lord's : Test Cricket.  
2.30—See 11.30 a.m.  
3.30—In Our Garden : C. H. Middleton.  
3.40—British Movietonews. 3.50-5.0—See 11.30 a.m.  
9.0—Cabaret. 9.25—Gaumont-British News.  
9.35—"Thread o' Scarlet," a play by J. J. Bell.  
10.0-10.20—News Bulletin.

## Which station was that?

This feature is intended for the use of readers who desire the identification of broadcasting stations only, whether on long, medium, or short waves. For particulars of amateur transmissions, readers are referred to the relevant paragraph below.

### The Alternative Postal Service

In addition to the free service of "Which Station Was That?" printed in these columns, replies to station identification queries can be obtained within forty-eight hours of receipt of details on payment of 6d. per query, in stamps, or P.O., accompanied by stamped addressed envelope (marked in left-hand top corner "Postal Query Service"), and coupon as per conditions for "Free Queries."

**SHORT WAVE (Eastbourne)** : Not a direct broadcast, but if w/1 is approximately correct probably reply of New York programme via WLK, Lawrenceville (N.J.) on 18.44 m. **AUDREY (Taunton)** : VLR, Lyndhurst (Victoria), on 31.32 m. **BALMAIN (Poplar)** : Please number your queries to facilitate replies. (1) possibly test by VUDZ, Delhi, on 31.28 m.; (2) regret, cannot trace. **MEXICANA (Tadworth)** : (21) we cannot trace any broadcasting station in that section of the waveband; possibly a relay by PSK, Marapicú (Brazil), on 36.65 m.; (22) Estacion TG2, Dir. Gr. de Comunicaciones Electricas, Guatemala City, Republic of Guatemala; Estacion XEXA, Bucareli, 12, Despacho 103, Mexico City, Republic of Mexico; COBC, Apartado Postal, 139, Havana, Cuba; HJ4ABE La Voz de Antioquia, Hotel Europa, Medellin, Colombia; (23) HJ1ABB, Barranquilla, 62.75 m.; HJ3ABD, Bogotá, 61.9 m.; HJ3ABH, Bogotá, 61.22 m.; HJ3ABO, Bogotá, 61.6 m.; HJ4ABP, Medellin, 61.48 m.; HJ6ABC, Ibagué, 63.29 m. and HJ7ABD, Bucaramanga, 62.24 m., according to the latest official list. (24) there is no Nicaraguan broadcasting station advertised to work on that wavelength; possibly news bulletin from TIEP, San José (Costa Rica) on 44.71 m. **D-EXER (E.4)** : (1) ZMA is a coastal telegraphy station at Apia (Samoa) working on 800 m.; (2) HB9D, Zürich, 31.46 m.; (3) HH2S, Port-au-Prince (Haiti) on 50.85 m.; (b) do not understand your query; the International amateur prefix for Jamaica is VP5. **SIX PIPS** : (2) if Venezuela, either YVIRM, Maracaibo on 46.15 m. or YVIRI, Coro on 48.31 m.; the details you give do not permit identification; (3) vague; possibly Radio Quito (HCJB); (4) 12RO3, Rome on 31.13 m. and IRF, Rome-Torrenova on 30.52 m.; YVSRQ, Caracas, La Voz de la Philco, Venezuela, on 47.85 m.; GYZ3, Rinella (Malta) on 38 m. is a wireless telegraphy station. **S.N. (Irthlingborough)** : Regret cannot trace such a transmitter in Paraguay of which the International prefix would be ZB; if CPP was heard it would be a station in Bolivia, but there is none so far published in official lists to coincide with your wavelength. **KLUMPTON (Briton Ferry)** : (1) TGWA, Guatemala City (19.78 m.); (2) La Voz de Guatemala, TGWA, Broadcasting

Nacional, Guatemala City. **HIGH FREQUENCY (Wareham)** : COBC, Apartado Postal 139, Havana, Cuba, on 31.97 m. **ONDA CORTA JAIME (S.W.11)** : HCETC, Teatro Bolivar, Quito, Ecuador, on 43 m.; HC2RL, Apartado Postal 759, Guayaquil, Ecuador, on 45.13 m.; H17P, Calle José Reyes 35, Ciudad Trujillo, Dominican Republic, on 44.12 m.; H1H, San Pedro de Macoris, Dominican Republic, on 44.25 m.; H13C, La Voz de la Feria, La Romana, Dominican Republic, on 44.61 m.; HIT, Apartado Postal 1105, Ciudad Trujillo, on 45.25 m.; PMH, Posts and Telegraphs Department, Bandoeng, Java, on 44.62 m.; YVQ, Servicio Radio Telegrafico, Maracay (Venezuela), on 46.55 m.

### AMATEUR TRANSMITTERS

The identity of amateur transmitters may be found in the "Radio Amateur Call Book." The Spring Edition (price 6s. post free) is obtainable from the BBC Publications Management Offices, 35, Marylebone High Street, London, W.1. The 1938 Edition of the "Radio Amateur Handbook," price 5s. 6d. post free, is now available from the above address.

### WAVELENGTH DEVIATIONS

The following list shows the deviations of stations, as measured at the Tatsfield Checking Station, during the past week :—

Station	kc/s	m.
Cork (Eire)	1238.4	242.2

### IDENTIFICATION COUPON (No. 488)

This coupon is valid for ONE QUESTION only and should be cut out and attached to a separate sheet, upon which the following questions should be answered in the order shown. No coupon more than one month old is valid. A coupon is not required from readers living in countries outside Europe who desire identification of transmissions.

1. Time and date of reception.
2. Approximate frequency in kilocycles (or, for short waves, in megacycles) per sec. (or wavelength in metres).
3. Nearest known stations, above and below.
4. Call or interval signal, if heard.
5. Language.
6. Type of receiver in use and strength of signals.
7. Details of programme or signal received.
8. Name and address.
9. Nom de plume. (Proprietary names must not be used.)

## Esperanto Transmissions

Sunday : Barcelona, 377 m. and 42 m. 00.30 a.m. Parolado, Hilversum (1) 11.40 p.m. Romkatolika Prelego. Monday : Sottens, 6.20 p.m. Leciono de S-ro Bouvier. Rome (2) and 2RO, about 10 p.m. Informoj, Paris (PTT), 10.45 p.m. Unuakta Komedio—"Rozalio." Tuesday : Kaunas, 9.20 p.m. Nia Anguleto. Estonian stations, 10 p.m. Facetoj de Estona Kulturo. Wednesday : Mexico (50.17 m.) 2.45 a.m. Parolado kaj Informoj, Paris (PTT) and relays, 2 p.m. Elementa Kurso. Saturday : Lille, 1.45 p.m. Leciono kaj Informoj. Hilversum (2) 4.10 p.m. Esperantaj Kantoj. Hilversum (1) 5.10 p.m. Informoj por Romkatolikoj kaj aliaj. Rome (1) and 2RO, 7 p.m. Turismaj Notindajoj.

## "DO YOU KNOW...?"—13

Answers to Questions on page 5

1. (a) in 1920.  
(b) 718 ft. high.  
(c) Cincinnati WLW ; 428.6 metres, 500 kW.
2. Johann Sebastian Bach conducted the famous "Thomanerchor," or St. Thomas's Church Choir, of Leipzig. It was founded by monks in 1212.
3. W2XE.
4. PCJ, Huizen.
5. John Barrymore.
6. 66 ft.
7. Boston, W1XAL.

## GEORGE STEPHEN KEMP

(Continued from page 6)

in all this work was a large one, but such was his attachment to Marconi, apart from the commercial necessity of adding renown to the name of Marconi himself, that Kemp, like many of Marconi's later assistants, willingly gave up his personal claims in the work. Without such men as Kemp, however, men who are willing to sink their personal claims and interests for the sake of the common good, the world would indeed be a poorer place,

# All-World Short-Wave Review

*A record of reception during MAY at a listening post near NEWCASTLE-upon-TYNE. A home-constructed three-valve "straight" receiver was used.*

A **S**PLENDID recording of the May Day demonstration in Red Square, Moscow, was the first item of interest heard. This was radiated by Moscow on 25 m. at 22.15 on May 1. "Mickey Mouse's Theatre," heard at 22.45 from W2XAF, was also enjoyed, strength R5. Thirty minutes later, DJD repeated a special May Day broadcast consisting of speeches by prominent Ministers, and music. At 23.20, CB1170 was R6 with orchestral music; and at 23.30, W1XAL was just signing off (R7). Shortly after, a comic version of "The Blue Danube" waltz emanated from W2XE (25.36 m.); and CD1190 was R5, with the *bolero*, typical of South America, at midnight.

Portuguese songs and a news bulletin were heard through CR7BH, Mozambique (25.6 m.), at 18.15 on May 3; and, at 18.20, "Let's all play geography" was sung with gusto at station W3XAL (16.87 m.). Three further items were: W1XAL (19.67 m.) with "I've got my eye on you," at 19.00; W2XAD at 19.50 with the song "The Nightingale" and selections by the Conservatoire orchestra; and W1XAL (25.45 m.) with a news review at 23.10.

At 19.55 on the 5th, W2XE (19.65 m.), re-broadcasting one of the Tokio programmes, was R7 with the song, "The Emperor's Daughter." Latest Japanese song hits came over at R9 from JZJ at 21.20, the sister station JZI being rather weak. Brazilian music followed from PRA8 at 22.25; while at 22.45, LRX broadcast a sketch in Spanish. At 00.30 (6th), on 25.26 m., came the words: "This is the Voice of Westinghouse, the name that means everything in Electricity." Then followed the song, "Serenade to the Stars," then the call-sign "W8XK"—in Spanish and English. At 00.55, both HP5A and CB1170—on the same frequency—were distinguishable. At 01.00, COCX was R7 with Cuban orchestra, and in addition to hearing the call and chime interval signal, the listener was treated to a good, hearty laugh! News from the Spanish war front was obtained through EAQ (30.43 m.) at 01.50; the final "catch" being COCQ with an amusing item: a Spanish lady singing familiar love songs in English.

## Late Night Reception

Topical news came from W2XE (19.65 m.) at 23.00 on the 7th, and ten minutes later two Mexican ladies in the "El Chico" revue sang from W2XAD. At 23.20, W8XK (19.72 m.) broadcast "The Star Spangled Banner," and "My Old Kentucky Home;" a sports commentary following. Between 00.25 and 00.45 fine Cuban music was heard from COGF (25.42 m.) and COCH (31.8 m.); and, at 01.30, HJ1ABP (31.21 m.) was quite good with orchestra, while LRX was outstanding with tangos and rhythmic dancing to castanets. By 02.35, W2XAD (31.4 m.) was R5, with Ralph Valentine and his orchestra; and at 03.00, VUD2, Delhi (31.28 m.)—with native music and singing—was powerful, but rather badly heterodyned.

On the 9th, HS8PJ (15.77 m.) was audible at 15.30 with Siamese songs and orchestra (R4). Between 19.00 and 20.15, VQ7LO, Nairobi, entertained with native music and records at quite good strength. By 22.55, W1XK was heard with dance music and world-wide news. More news from America was obtained through W2XAF, and, around 23.20, a talk on "Colorado Springs" was very interesting. Ten minutes after midnight PMN, with organ tunes, was R6, while PSH, with Brazilian orchestra, was at similar strength.

VQ7LO, Nairobi, provided a news bulletin at 19.00 the same day; and at 21.15, "The Voices of Tokio"—JZK and JZJ—were heard with "Yankee Doodle," "La Marseillaise," selections by the K.A.U. University band, and a programme in French. News from Spain came from EAR at 22.55 and, near 23.20, VP3MR, Georgetown, was R5 with call and music. A little later, a supposed new Latin-American on 31.4 m. turned out to be W2XAD with a programme for South America! COCH was next identified at 01.25 (11th) with a news bulletin in Spanish. At 01.45, COBC (30.12 m.)—with frequent reference to "General Electric" and a cock-crow identification signal—was really good. Lastly, W2XE (49.02 m.) was heard at 02.20, with a brief programme sponsored by a tobacco firm. A lady impersonator named Elaine caused much amusement.

Listening was resumed on the 14th at 21.45, when details of various sports events between Yale and Harvard Universities were given over W2XE (19.65 m.). At 22.00, W2XAD greeted me with the song, "Goodnight, I'll see you in



*South American singers at W2XAF during one of the Spanish broadcasts.*

the morning," and, at 22.15, it was learned, through DJD, that a temperature of 68 degrees Fahrenheit had been registered in the surrounding districts of Germany. At 22.30, W1XAL (25.45 m.) was really interesting with a recorded talk on "Radio in Education," a Boston professor and an Argentinian lady taking part in the discussion.

## Sydney, VK2ME

From VK2ME, Sydney, at 07.15 next day, there came over the ether, "Old Man River" (organ), songs by Richard Tauber, and "The Hungarian Rhapsody" (pianoforte). At 14.05, W2XE (13.94 m.) was just finishing a relay from medium-wave station WABC, N.Y., after which an organ recital was given. PMN was very strong in the afternoon with native music and songs, when weird Javanese instruments were played. At 19.45, TFJ began his broadcast with music by the "Icelandic orchestra," followed by a talk on, "Lee Ericsson, the first white man born in America." The speaker said that Lee was born in A.D. 1008. At 01.20 (16th), W8XK (25.26 m.) broadcast the cowboy sketch "Moonshine;" and, ten minutes later, child singers were heard from XEW1, Mexico City (25.21 m.). At 01.35, CD1190, Valdivia, was quite strong but spoilt by morse; and by 01.40, W2XE (25.36 m.) was R6 with the foxtrot "My

heart is taking lessons." From 02.00-03.50, all the following stations were well heard: COBC (30.12 m.), bugle call; XEWW, Mexico City (31.58 m.), political news; W2XAF, Jean Dickinson singing "The Last Rose of Summer;" W1XK, "Boston's Problems" (talk); CXA8, Montevideo (31.21 m.), news and orchestra; LRX, with beautiful mandoline music; and COCQ with *bolero*.

At 20.50 on May 17, W3XAL (16.87 m.) was at fair strength with orchestral music by Sir Edward German. YV4RB, Valencia on 46 m. was strong at 23.00 with South American news; and a few minutes later VP3BG, Georgetown, concluded with songs. Three other "catches" after midnight were COCX, with chimes and cuckoo calls on 25.55 m.; PSH (29.35 m.), "Radio Brazil"—with interval signal, a note on a stringed instrument and three chimes—broadcasting opera music; and the Cuban COCD.

## Early-Morning Listening

On the 19th, the following were heard at strengths varying from R7-9. At 02.10, HJ1ABG (49.67 m.) broadcast versions of popular tunes; while violin solos were heard through HJ4ABP (49.75 m.). A few minutes later I picked up W3XAU (49.5 m.) in the midst of a "Spelling Bee" tournament final. By 03.00, HJ6ABB, "Radio Manizales" (49.1 m.), was quite loud with American dance tunes; and at 03.45, COCD (48.92 m.), was busy praising a certain brand of tobacco. Near 04.00, YV5RD (48.78 m.), was heard with band marches, and HJ6ABU (48.81 m.), "La Voz de Pereira," with concertinas.

Recordings of music by the London Symphony Orchestra, and dance tunes, were heard over W8XK (48.83 m.) at 04.20. W2XE (49.02 m.), W3XAL (49.18 m.), and W1XK were busy between 04.50 and 05.30 with commentaries of the boxing tournament held by the International Golden Club at the Chicago stadium. Station W2XE signed off at 05.30. At this time TGWA (30.97 m.), was just closing down with the words:

"We hope you enjoyed our programme—Guatemala now bids you good-night," the station "leaving the air" until 06.30. At 06.00, Mexico City, was visited through XEWW (31.58 m.), when a Mexican orchestra and some mouth-organ tunes were enjoyed. Finally, at 07.00, VLR, Lyndhurst, was calling on 31.32 m., and, after an interval signal of three chimes and turf news, the announcer said: "Good afternoon, ladies and gentlemen. There will be songs and melodies at eight o'clock and a comic opera to-morrow night." Then followed foxtrots.

COCM (30.51 m.) was heard on May 24 with cabaret music and songs, and call, in English, at 06.30. ZRD (48.8 m.), Durban, was just audible near 19.50. At 20.00, HVJ gave a talk in English on "Whitsuntide," the station broadcasting simultaneously on two wavelengths (announced) of 50.26 m. and 49.75 m. Early in the morning (25th), YV4RB, YV6RC, YV5RH, YV4RC, YV1RH, YV4RD, YV5RP, YV5RJ, and YV5RD—on the 46/49 m. band—were at good strength. W8XK (13.93 m.) supplied a news bulletin and song at 13.35; and between 16.30 and 17.30, VUD2, Delhi (31.28 m.) with Indian music and weather report, and news in English, was R7.

Fascinating Russian music came over RKI (19.89 m.) at 20.00 on the 26th. After mid-

*(Continued at foot of col. 2, page 11)*

# Short-Wave News-Reel

Compèred by "RANGER"

*The facility with which short waves enable listeners to keep in touch with sporting events in different parts of the world, is well illustrated by our first item this week.*

## SATURDAY SPORT

SPORTING broadcasts on the short waves provided thrilling listening on Saturday, June 11. Through the facilities of VLR, at 07.30, I was taken to the Melbourne race-track for a commentary on the race then in progress. After a very close and exciting duel Emerald proved to be the winner, passing the winning post a neck in front of Dandy.

From the same station during the afternoon the thrills of the Test Match between England and Australia were conveyed by a ball-by-ball commentary given by W. A. Oldfield and others. Descriptions of Paynter's great innings, Bradman's dismissal, etc., made it possible to enjoy these thrills simultaneously, with the Trent Bridge spectators, in spite of the broadcast's 20,000-miles journey.

A final sporting broadcast came from Denver, Colorado, at 23.00, when W2XAD broadcast a description of the U.S. National Open Golf Championship. At that time (15.00 "Mountain Time") Dick Metz, of Chicago, was leading with a total of 211; Jimmy Hines (214) was second; and Ralph Goodall, the defending champion, third with 215.

Yate, Glos.

F. J. R.

## RADIO AMATEUR HONOURED

*The story of the part played by radio—including amateur radio—in the American floods of 1937 was told, briefly, in WORLD-RADIO. It is certainly a pleasure to learn of the presentation described below.*

ON Thursday, June 9, W2XE broadcast the proceedings at a luncheon arranged for the purpose of presenting the 1937 William F. Paley Award to the American amateur Mr. Robert Anderson, of Illinois, for radio rescue work in the 1937 floods on the Ohio River.

Mr. William F. Paley presented the award and told us that Mr. Anderson had achieved a very great honour and his work was to be remembered as displaying both bravery and ingenuity. He then told us that Mr. Anderson had taken his transmitter and equipment in an open boat upon very dangerous flood waters, rigged up his set and an aerial, and maintained contact with rescuers on the river banks for 40 hours, thus helping materially in the rescue of stranded people.

The American Coastguards, the American Red Cross Association, the American Navy, and the A.R.R.L. (the amateurs' association) were also represented.

Before the luncheon, Mr. Anderson had been speaking to fellow "hams" from an adjoining room which had been furnished to represent a "ham shack."

Leeds.

J. S.

## INFORMATION PLEASE!

*Here is an account of another form of "radio contest" in which the questioner may win and a board of experts lose at the rate of five dollars per unanswered question.*

A WORTHY rival to the "spelling bees" appeared in the W8XK programme at 01.30 on June 7, an item known as "Information, please!" and conducted by Mr. John Erskine.

Four well-known men, experts in various professions, were prepared to answer any questions

which listeners cared to send or bring. The sum of five dollars is paid to anyone who asks a question which the experts cannot answer.

Such questions as, "Name four living ex-kings;" "Is an oxygen tank needed by airmen when in the troposphere?;" and, "Who hears the speaker first, people in the rear of the hall, or people listening by radio 3,000 miles away?;"—were answered correctly.

Eventually a question proved too hard for the experts; it was "What well-known boxer has a name appropriate to his profession?;" The answer was "Armstrong" (John Henry) and the questioner collected his five dollars. I recommend this item to other listeners.

Pontefract.

A. W.

## THE PRESIDENT'S WITTICISM

*Finally, a brief account of an address given to graduates at the U.S. Naval Academy by President Roosevelt.*

AN interesting broadcast took place on Thursday, June 2, at 17.00, from W3XAL (16.87 m.). Listeners were taken to the U.S. Naval Academy at Annapolis, where the issue of diplomas for 1938 was to take place.

Rear-Admiral Wilson Brown, speaking briefly, opened the ceremony. Then President Roosevelt was introduced and addressed the graduates. He advised those about to enter the U.S. Navy to take an intelligent interest in world events. "To reach the top," he said, "you must have a well-rounded knowledge of modern civilisation." His final words caused laughter: "Before you actually become Bachelors of Science let me stress that in the years to come you do not place too much emphasis on the 'bachelor'! Good luck, and happy voyage!" Deafening applause and three hearty cheers for the President followed. Mayor McClaren, of St. John, Newfoundland, also spoke.

The President then began to present the diplomas, bound in blue, yellow, and white ribbon, first to the 23 graduates with honours, then to the remaining 435 in alphabetical order. Afterwards they left for Memorial Hall to receive their commissions in the U.S. Navy.

Bristol.

J. E. O.

## ALL-WORLD SHORT-WAVE REVIEW

*(Continued from opposite page)*

night (27th), HJ1ABP, "Cartagena" (31.21 m.), broadcast violin solos; and HJ7ABD, "Radio Bucaramanga" was identified. HH3W, Port-au-Prince (31.1 m.), was fairly good at 01.30 with music and announcements in French. Then HJ6ABH (31.51 m.), "The Voice of Armenia," supplied dance tunes; and COBZ (33.2 m.), "Radio Sallas," COJK (34.62 m.), relaying CMJK, and COBX (33.1 m.) were logged. "No more millionaires for me" was heard from Philadelphia (49.5 m.) at 03.00. Soon after W3XAL (49.18 m.) entertained with selections from Mozart and Beethoven. During his broadcast (from New York), Sir Adrian Boult was "guest conductor."

The special programme dedicated to WORLD-RADIO and the British Short-Wave League from T14NRH (30.89 m.), "The Voice of Costa Rica," between 03.00 and 04.00 on the 28th, came over splendidly. The hearty greetings to WORLD-RADIO and the S.W. League, as well as the President's message, the beautiful tangos "Margarita" and "Serenade of Love," and song about "the Great Nation with peoples all over the world," were much appreciated.

## Below 100 Metres

By "NORTHERNER"

(June 5-11)

THE week under review was again favourable here in the Tyne district, and there was plenty of choice for the DX enthusiast. Signal strengths from distant stations during the daytime, however, were often poor, splendid results being again obtained during the early morning periods.

At 05.30 on Sunday, the 49 m. American stations, W8XK, W2XE, and W3XAL were all R7. TGWA, Guatemala City (30.97 m.) attained R7 at 06.05, and COCQ was R8 at 06.30. VK2ME was at fair strength (R4-5) for a short period after 07.00. W2XE maintained R8-9 throughout his afternoon transmission, and VUD2 (31.28 m.) was R6. W3XAL was R4 at 20.00, and around 21.30, W2XAD and W8XK were quite strong.

Conditions were rather poor during Monday, and little was heard until 17.30 when W3XAL was R4. At 20.00, W2XAD was R5, W2XE R6, and W8XK rather weak. Reception improved after 21.00 when there were fewer atmospherics. W8XK was R7 soon after midnight and much superior to W2XE, while CB1170 was R6. The 31 m. U.S. stations were just audible and HJ1ABP, LRX, and COCQ were also heard.

At 07.20 and for some time after, on Tuesday, VLR, Lyndhurst, was R6, a big improvement on previous performances. During the afternoon, VUD2 was R6, and the "locals" on 19 and 31 m. compensated for the lack of DX thrills. After 18.10, CR7BH was R3-4; and from 19.45 to the close VQ7LO was decidedly good (R7). At 22.20, W2XAD, W2XE, and W8XK were R8, R7, and R6 respectively.

On Wednesday, nothing was heard until 14.25, when W8XK (19.72 m.) put in a surprising appearance (R4). W3XAL was R4 at 18.00, and was more reliable after 20.30. At 20.45, W2XAD was R8, and W8XK, W2XE, and JZK were all R6.

A special early morning search on all bands between 03.00 and 04.30 on Friday, revealed the following 21 stations, when phenomenal conditions were evident: W8XAL, Cincinnati, with a "Radio Artists" programme (R6); W4XB, Miami, slightly heterodyned, but quite good (R5); W2XAD (R7); W2XAF (R7); W1XK (R8); W3XAU (31.32 m.), R5; W8XK (48.83 m.), R8; W2XE (49.02 m.), R8; W3XAL (49.18 m.), R9; T14NRH (R6); HJ1ABP (R7); HP5J (R5); HJ7ABD (R4); TGWA (30.97 m.), R8; COCQ (R7); COCM (R7); COCD (R6); OAX4Z (R6); COCH (R6); XEWW (R5); and COCX (R8).

At 00.30 on Saturday, W8XK was R8, W2XE R4, and CB1170 and CD 1190 were at good strength. The 31 m. Americans W2XAD and W1XK were R5 and R7 before 01.00; and HJ7ABD, HJ1ABP, LRX, FZF6, and PSH were of entertainment value. On the 46-49 m. band, many Latin-Americans were heard.

Familiar hymns were heard over ZRH, Pretoria (50 m.) at 17.35 on Sunday, the 29th; and at 16.00 the next day, HS8PJ (15.77 m.) concluded the programme with a piece by Schubert on the piano. EA1BO, Burgos (28.93 m.) was R5 at 23.15. CXA2, Montevideo (49.96 m.), was splendidly heard at 23.30 with Tipica music.

Five minutes after midnight (the 31st), seven chimes were heard from PMN, PLP, and YDC, when all were busy giving instructions for "the daily dozen." By 02.40, HP5B (which sounded like HP5P on one occasion), Republic of Panama, on an announced frequency of 11,780 kc/s, or 25.47 m., was at excellent strength. The station signed off about 04.00.

After 04.15, TGWA, Guatemala City, on an announced frequency of 9,685 kc/s (30.97 m.) was heard with a selection from "William Tell," played by the band of the Guatemala garrison. At this time W8XK, W2XE, and W3XAL on 49 m. were all radiating dance music; and tuning a little higher, to 49.33 m., I was thrilled to hear OAX4Z, Lima (Peru), also with fine dance music, the announcer bidding listeners "Good night" (Buenas noches) at approximately 06.00—thus concluding a month of very interesting short-wave listening.

C. A. R.

BBC ENGINEERING SERIES

# The Principles of the Pentode Valve

By H. D. McD. ELLIS, M.A., A.M.I.E.E., of the Research Department, BBC

*This article describes the fundamental differences between triode and pentode valves. It is shown that the pentode, having a high internal impedance, can be regarded as a constant-current generator, whereas the triode is essentially a constant-voltage generator. The high impedance of the pentode is by no means a disadvantage, since it is accompanied by a high amplification factor. Equivalent circuits are given to illustrate the working of the pentode as a constant-current generator. Typical characteristic curves show that in practice the triode tends to introduce some second harmonic, whereas the pentode causes mainly third harmonic.*

WHEN the pentode and its forerunner the tetrode were first introduced they were accepted as a tremendous advance in valve design. Subsequently, however, enthusiasm waned when it was found that amplifiers employing pentode valves frequently introduced large values of harmonic distortion, the cause of the excessive distortion being attributed to the valve.

The stigma on the pentode was both unjustified and unfortunate, since the cause of the trouble lay not in the valve itself, but in the fact that it was often operated under unfavourable conditions. Subsequent investigation has shown that the pentode does, after all, represent something approaching the optimum in valve design. Since the early days the behaviour of the valve has become more thoroughly understood, and when used under the correct conditions it is capable of a better performance than any other type of valve. It is hoped that this article will clear away various misconceptions and indicate the lines of thought which make its behaviour understandable.

## HIGH IMPEDANCE OF THE PENTODE

The differences in structure between the pentode and the triode are well known, the screen-grid being originally introduced to screen the anode from the control grid, and so reduce the grid-to-anode capacity, while the third or suppressor grid serves to deflect the secondary emission which would otherwise flow from the anode to the screen.

An extremely important result of these structural alterations was somewhat unexpected by the early research workers, though it is now fully understood and is, in fact, the fundamental difference between the triode and the pentode. It is that, in the triode, the anode potential has a large effect upon the anode current, while in the pentode, owing to the presence of the screen-grid, the effect is negligible. Or, in other words, the pentode has a very high internal impedance, while that of the triode is relatively low.

Before passing on to consider the effects of this difference in impedance it might be of interest to examine exactly how the high impedance of the pentode comes about. It should be remembered that a high anode impedance means that the anode current is but little affected by changes of anode potential, while a low impedance signifies that the current is controlled by the anode voltage. The impedance has no connexion whatever with the D.C. conditions; it is entirely with the changes about the mean state that we are concerned.

In the triode, since the control grid is of relatively coarse mesh, the electric field due to the anode potential is felt at the cathode, and variations of anode voltage therefore cause a

fluctuation in the electron stream which flows through the grid to the anode. The triode, therefore, has a relatively low anode impedance, the precise value of which depends on the distance between anode and cathode, the grid mesh or "pitch," and other factors.

In tetrode and pentode valves, however, a screen of close mesh is included between the anode and the control grid. If this were a perfect shield held at a constant potential the electric field inside it—i.e. between it and the cathode—would be unaltered by variations of anode potential. In actual fact it is a gauze structure held at a constant positive potential, which accelerates electrons from the cathode. Most of these electrons shoot through the screen mesh and arrive at the anode. An anode current is therefore obtained which is largely independent of anode voltage, the current arriving at the anode being chiefly determined by the screen potential.

In passing, it might be of interest to mention why the pentode has in addition a "suppressor" grid of extremely coarse mesh held at cathode potential. The heavy bombardment of the anode by the electron stream liberates what are called "secondary" electrons from the anode, which,

and  $\mu$  the amplification factor), the argument being that, for a given value of  $Z$ ,  $G$  must decrease as  $R_a$  increases. In point of fact, however, there is no loss of amplification—as will be readily seen when it is realised that  $\mu/R_a = G_m$  (the mutual conductance), which is substantially the same whether the valve is a pentode or a triode, so that as  $R_a$  increases so also does  $\mu$ , and  $G$  tends therefore towards a finite maximum value. Other things being equal, therefore—in particular  $G_m$  and  $Z$ —the pentode gives a higher gain than the triode.

The mutual conductance is the basic parameter of a valve since within wide limits it is independent of the valve structure outside the control grid, and is determined solely by the grid structure and potential, and the cathode current. (In this argument the conductance of the total cathode current path is referred to; in the case of a pentode the conductance to the anode is reduced by the proportion of the cathode current which is intercepted by the screen-grid.) That is to say, the performance of a triode and a pentode will be truly comparable if they have similar values of mutual conductance, since this parameter is the real figure of merit for any type of valve.

The ultimate basis of calculations, therefore, especially on pentode valves, should be the parameter  $G_m$  and not  $\mu$ , or, in other words, the valve should be regarded essentially as a constant current generator. In the classic valve equations where the valve parameter  $\mu$  is employed, the valve is really being represented as a constant voltage generator. These statements may raise doubts regarding the interchangeability of the two conceptions—namely, that of a constant current or of a constant voltage generator—so that the following exposition may be helpful.

## EQUIVALENT CIRCUITS

Any electrical generator of given internal impedance may be regarded from two points of view; either as an ideal constant-voltage generator in series with its internal impedance, or as an ideal constant current generator in shunt with its impedance; either conception gives the same result, as an example will show.

Consider a generator whose internal impedance is, for simplicity, say 1 ohm. Suppose that when a load of 1 ohm is connected a power of 1 watt is delivered—i.e., 1 volt is developed across the load. Taking one point of view, the generator may be considered as a source of constant E.M.F. of 2 volts, whatever the load, in series with its internal impedance, as in Fig. 1a. Alternatively, it may be considered as a source of constant current of 2 amps. in shunt with its impedance as in Fig. 1b. It will be observed that, in either case, if the load is short-circuited, a current of 2 amps. will flow in the load circuit, while if the load is open-circuited a potential of 2 volts will exist across the generator terminals. Further, any value of load resistance may be chosen and the two circuits will yield the same result for power in the load, as shown in Figs. 1c and 1d.

It will be seen, therefore, that the two conceptions give identical results, and it is purely a matter of convenience which is employed in any particular circumstances. It has been usual in classical valve theory, as has been stated, to consider the valve as a constant voltage generator and, indeed, when the load impedance is greater than the valve impedance this is perhaps the most suitable line of thought. This conception came to be adopted naturally enough in the

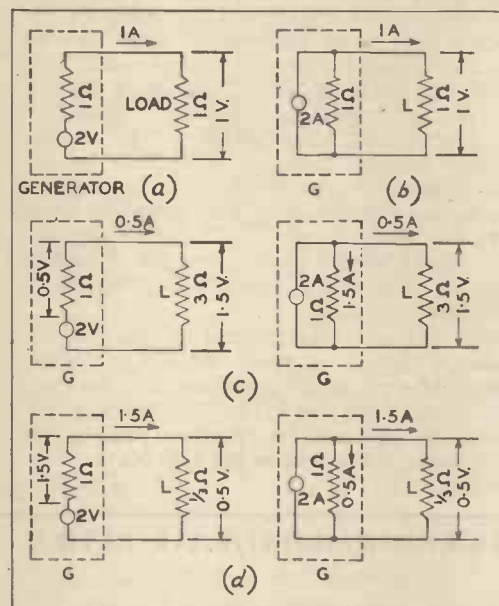


Fig. 1—Equivalent circuits illustrating how a generator may be regarded either as a source of constant current or constant voltage.

when the anode potential falls below the screen potential, are collected by the screen, thereby reducing the net anode current. The suppressor grid prevents these secondary electrons going anywhere but back to the anode, so that in a pentode the anode potential may fall well below the screen potential with little effect upon the anode current.

The high internal impedance of the pentode is no disadvantage, as is commonly supposed; on the contrary, it is entirely due to this characteristic that the pentode can be designed to give results superior to those available from a triode. It is frequently argued that the pentode suffers by reason of its high impedance on account of the loss of amplification implied by the classic equation:

$$G = \frac{Z}{R_a + Z} \mu$$

(where  $G$  is the overall gain,  $Z$  the load impedance,  $R_a$  the internal valve impedance,

days when only triodes were available (whose amplification factors were easily measured) and when load impedances considerably higher than the valve impedances were usually employed. In cases where the valve impedance considerably exceeds that of the load, however, as is frequently the case in pentode valve circuits, the conception of a constant voltage generator may easily lead to misconceptions and tends to give less accurate results.

For example, neither the amplification factor nor the internal impedance of a pentode can be measured accurately, yet both must be known before the voltage gain can be determined if the valve is considered to be a constant voltage device. If, however, the valve is assumed to be a constant current generator, the important parameter is the mutual conductance which can be measured with great precision, and errors in the assumed value of internal impedance have negligible effect. Thus if  $R_a$ ,  $\mu$ , and  $G_m$  are the valve parameters, the conception of a constant voltage generator gives for  $G$ , the overall gain,

$$G = \frac{\mu}{R_a + Z}$$

where  $Z$  is the load impedance.

If  $R_a \gg Z$ , as in many pentode circuits, we may write

$$G = \frac{Z}{R_a} \mu$$

But  $\frac{\mu}{R_a} = G_m$ ; hence  $G = ZG_m$ .

This result, however, is obtained directly if we consider the valve as a generator of constant current  $G_m$  amps. per grid volt, and neglect the current which flows through the shunt  $R_a$  in comparison with the load current (just as we neglected  $Z$  in comparison with  $R_a$  in the equation above). The gain of a pentode valve stage may therefore be calculated mentally merely with a knowledge of  $Z$  and  $G_m$ . This alternative conception is stressed, not only on account of the simplicity of the calculations and the elimination of errors, but because it enables the behaviour of the pentode to be more clearly understood.

According to our particular preference for either conception it is tempting to argue that in actual physical reality the valve conforms to one type of generator or the other. But since we have access only to the two output terminals of our generator we can do no more than measure the effect it produces, and it has been shown that both types of generator are identical in this respect. The physical equivalent is, however, of no immediate importance, since we are only interested in the effects produced and not in what may or may not be happening within the valve in order to produce these effects.

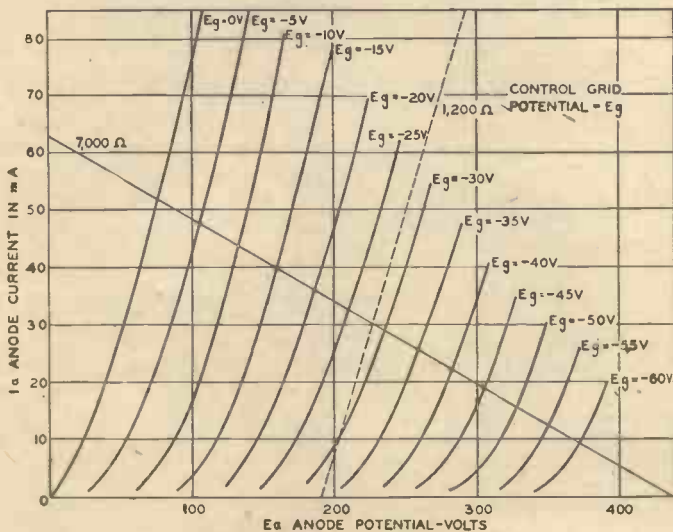


Fig. 2—Typical triode characteristics

### TRIODE AND PENTODE CHARACTERISTICS

The fundamental difference between a triode and a pentode is shown up very clearly in the anode - voltage - anode - current characteristics. Figs. 2 and 3 are typical characteristics for a triode and a pentode respectively; anode current being shown plotted against anode voltage for various constant values of grid potential. The internal anode impedance, being the change in anode current for a given change of anode voltage, may be determined at any working point by measuring the slope of the characteristic at that point. It will be seen that, for the particular valves represented, the working impedance is of the order of 1,200 ohms and 100,000 ohms respectively, these values being indicated by the slope of the dotted lines shown.

### LOAD-LINES

A few remarks may not be out of place here on the subject of load-lines and valve characteristics, for the benefit of those readers who have not had occasion to deal with this subject.

The current which flows to the anode of a valve is determined at any instant by the values of the grid and anode potentials. If there is no impedance in the anode circuit, the anode potential equals the H.T. supply voltage whatever the anode current may be. The anode current under these conditions may be read from the diagrams shown in Figs. 2 and 3, from the point where the vertical ordinate corresponding to the supply potentials (and hence anode potentials) intersects the grid potential contour. But if there is a resistance between the anode and the H.T. supply, the anode current will drop the anode potential below that of the supply, and since this voltage drop is directly proportional to the current, the anode resistance may be represented by a straight line (the load-line) passing through the horizontal axis at the point corresponding to the supply voltage (438 volts in the case of the 7,000-ohms load drawn in Figs. 2 and 3).

It will be evident that, since the current through the valve and that through the anode resistance are one and the same, the actual values of anode potentials and anode current for any particular grid voltage are given by the point where the line corresponding to the anode resistance cuts the corresponding grid contour. Further, as the grid voltage varies, this operating point travels up and down the load-line.

In all circuits where a choke or transformer winding is used to carry the D.C. anode current, the impedance of the anode circuit to the rapid variations of anode current caused by the signal may be high, while the resistance to D.C. is very low. Thus, the mean voltage will be nearly equal to the supply voltage and the signal will cause the anode potentials to swing above and below this value, instead of being always left at the supply voltage as in the case of a resistance feed.

The load-line not only provides a rapid means of determining the anode current and anode voltage swing, and therefore the power output, but also gives some indication of the distortion introduced by the valve, as will be seen by reference to Figs. 2 and 3.

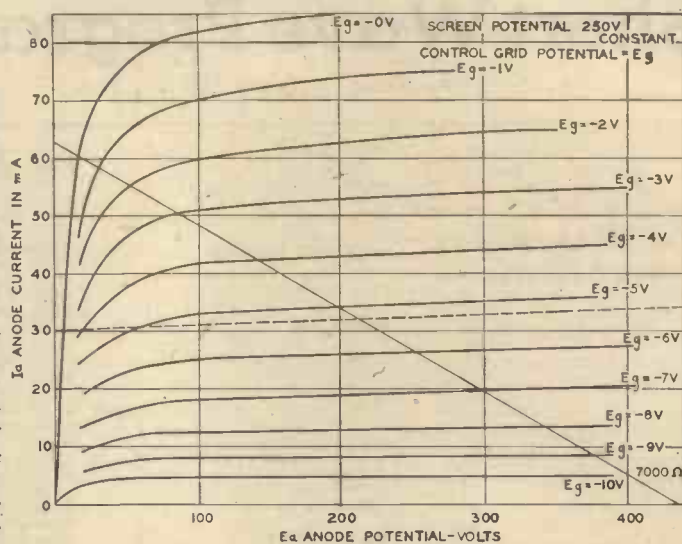


Fig. 3—Typical pentode characteristics

A load-line representing 7,000 ohms has been drawn on each diagram assuming an operating point in each case of  $I_a = 34$  mA  $V_a = 200$  volts. Then, when a signal is applied to the grid, the instantaneous values of anode current and anode potential are given by the point of intersection of the load-line and the contour corresponding to the grid potential at that instant. If all the intercepts made on the load-line by the contours of grid potential are equal it will be evident that the variations of anode potential will be an exact copy of the variations of grid potential and there will, therefore, be no distortion. If, however, the intercepts are not equal, non-linear distortion will be introduced.

### HARMONIC DISTORTION

It is found that normal valve circuits produce a preponderance of either second or third harmonic distortion; the former when the output wave is flattened on one side only, that is the intercepts on the load-line close up at one end only, and the latter when both sides of the wave are flattened, or the intercepts close up at both ends of the load-line.

It will be seen that the triode always produces second harmonic distortion whatever the slope of the load-line, while in the case of the pentode with the load-line shown, the distortion will be chiefly third harmonic because the wave is flattened on both sides. With other values of load the pentode produces second harmonic in addition, and it will be seen that the optimum load is very nearly the one indicated, which extends into the "knee" of the curve. It may safely be said that it was the failure to appreciate the importance of maintaining the load near the optimum value which formerly caused the pentode to be regarded as a potential source of harmonic distortion.

In a later article it is proposed to deal with the causes of distortion in more detail, to indicate the precautions necessary to obtain the best results from a pentode valve, and to show how the characteristics of a triode may be reproduced by using a pentode and negative feedback, with a considerable reduction of harmonic distortion.

The "BBC ENGINEERING SERIES" consists of authoritative technical articles dealing with certain phases of broadcasting. Research and development are constantly going on and interesting information is continually being collected, much of which has never been published.

Most of the articles are by engineers of the BBC. Next week's article will deal with the subject of

"PROGRAMME METERS"









**DELHI**  
(31.28 m.)  
02.30—Recitation.  
02.45—Vocal and Instrumental.  
04.10-04.30—News (Eng., Hindu.).  
07.30—Indian Music (Recorded).  
08.30-09.30—The Three B's (European).

**HUIZEN**  
(16.87 m.)  
13.25-15.30—For the Dutch Indies.

**LYNDHURST**  
(31.32 m.)  
03.25—Stocks; Music; News.  
06.00-08.00—For Schools; Concert.  
09.30—News; Music; Talk.  
11.00—Second Test Match, Australia v. England, at Lord's.  
13.30-18.30—News; Test Match (contd.).

**MILLIS**  
(31.35 m.)  
14.55—News.  
23.45—Lowell Thomas.

**MOSCOW**  
(25 m.)  
12.00 and 18.15—Talks (Ger.).  
21.00—Talks, etc. (It., Ger.).  
22.00—Talks (Eng., Ger.).  
(31.25 m.)  
00.00—Programme in Spanish.  
(19.89 m.; 31.25 m.)  
01.00—Programme in English.  
(25 m.)  
02.30—Programme in Portuguese.  
04.15—Programme in Portuguese.

**PARIS-MONDIAL**  
(19.68 m.)  
12.00—News (Eng.); Concert.  
13.30—News; Talks; Records.  
(16.88 m.; 19.68 m.)  
14.30—Delannoy Music.  
15.55-16.00—Exchange; Markets.  
(25.24 m.; 31.41 m.)  
16.15—Records; at 16.40—News (Arabic).  
17.15—News; Records; Talk.  
19.00—News; Records.  
19.35—News (Arabic).  
19.50-20.30—News (Eng., It.).  
22.30—Markets; News (Port.).  
(19.83 m.; 25.6 m.)  
00.00—Records.  
01.00—News (Fr., Sp., Port.).  
01.50-02.15—Records; Talk (Sp.).  
(25.24 m.; 25.6 m.)  
02.30—Records; at 03.15—News.  
04.00—News (Eng.); Records.  
04.25—Talk (Eng.).  
04.40-05.00—News (Ger.).

**PITTSBURGH**  
(13.93 m.)  
11.45—Farm Markets.  
12.00—Trail Blazers.  
12.15—Musical Clock.  
13.15—News; Musical Clock.  
13.45—Jerry Sears' Music Makers.  
(19.72 m.)  
14.00—Kitty Keene.  
14.15—Linda's First Love.  
14.30—The Editor's Daughter.  
14.45—Shopping Circle.  
15.00—Just Neighbours.  
15.15—Asher and Little Jimmie.  
15.30—Josh Higgins of Finchville.  
15.45—Ma Perkins.  
16.00—Mary Marlin.  
16.15—Vic and Sade.  
16.30—Pepper Young's Family.  
16.45—Getting the Most out of Life.  
17.00—News; Harding's Wife.  
17.30—Farm and Home.  
18.30—Voice of the Farm.  
18.45—Jack and Loretto Clemens.  
19.00—Betty and Bob.  
19.15—Arnold Grimm's Daughter.  
19.30—Valiant Lady.  
19.45—Betty Crocker.  
20.00—Baseball Game—Boston v. Pittsburgh.  
22.00—News Reeler.  
22.15—Attorney at Law.  
22.30—Movie Magazine.  
22.45—Dog Heroes.  
23.00—News; Sports.  
23.15—Melody Master.  
23.30—Daily Sports Column.  
23.45—Lowell Thomas.  
(5.26 m.)  
00.00—Dot and Pat.  
00.15—Music is my Hobby.  
00.30—Let's Celebrate.  
00.45—Variety Items.  
01.00—Maurice Spitalny's Orchestra.  
01.30—Variety.  
02.00—Royal Crown Revue.  
02.30—NBC Spelling Bee.  
03.00—Paul Martin's Music.  
03.30—Variety.  
(48.83 m.)  
04.00—News.  
04.15—Music You Want.  
05.00—Orchestra.  
05.15—DX Club.  
05.30-06.00—Orchestras.

**PODEBRADY**  
**For Europe.**  
(25.34 m.; 25.51 m.)  
19.55-22.30—News; Light Music; Concert; Quartet (Kromer-Kramar); Slovak Songs; at 20.40—News (Ger.), and at 22.00—News (Fr.).  
22.30-22.40—News (Eng.).

**ROME**  
(25.4 m.)  
11.00-14.15—News; Music; Talks; at 12.00—News (Eng.).  
16.00—News; Music; News (Eng.); Sports; News.  
18.10—News, Music, Talk (Arabic).  
19.01—Talk (Dutch).  
19.19—News (Eng., It.).  
19.56—News and Italian Lessons (Serb., Fr., Ger.).  
21.00—From Turin (No. 1): Talks (Serb., Fr., Eng., Ger.).  
23.30—News (Sp., Greek); Music.  
00.00—For Latin America: News; Music; News (Sp., Port.).  
01.30-03.00—For U.S.A.: News (Eng.); Music; News.

**SCHENECTADY**  
(13.95 m.)  
16.00—Viennese Ensemble.  
16.30—Sweethearts of the Air.  
16.45-17.00—Hollywood Brevities.  
(19.57 m.)  
17.15—Edward Gamage (Tenor).  
17.30—Farm Programme.  
18.00—News; Escorts and Betty.  
18.30—Words and Music.  
19.00—News (Fr.).  
19.15—The New World Salutes the Old.  
19.30—Portraits of Famous Americans.  
19.45—Recorded Programme.  
20.00—Radio Guild.  
(19.57 m.; 31.48 m.)  
21.00—What's Ahead.  
21.15—There was a time when.  
21.30—Matinee Melodies.  
22.00—American News Tower.  
22.15—Church in the Wildwood.  
22.30—Your Family and Mine.  
22.45—Little Orphan Annie.  
23.00—Education in the News.  
23.15—Piano Time.  
23.25—News; Home Programme (Sp.).  
(31.48 m.)  
00.00-05.00—For Latin America.  
00.00—Dance Music (Sp.).  
00.15—Uncle Ezra.  
00.30—Stocks; Sports; News (Sp.).  
01.00—Lucille Mannfers (Soprano).  
01.30—Farm Forum.  
02.00—Waltz Time.  
02.30—Literature (Sp.).  
03.00—The First Nighter.  
03.30—Hollywood Gossip.  
03.45—Dorothy Thompson; Variety.  
04.30-05.00—Orchestra.  
(31.4 m.)  
00.15-04.00—For Latin America.  
00.15—Variety Musicale (Port.).  
00.30—Stocks; Sports.  
00.50—Portuguese Musicale.  
01.00—The Portuguese Hour.  
02.00—Dance Music.  
02.30—Comments on Electricity.  
02.45—Concert Master.  
03.00—Paul Martin.  
03.30-04.00—Dance Music.

**TOKIO**  
(19.79 m.; 25.42 m.)  
**For Europe.**  
20.30—News and Talk (Eng.).  
21.05—News (Ger.); Songs of Work.  
21.35-22.00—News (Fr., Jap.).

**VATICAN CITY**  
(19.84 m.)  
16.30-16.45—Church Notes (Ger. or It.).  
(50.26 m.)  
20.00-20.15—Church Notes (Ger.).

**WARSAW**  
(22 m.; 26.01 m.)  
00.00—News (Pol., Eng.); Songs; Talk.  
01.00—Polish Dances; Talk (Fr.).  
02.00-03.00—Light Music; Notes.

**WAYNE**  
(16.89 m.)  
12.30—Daily Almanac—Phil Cook.  
12.55—News; Music; Variety.  
14.25-15.00—News; Music.  
(19.65 m.)  
18.00—Popular Music.  
18.30—News; Stocks; Variety.  
20.00—Buffalo Summer Theatre.  
20.30—Variety; Music; at 21.45, World Economic Co-operation.  
22.50-23.00—News; Stocks.  
(25.36 m.)  
23.30-04.00—For S. America: News, Music, Talks, etc.  
(49.02 m.)  
04.30-05.30—For S. America: Dance Music.

**ZEESEN**  
(19.85 m.; 25.49 m.; 49.83 m.)  
16.40—Call (Ger., Eng.); Concert.  
17.15—Schubert Pfte. Duet; Music.  
18.15—Talks (Afrikaans, Ger.).  
18.45—News; "Waxworks"—Sequence.  
20.00—News (Eng.); Topical.  
20.30—Markets; Music.  
21.30—Symphony Concert.  
22.00-22.25—News (Ger., Eng.).  
(19.74 m.; 25.49 m.)  
22.50—Call (Ger., Eng.); Music.  
23.45—News; "The Pied Piper"—Play.  
00.45—Symphony Concert; Topical.  
01.30—Music.

**SATURDAY, June 25**

**EMPIRE**  
**Transmission 1** (GSG, GSO, GSF, GSD, GSB)  
06.00—Big Ben; "At the Black Dog."  
06.30—Trumpet Solos.  
06.40—Music from "Martha."  
07.40—"London Log."  
07.50-08.15—News.  
**Transmission 2** (GSJ, GSH, GSG, GSG+, GSP)  
11.45—Big Ben; "Take Your Choice."  
12.30—England v. Australia.  
12.40—Gershom Parkinson Quintet.  
13.20—England v. Australia.  
13.35—BBC Theatre Organ.  
14.05—"London Log."  
14.15—England v. Australia.  
14.30—Big Ben; News.  
15.00-15.00—Interlude.  
15.00-16.30—GSP.  
16.45-18.40—GSD; Test Match commentary.

**Transmission 3** (GSJ until 16.30, GSH, GSG, GSG+, a second transmitter until 17.00; GSF from 16.45)  
15.00—Big Ben; "Monologues in Melody."  
15.15—"At the Black Dog."  
15.45—Polo Champion Cup.  
16.15—Banjo Music.  
16.25—Fred Hartley's Sextet.\*  
17.00—Big Ben; News.  
17.30—England v. Australia.  
17.40—Sid Millward's Band.  
18.00—Big Ben; Montague Brearley's Orchestra.  
18.25-18.40—England v. Australia.

**Transmission 4** (19.00-22.00 GSG, GSG+, GSI, GSD, GSB; 22.15-00.00 GSG, GSP, GSO, GSF, GSB)  
19.00—Big Ben; News.  
19.25—Musical Interlude.  
19.30—"In Town Tonight."  
20.00—"Palace of Varieties."  
21.00—"London Log."  
21.15-22.00—Excerpt from "Pleasure on Parade."  
22.15—Big Ben; News.  
22.40—BBC Theatre Orchestra.  
23.15—England v. Australia.  
23.30-00.00—"Soho."  
**Transmission 5** (GSG, GSP, GSO, GSD, GSB)  
00.20—Excerpt from "Pleasure on Parade."  
01.10—"In Town Tonight."  
01.40—News.  
02.05-02.30—Harriet Cohen (Pfte.).

**Transmission 6** (GSI, GSD, GSC, GSB)  
03.20—"Rhythm Express."  
04.10—Harry Brindle (Bass).  
04.30—Big Ben; News.  
04.55—"London Log."  
05.05-05.20—"Fireside Music."  
Arabic Transmission (GSP)  
18.20-19.15.

**Spanish and Portuguese News** (GSO, GSB) 02.30-03.00.

**BOMBAY**  
(31.41 m.)  
03.30-04.30—Indian Music.

**BOSTON**  
(19.67 m.)  
19.30—Monitor views the News.  
(25.45 m.)  
21.50—Science; URSIgram.  
22.00—World Youth speaks.  
23.00—Monitor views the News.

**BUDAPEST**  
(32.88 m.)  
00.00-01.00 (Sun.)—Serenades; Folk-Music; Orchestra; News.

**CHICAGO**  
(49.18 m.)  
21.00—Club Matinee—Variety.  
06.05—Dance Band.

**DELHI**  
(31.28 m.)  
02.30—Vocal and Instrumental.  
04.10-04.30—News (Eng., Hindu.).  
07.30—For Women.  
08.00—Indian Music.  
08.30-09.30—European Dance Music.

**HUIZEN**  
(16.87 m.)  
13.25-15.30—For the Dutch Indies.

**LYNDHURST**  
(31.32 m.)  
03.25—Stocks; News; Music.  
04.15-08.30—Racing; Music.  
09.30—News; Music; Talk.  
11.00—Second Test Match at Lord's—Australia v. England.  
14.00-18.30—News and Test Match (contd.).

**MILLIS**  
(31.35 m.)  
14.30—Breakfast Club.  
02.00—National Barn Dance.

**MOSCOW**  
(25 m.)  
12.00 and 18.15—Talks (Ger.).  
21.00—Talks (It., Ger., Fr.).  
23.00—Programme in Spanish.  
(31.25 m.)  
00.00—Programme in Spanish.  
(19.89 m.; 31.25 m.)  
01.00—Programme in English.  
(25 m.)  
02.30—Programme in French.  
04.15—Programme in English.

**PARIS-MONDIAL**  
(19.68 m.)  
11.00—Records; Talk (Yugoslav).  
12.00—News (Eng.); Music.  
13.30—News; Talks; Records.  
(16.88 m.; 19.68 m.)  
14.30—Sketch with Orchestra.  
15.40-16.00—Songs.  
(25.24 m.; 31.41 m.)  
16.15—Records; at 16.40—News (Arabic).  
17.15—News; Records; Talk.  
19.00—News; Records.  
19.35—News (Arabic).  
19.50-20.30—News (Eng., It.).  
22.30—Markets; News (Port.).  
(19.83 m.; 25.6 m.)  
00.00-02.15—Records; at 01.00—News (Fr., Sp., Port.).  
(25.24 m.; 25.6 m.)  
02.30—Records; at 03.15—News.  
04.00—News (Eng.); Records; Talk.  
04.40-05.00—News (Ger.).

**PITTSBURGH**  
(13.93 m.)  
11.45—Farm Markets.  
12.00—Musical Clock.  
12.15—Trail Blazer.  
12.30—Musical Clock.  
13.15—News; Musical Clock.  
13.45—Jack and Loretto Clemens.  
(19.72 m.)  
14.00—Breakfast Club; News.  
15.00—Sweethearts of the Air.  
15.15—Viennese Ensemble.  
15.30—The Child Grows Up.  
15.45—Swing Serenade.  
16.00—Vaughn de Leath.  
16.15—Radio City Four.  
16.30—Our Barn.  
17.00—News.  
17.15—Carol Weymann.  
17.30—Farm and Home.  
18.30—Hotel Lexington Orchestra.  
19.00—Jean Ellington (Songs).  
19.15—Kidoodlers.  
19.30—Bill Krenz's Orchestra.  
20.00—Baseball Game—Boston v. Pittsburgh.  
22.00—News Reeler.  
22.15—Trio Time.  
22.30—Paul Sabin's Orchestra.  
22.45—Movie Magazine.  
23.00—News; Sports.  
23.15—Variety.  
23.30—Daily Sports Column.  
23.45—Rakov's Orchestra.  
(25.26 m.)  
00.00—Message of Israel.  
00.30—Uncle Jim's Question Bee.  
01.00—Design for Music.  
01.30—Variety.  
02.00—National Barn Dance.  
03.00—Concert in Rhythm.  
03.30—Namo Rodrigo's Orchestra.  
(48.83 m.)  
04.00—News.  
04.15—Music You Want.  
05.00-06.00—Orchestras.

**PODEBRADY**  
**For Europe.**  
(25.34 m.; 25.51 m.)  
19.55-22.30—News; Dance Music; Revue; Orchestra; Carnival (Schumann); Light Music; Prague Teachers' Choir; at 20.40—News (Ger.); and at 22.00—News (Fr.).  
22.30-22.40—News (Eng.).

**ROME**  
(25.4 m.)  
11.00—News; Opera Music.  
12.00-13.20—News (Eng., Fr.); Songs; News (Jap., It.).  
13.30-14.45—Talk; Opera Music; Talk; News (Hindu., Eng.).  
17.15—Sports; Trio; News.  
18.10—News, Music, Talk (Arabic).  
19.01—Talk (Esp.).  
19.19—News (Eng., It., Serb.).  
20.15—News and Talk (Fr.).  
20.30—News and Mail (Ger.).

21.00—From Turin (No. 1). In the intervals, Talks (Ger., Fr., Eng.).  
23.30—News (Sp., Greek).  
00.00—For Latin America: News; Opera; Talk; News (Sp., Port.).  
01.30-03.00—For U.S.A.: News (Eng.); Chamber Music; Music Talk; News.

**SCHENECTADY**  
(13.95 m.)  
13.00—Children's Stories; Variety.  
14.40—News; Trio; Variety.  
15.30—Music International.  
16.00—Forum; Variety.  
16.45-17.00—Serving the Consumer.  
(19.57 m.)  
17.15—Carol Weymann (Soprano).  
17.30—Farm Programme; Music.  
18.30—Your Host is Buffalo.  
19.00—Music; Campus Capers.  
20.00—Melodies; Swingology.  
(19.57 m.; 31.48 m.)  
21.00—For Stamp Collectors.  
21.15—Men of the West.  
21.30—Top Hatters.  
22.00-22.30—Orchestra.  
23.00—El Chico.  
23.25—News; Sports.  
23.45—Religion in the News.  
(31.48 m.)  
00.00-05.00—For Latin America.  
00.00—Kaltenmayer's Kindergarten.  
00.30—Stocks; Sports; Baritone.  
01.00—Madriguera's Orchestra.  
02.00—NBC Symphony.  
03.30—Rhythm; Variety.  
04.35-05.00—Lou Breeze's Orchestra.  
(31.4 m.)  
00.15-04.00—For Latin America.  
00.15—Variety Musicale (Port.).  
00.30—Stocks; Sports; Serenade.  
01.30—There was a time when.  
01.45—Harmony Hall.  
02.00—Musical Clock.  
03.00—Design for Music.  
03.30-04.00—Dance Music.

**TOKIO**  
(19.79 m.; 25.42 m.)  
**For Europe.**  
20.30—News and Talk (Eng.); Variety.  
21.05—News (Ger.); Folk-Songs.  
21.35-22.00—News (Fr., Jap.).

**VATICAN CITY**  
(19.84 m.)  
16.30-16.45—Church Notes (Polyglot).  
(50.26 m.)  
20.00-20.15—Church Notes (Polyglot).

**WARSAW**  
(22 m.; 26.01 m.)  
00.00—News (Pol., Eng.); Songs.  
00.50—Talk (Eng.): Polish Musicians in America.  
01.00—Polish Pfte. Music.  
01.30—Polish Sea Shanties.  
02.00-03.00—Music; Notes; Recitations.

**WAYNE**  
(16.89 m.)  
13.00—Poetic Strings; Music.  
14.15—Richard Maxwell (Sacred Songs).  
14.30—Fiddler's Fancy—Music.  
14.55—News.  
15.00—Lew White (Organ).  
15.30—The Jewel Cowboys (Songs).  
16.00—Orchestra—Music.  
16.15—Melody Ramblings.  
16.30—Junior Musical Comedy.  
17.00—Columbia Concert Hall—String Quartet.  
17.45-18.00—Dance Music.  
(19.65 m.)  
19.30—Melodies.  
20.00—Merrymakers—Music; Songs.  
21.00—Brooklyn Handicap from the Aqueduct Race Track.  
21.30—The Dancers.  
21.45—The Four Clubmen.  
22.00—Columbia Concert Orchestra. Conductor: Leon Goldman.  
22.30-23.00—Swing Session.  
(25.36 m.)  
23.30-04.00—For S. America.  
23.30—Artie Shaw Orchestra.  
00.00—Syncopation Piece; Music.  
00.45—News (Sp.).  
01.00—Swing Session; Music.  
02.00—Professor Quiz.  
02.30—Rhythm Rendezvous.  
03.00—Hit Parade.  
03.45-04.00—Capitol Opinions.  
(49.02 m.)  
04.30-05.30—For S. America.

**ZEESEN**  
(19.85 m.; 25.49 m.; 49.83 m.)  
16.40—Call (Ger., Eng.); Music.  
18.45—News; Variety.  
20.00—News (Eng.); Topical.  
20.30—Dance Music.  
22.00-22.25—News (Ger., Eng.).  
(19.74 m.; 25.49 m.)  
22.50—Call (Ger., Eng.); Variety.  
23.45—News; Variety; Talk.  
01.30—Transylvanian Music.  
02.00—Records.

# What Would You

	SUNDAY, June 19	MONDAY, June 20	TUESDAY, June 21
<b>Symphony Concerts Operas</b>	2.40 Hilversum 2: From Scheveningen. 6.0 Deutschlandsender: "Lohengrin" (from Vienna Opera). 6.0 National: The Seasons (Haydn). 8.0 Brussels 2: Flemish music. 8.0 Munich: From Russian operas. 8.0 Vienna: German opera music. 8.30 Radio-Paris: Mozart, Albeniz. 9.0 Rome group: "The Barber of Seville." 9.35 National: "Martha" (Flotow).	8.0 Berlin: "A Masked Ball" (rec.). 8.0 Radio-Paris: "Samson and Delilah" (Saint-Saëns). 8.30 Lille, etc.: Russian music. 9.15 Prague, Paris (PTT): Baroque period music. 9.30 Rome group: From the Basilica di Massenzio. 9.35 National: Leslie Heward. 9.50 Budapest: Jerger, Bayer.	6.0 Regional: "Martha" (Flotow). 8.0 Brussels 1: Wagner, French prog. (9.15). 8.0 Vienna: Orchestra, violin. 8.10 Oslo: Beethoven No. 2. 8.15 Rennes, Nice: Chabrier operetta and "La Bohème." 8.30 Budapest: Rimsky-Korsakov. 8.30 Eiffel Tower: Orchestra, pfte. 8.30 Strasbourg: "Faust" (Berlioz). 9.0 Turin group: "The Barber of Seville."
<b>Chamber Music Recitals</b>	3.20 Kalundborg: Choirs (folk tunes). 3.30 Leipzig: Quintet (Kleemann). 5.25 Deutschlandsender: Song cycle. 6.30 Breslau: Two pianofortes. 7.10 Vienna: Cello, vln., pfte. 8.30 Oslo: Community Singing. 9.10 Hilversum 2: Tino Rossi (tenor). 9.15 Oslo: Song (Schumann, Schubert). 10.15 Kalundborg: Serenades. 10.30 Stockholm: Pianoforte, song.	1.55 Hilversum 1: Pianoforte. 2.40 Kalundborg: Vocal duets. 4.0 Paris (PTT): Organ. 7.10 Königsberg: Pfte., baritone. 7.10 Vienna: Quintet (Schubert). 8.5 Prague: Vln., pfte. sonata. 8.15 Paris (PTT): Quartet, song. 8.45 Stockholm: Münz (pfte.). 9.15 Deutschlandsender: Grieg, Wolf. 9.30 Kalundborg: Vln., pfte. Sonata (Beethoven). 9.45 Hilversum 1: Trio (Dvořák). 10.20 Turin group: Pianoforte.	5.0 Radio-Paris: Nadia Boulanger, choir, etc. 6.30 Paris (PTT): Soëns (violin). 7.15 Oslo: Brahms's Zigeunerlieder. 8.0 Kalundborg: Two violoncellos. 8.15 Radio-Paris: Rameau, Pierné. 9.50 Beromünster: Max Reger prog. 10.0 Warsaw: Ada Sari (soprano). 10.15 Stockholm: Church organ. 10.30 Kalundborg: Trios. 10.30 National: Griller String Quartet. 10.35 Prague: Suk pfte. music.
<b>Plays and Feature Programmes</b>	4.30 Radio-Paris: "Les Compatriotes" (Monnier). 6.40 Regional: "Dr. Faustus." 8.30 Paris (PTT): "Le tragique mystère de Verdun." 9.0 Beromünster: "Spiel im Schloss" (Molnar).	8.0 Hamburg: "Afrikanische Hochzeit." 8.30 Naples group: "Felicita Colombo" (Adami). 8.30 Strasbourg, etc.: "Les Femmes savantes" (Molière). 11.15 Paris (PTT): Esperanto plays.	8.0 Berlin: "Zille Martha." 8.40 Munich: "Faustina Hasse." 8.45 Radio-Paris: "Le Corsaire." 9.10 Rome group: "La figlia di Jorio." 10.35 Breslau: "Hill Fires," Summer Solstice play.
<b>Light Orchestral Bands Operettas</b>	12.0 Kalundborg: Popular orch. 2.10 Radio-Paris: Children's operetta. 4.0 Saarbrücken, etc.: Pop. prog. 4.15 Kalundborg: Open-air concert. 6.0 Warsaw: "The Land of Smiles." 7.30 Budapest: Orchestra. 7.50 Hilversum 2: Kovacs Lajos. 8.0 Berlin: Tresi Rudolph (soprano) and orchestra. 8.5 Beromünster: Folk music—choirs. 8.10 Brno, Prague: Folk music. 8.10 Hilversum 1: "Melody and Rhythm." 8.15 Kalundborg: Operetta music. 8.30 Lille: Orchestra, baritone. 9.10 Hilversum 1: Military Band. 10.10 Brussels 1: Restaurant orch. 10.15 Bucharest: Serenade. 10.30-3.0 a.m. German stations: Serenade. 10.50 Hilversum 2: AVRO Orch.	12.0 Kalundborg: Louis Preil's Ensemble. 12.10 Hilversum 1: Light music. 4.0 Frankfurt, etc.: Pop. orchestral. 4.0 Warsaw: Optta. exc., waltzes. 5.0 Brussels 1: Radio Orchestra. 5.0 Radio-Paris: Popular orchestral. 7.10 Breslau: "Princess Nefertiti." 7.30 Radio Eireann: Orchestra, soprano. 7.30 Stockholm: Light orchestral. 7.55 Hilversum 1: Military Band. 8.0 Brussels 1: English music. 8.0 Brussels 2: Light music, dances. 8.0 Kalundborg: Danish music. 8.30 Lyons (PTT): "Les Saltimbanques" (Ganne). 9.0 Cologne: Contemporary music. 9.30 Swiss stations: For Swiss abroad. 10.15 Kalundborg: Popular orchestral. 10.15 Oslo: Balalaika orchestra. 10.30-3.0 a.m. German stations: Serenade.	12.0 Kalundborg: Restaurant orch. 2.55 Hilversum 1: Russian orch. 7.15 Cologne: Italian opera music. 7.30 Stockholm: Swedish orch., etc. 7.55 Hilversum 1: KRO Symphony Orchestra. 8.0 National: "The Silver Spoon." 8.0 Sottens: Orchestra, violin. 8.30 Paris (PTT), etc., Sottens: "Ciboulette" (Hahn). 8.55 Beromünster: Scandinavian music. 9.0 Kalundborg: Contemporary Danish. 9.5 Prague: Czech music. 10.0 Rome group: Old and new dances. 10.15 Oslo: Bergen Radio Orchestra. 10.30 Hamburg, etc.: Light music, dances. 11.10 Hilversum 2: Cigány Band. 12.0-3.0 a.m. German stations: Serenade.
<b>Talks (including News in English) Commentaries</b>	1.20 Stockholm: Denmark v. Sweden (football). 5.0 Paris (PTT): Final Round International Football Cup. 7.19 Rome 2: News in English. 10.0 Moscow: English programme.	5.0 National: All-England Lawn Tennis. 7.10 Lille: Talk in English. 10.30 Sottens: International Labour Bureau Report. 11.0 Budapest: News in English.	4.0 Regional: International Horse Show. 5.0 National: Lawn Tennis Championships. 7.19 Rome 2: News in English. 11.0 Prague: News in English.
<b>Variety Cabaret</b>	8.0 Cologne: Variety. 8.0 Stuttgart, Frankfurt: Variety. 8.30 Eiffel Tower: Variety. 10.0 Poste Parisien: Cabaret.	7.0 National: "The Bungalow Club." 8.20 Regional: "Radiolympus." 9.10 Turin group: Revue. 10.30 Poste Parisien: Cabaret.	8.10 Hilversum 2: Variety: "The Tuesday Night Train." 9.0 Stockholm: Cabaret. 9.20 Regional: Variety. 10.30 Poste Parisien: Cabaret.
<b>Dance Music</b>	6.40 Hilversum 2; 10.0, Budapest; 10.15, Oslo, Warsaw; 10.30, Sottens; 11.0, Radio-Paris, Strasbourg; 11.15, Kalundborg, Rome, Turin groups.	7.35 Budapest; 10.25, Regional; 11.0, National; 11.15, Kalundborg, Turin group; 11.25, Budapest.	6.40 Hilversum 2; 8.30, Cologne, Deutschlandsender; 9.0, Stuttgart; 9.45, Budapest; 10.20, Hilversum 1; 10.25, Regional; 10.30, Sottens; 11.10, Budapest, Kalundborg; 11.15, National, Rome group.

# Like To Hear ?

WEDNESDAY, June 22	THURSDAY, June 23	FRIDAY, June 24	SATURDAY, June 25
<p>6.40 National, 9.45 Kalundborg (Act 2): "Don Giovanni" from Glyndebourne.</p> <p>8.0 Brussels 1: Liège composers.</p> <p>8.0 Frankfurt: French and Belgian music.</p> <p>8.30 Berlin, Paris (PTT): Graener, Strauss, etc.</p> <p>8.30 Lille: Mozart, Pierné, etc.</p> <p>9.10 Hilversum 2: Mahler No. 4.</p> <p>10.5 Warsaw: Opera music; Paes-ter, Saint-Saëns.</p>	<p>7.15 Munich: "Die Meistersinger."</p> <p>7.25 Vienna: "I Pagliacci."</p> <p>8.15 Cologne: University Jubilee concert.</p> <p>8.30 Radio-Paris: Rivier, Mussorg-sky, Fauré, etc.</p> <p>9.0 Brussels 2: Orchestra, baritone.</p> <p>9.0 Rome group: "La via della finestra" (Zandonai).</p> <p>9.10 Hilversum 2: Italian opera music.</p> <p>10.0 Sottens: Beethoven, Brahms.</p>	<p>5.5 Stockholm: Mendelssohn No. 4.</p> <p>8.0 Frankfurt: Pfitzner programme.</p> <p>8.30 Berlin: Brahms No. 1, etc.</p> <p>9.0 Brussels 2: Symphony (Franck).</p> <p>9.0 Prague: Phil. Orch., choir, etc.</p> <p>9.10 Hamburg: "The Flying Dutchman" (excerpts).</p> <p>9.30 Turin group: From the Basilica di Massenzio.</p> <p>10.0 Warsaw: French music, etc.</p> <p>11.0 Radio-Paris, Strasbourg: Sym-phony (Dittersdorf) etc.</p>	<p>4.30 Hilversum 2: Orch., soprano, viola.</p> <p>8.30 Eiffel Tower, etc.: "Carmen" (Bizet) from the Opéra-Comique.</p> <p>8.45 Brussels 1: Ysaye, Dubois, etc.</p> <p>9.0 Turin group: "La via della finestra."</p>
<p>1.40 Hilversum 1: Soprano songs.</p> <p>5.40 Hilversum 2: Organ, tenor.</p> <p>6.15 Königsberg: Choir.</p> <p>6.20 Prague: Folk songs.</p> <p>6.30 Paris (PTT): 'Cello, pfte., sonatas.</p> <p>6.55 Warsaw: Violin.</p> <p>7.0 Brussels 2: Flemish songs.</p> <p>7.55 Hilversum 1: Sacred organ music.</p> <p>8.0 Kalundborg: Two pianofortes.</p> <p>8.15 Bucharest: Violin.</p> <p>10.10 Rome group: Pianoforte.</p>	<p>6.10 Deutschlandsender: 'Cello, pfte.</p> <p>6.20 Leipzig: Beethoven pfte. music.</p> <p>6.40 Hilversum 2: Quartet.</p> <p>7.3 Brussels 2: Organ.</p> <p>7.50 Hilversum 2: Choir, soprano, organ.</p> <p>8.0 Eiffel Tower: Song, pfte.</p> <p>9.5 Oslo: Norwegian music.</p> <p>9.10 Kalundborg: Danish songs.</p> <p>9.20 Budapest: Vln., pfte. sonatas.</p> <p>9.30 Prague: Two pianofortes.</p> <p>10.0 Warsaw: Trout Quintet (Schu-ber), Quintet (Hummel).</p>	<p>3.55 Hilversum 1: Chamber orch.</p> <p>5.20 Prague: The Ondřicek Quartet.</p> <p>6.5 Königsberg: Organ.</p> <p>6.30 Cologne: Pianoforte (Schubert).</p> <p>6.30 Paris (PTT): The Danish Quartet.</p> <p>7.30 Oslo: Accordion.</p> <p>7.40 Hilversum 2: Song, pfte.</p> <p>8.0 Eiffel Tower: Sonata, quartet.</p> <p>9.10 Hilversum 2: Organ, pfte., etc.</p> <p>9.15 Beromünster: Folk songs.</p> <p>10.0 Strasbourg: Guitar.</p> <p>10.30 Deutschlandsender: Quartet.</p>	<p>4.0 Brussels 2: Violin, 'cello.</p> <p>4.30 Beromünster: Songs to the Lute.</p> <p>5.30 Stockholm: Pianoforte.</p> <p>6.15 Brussels 2: Song.</p> <p>6.30 Stockholm: Accordions.</p> <p>7.0 Budapest: Hungarian songs.</p> <p>7.0 Warsaw: Mme. Adamska ('cello).</p> <p>8.0 Kalundborg: Vln. duet (Haydn).</p> <p>8.10 Paris (PTT): Vocal duets.</p>
<p>7.55 Beromünster: Lope da Vega comedy.</p> <p>8.20 Stuttgart: "Botschaft des Her-zens."</p> <p>8.30 Eiffel Tower, etc.: "Le beau métier" (Clerc).</p> <p>9.0 Regional: "Parnell" (Schauffler).</p>	<p>5.0 Radio-Paris: "Le menteur."</p> <p>8.0 Deutschlandsender: "Augs-burg."</p> <p>8.30 Paris (PTT): "Le véritable Vercingetorix" (Carel).</p> <p>9.30 Kalundborg: "Midsummer Eve."</p> <p>11.0 Stockholm: "Midsummer Eve."</p>	<p>7.40 Warsaw: Midsummer's Day programme.</p> <p>8.30 Radio-Paris: "Un cœur tout neuf" (Vialar).</p> <p>8.30 Naples group: One-act comedy.</p>	<p>8.30 Radio-Paris: "Les Plaideurs" (Racine).</p> <p>8.30 Strasbourg: "The Midnight Sun."</p> <p>9.0 Rome group: "Biraghin."</p> <p>11.0 Paris (PTT): "Les Amants de Sazy."</p>
<p>12.0 Kalundborg: Louis Preil's En-semble.</p> <p>12.10 Hilversum 1: Light orchestral.</p> <p>12.15 Radio-Paris: Garde Républi-caine Band.</p> <p>5.0 Brussels 2: Salon orchestra.</p> <p>5.5 Oslo: Bergen Radio Orchestra.</p> <p>6.0 Berlin: Hans Bund Band.</p> <p>7.30 Warsaw: Waltzes.</p> <p>7.45 Stockholm: Naval Band.</p> <p>7.55 Hilversum 2: VARA Orch.</p> <p>8.0 Brussels 2: Studio operetta.</p> <p>8.0 Prague: Old-Prague operetta.</p> <p>8.0 Vienna, etc.: Mandolines, tenor.</p> <p>8.25 Oslo: Conductor, Hugo Kramm.</p> <p>8.30 Cologne: Rhapsodies, dances.</p> <p>8.30 Rennes: Exotic music, etc.</p> <p>9.30 Strasbourg: "Rose et Colas."</p> <p>9.55 Budapest: Popular orchestral.</p> <p>10.10 Turin group: Operetta music.</p> <p>10.30 Breslau, etc.: "Melody and Rhythm."</p> <p>12.0 Stuttgart, Frankfurt: Overtures, ballet music, etc.</p>	<p>12.0 Kalundborg: Louis Preil's Ensemble.</p> <p>12.20 Radio-Paris: Cantrelle Orch.</p> <p>12.50 Hilversum 1: Light orchestral.</p> <p>4.0 Stuttgart: From Baden-Baden.</p> <p>5.5 Oslo: Stavanger Orchestra.</p> <p>5.10 Hilversum 2: Kovacs Lajos.</p> <p>6.0 Berlin: Hans Bund Band.</p> <p>6.20 Prague: Salon orchestra.</p> <p>7.5 Radio Eireann: Orchestra, songs.</p> <p>7.10 Cologne: Light opera music.</p> <p>8.0 Brussels 1: Light orchestral.</p> <p>8.10 Frankfurt, etc.: Operetta music.</p> <p>8.20 Kalundborg: Danish and Swedish programme.</p> <p>8.30 Eiffel Tower: "Beau Brum-mel" (Hahn).</p> <p>9.45 Beromünster: New German music.</p> <p>9.45 Bucharest: Restaurant orch.</p> <p>10.30 Stuttgart, etc.: Folk and light music.</p> <p>10.50 Hilversum 2: Gipsy music.</p>	<p>12.0 Kalundborg: Restaurant orch.</p> <p>2.10 Oslo: Bergen Radio Orchestra.</p> <p>2.30 Kalundborg: Louis Preil's Ensemble.</p> <p>4.55 Hilversum 1: KRO Orchestra.</p> <p>5.0 Brussels 1: Light orch., songs.</p> <p>6.20 Prague: Band concert.</p> <p>7.10 Munich: Operetta and film music.</p> <p>7.30 Prague: Operetta selections, etc.</p> <p>8.0 Brussels 1: Military Band.</p> <p>8.0 Deutschlandsender: Popular prog.</p> <p>8.30 Paris (PTT): Orchestra, pfte.</p> <p>8.30 Stockholm: Studio operetta.</p> <p>8.30 Strasbourg: Alsatian evening.</p> <p>9.0 Rome group: Midsummer's Day Festival.</p> <p>10.10 Kalundborg: Opera and Operetta programme, etc.</p> <p>10.30 Leipzig, etc.: Light music.</p> <p>11.10 Budapest: Cigány Band.</p> <p>12.0 - 3.0 a.m., German stations: Serenade.</p>	<p>12.0 Kalundborg: Louis Preil's Ensemble.</p> <p>12.15 Radio-Paris: Popular orchestral.</p> <p>4.0 Cologne, etc.: Popular tunes.</p> <p>4.25 Hilversum 1: KRO Orchestra.</p> <p>7.30 Stockholm: Marches, waltzes.</p> <p>7.35 Bratislava, Prague: "A Sum-mer Night in Bratislava."</p> <p>7.55 Oslo: Popular orchestral.</p> <p>8.0 Brussels 2: Radio Orchestra.</p> <p>8.0 Hilversum 2: Operetta music.</p> <p>8.0 Vienna: Light music, dances.</p> <p>8.10 Hamburg: Operetta prog.</p> <p>8.15 Cologne: "The Merry Widow."</p> <p>8.15 Hilversum 1: Variety concert.</p> <p>8.30 Naples group: Studio operetta.</p> <p>8.30 Paris (PTT): Orchestra, songs.</p> <p>9.10 Warsaw: Light orchestral.</p> <p>10.5 Radio-Paris: Orchestra, songs.</p> <p>10.30 Berlin, etc.: Light music and dances.</p> <p>10.40 Hilversum 2: Accordions.</p> <p>10.45 Budapest: Popular orchestral.</p> <p>11.0 Brussels 2: Restaurant orch.</p>
<p>5.0 National: Lawn Tennis Cham-pionships.</p> <p>6.32 Radio-Paris: "French Opera from 1900 to to-day."</p> <p>7.10 Lille: Talk in English.</p> <p>11.0 Budapest: News in English.</p>	<p>2.45 (a.m.) National: Joe Louis v. Max Schmeling.</p> <p>4.0 Regional: International Horse Show.</p> <p>5.0 National: Lawn Tennis.</p> <p>11.0 Prague: News in English.</p>	<p>At intervals Regional: Test Match.</p> <p>5.0 National: Lawn Tennis.</p> <p>8.0 Paris (PTT): M. Calvocoressi: "La musique russe en France."</p> <p>10.30 Prague: Sokol Exercises.</p>	<p>At intervals National: Test Match.</p> <p>3.0 Prague: From the Sokol Stadium.</p> <p>3.45 National: Polo — Champion Cup.</p> <p>7.10 Lille: Talk in English.</p>
<p>9.0 Radio-Paris: Variety.</p> <p>9.10 Poste Parisien: Max Regnier.</p>	<p>8.0 Lille: Variety.</p> <p>8.15 Poste Parisien: Music-Hall.</p> <p>8.15 Stockholm: Midsumme r Cabaret.</p> <p>8.40 Regional: "Follies of 1938."</p>	<p>2.40 Hilversum 2: Variety.</p> <p>7.55 Hilversum 1: Musical variety.</p> <p>8.0 National: "The Old Music Halls."</p> <p>8.50 Sottens: Cabaret.</p>	<p>8.0 Deutschlandsender: Music-Hall variety.</p> <p>8.0 National: Palace of Varieties.</p> <p>8.0 Sottens: Variety.</p> <p>10.30 Kalundborg: Cabaret.</p>
<p>10.10 Brussels 1; 10.25, Regional; 10.30, Sottens; 10.45, Hil-versum 2; 11.0, National; 11.10, Budapest; 11.15, Rome, Turin groups; 11.20, Kalundborg.</p>	<p>8.20 Vienna; 10.5, Stockholm; 10.10, Brussels 1; 10.25, Regional; 10.55, National; 11.10, Budapest; 11.15, Oslo, Rome, Turin groups.</p>	<p>5.0 Warsaw; 6.0, Hilversum 1; 9.40, Hilversum 2; 10.15, Budapest; 10.25, Brussels 1, Regional; 10.30, Sottens, 10.40, National; 11.10, Kalundborg; 11.15, Rome group.</p>	<p>8.15 Bucharest; 8.35, Radio Eireann; 9.0, Leipzig: Radio Ball; 10.10, Brussels 1; 10.15, Oslo, Stockholm; 10.30, Brno, Prague, Re-gional, Sottens; 11.0, Radio-Paris, Strasbourg; 11.15, Kalundborg, National.</p>

# Long and Medium Wave Programmes

## SUNDAY JUNE 19

### National

Time Signals: Big Ben, 12.30, 10.45 p.m. Greenwich, 10.30 a.m., 4.0, 9.0 p.m. D = Droitwich.

9.30-10.5 a.m. (D)—Service (R.C.).  
10.30 (D)—Weather Forecast.  
10.45 (D)—Eugene Pini's Tango Orchestra.  
11.15 (D)—London Palladium Orchestra.  
12.15 p.m. (D)—Florence Marks (Disease).  
12.30 (D)—Ghost Spelling: Wives v. Husbands.  
1.15 (D)—Jan Berenska's Orchestra.  
2.0 (D)—In Your Garden: C. H. Middleton and F. H. Grisewood.  
2.20 (D)—Medvedeff's Balalaika Orchestra. 2.45 (D)—Records.  
3.15 (D)—BBC Military Band: Gladys Palmer (Contralto).  
4.0—"The World Congress of Faiths: " Sir Francis Young-husband.  
4.20—Alfredo Campoli's Salon Orchestra.  
5.0—"Great Books of Christendom," The Rev. C. H. Dodd.  
5.20—Ruth Naylor (Soprano); Rudolph Dolmetsch (Harpsichord).  
5.45—"The Fortnight's Films: Andrew Rice, from "The Seasons" (Haydn); Elsie Suddaby (Soprano); Heddie Nash (Tenor); Keith Falkner (Bass); BBC Chorus and Orchestra. Conductor, Sir Adrian Boult.  
6.40—Reginald Foort (BBC Theatre Organ).  
7.15—Mantovani's Tipica Orchestra.  
7.55—Bible Sunday Service.  
8.45—Appeal on behalf of the British Empire Leprosy Relief Association by Christopher Stone, D.S.O., M.C. 8.50—"The News.  
9.5—Recollections of Lord's Cricket Ground.  
9.35—"Martha," an opera by Friedrich von Flotow, with Lorely Dyer, Freda Townson, Frank Titterton, Stuart Robertson, Dick Francis.  
10.35—Epilogue.

### London Regional

Time Signals: Big Ben, 12.30, 10.45 p.m. Greenwich, 4.0, 9.0 p.m.  
9.30 a.m.—National.  
4.0 p.m.—Philip Whiteway Ensemble.  
4.30—"The Open Bible," by Alec Macdonald.  
5.0—Horsham Borough Band: Francis Russell (Tenor).  
6.0—Walford Hyden's Magyar Orchestra.  
6.40—"Dr. Faustus," a tragical history of the Renaissance by Christopher Marlowe.  
7.55—Service (Methodist).  
8.45—National.  
9.5—BBC Midland Orchestra, conducted by Eric Warr: Ballet music, Prometheus (Beethoven).  
9.50—"The Lunch and the Launch," short story by John Glog.  
10.5—Charles Ernesco's Quintet, with Anne Ziegler.  
10.35—Epilogue.

### Midland

4.0 p.m.—Nottinghamshire British Legion Annual Rally.  
5.0—Regional.  
7.55—Sunday School Anniversary Service (Methodist) from Leicester.  
8.45—National.  
9.5—Regional.  
9.50—New Coventry Hippodrome Orchestra. 10.35—Epilogue.

### Northern

9.30 a.m.—National.  
4.0 p.m.—Regional.  
5.0—Brighouse and Rastrick Band: Harold Bradbury (Tenor).  
6.0—Regional.  
6.40—"Not very long ago;" J. L. Hammond.  
6.55—"My Week-end out of Doors;" William Aspden.  
7.10—National Rally of Choirs, Skegness.  
7.55—Service (Presbyterian).

8.45—National.  
9.5—BBC Northern Orchestra: Harry Mortimer (Trumpet).  
9.50-10.35—Regional.

### Western

4.0 p.m.—Regional.  
8.0—Service (C.E.) from the studio.  
8.45—National.  
9.5-10.35—Regional.

### Welsh

9.30 a.m.—National.  
4.0 p.m.—J. H. Johns (Baritone); Frederic Clements (Clarinet).  
4.40—Y Beible Yng Nghymru: T. H. Parry-Williams.  
5.0—Regional.  
6.0—Garfield Phillips Quintet.  
6.30—Records of Chopin's Pfte. Solos, 6.40—Regional.  
7.55—Service from Holy Trinity Church, Aberystwyth.  
8.45—National.  
9.5—"Y Ficer;" Welsh play by Rhys Dafys-Williams.  
10.5-10.35—Regional.

### N. Ireland

9.30 a.m.—National.  
4.0 p.m.—Regional.  
6.40—Irish Poetry reading by Shelah Richards.  
6.55—Service (Methodist) from Carlisle Memorial Church, Belfast.  
7.55—Opening Service of the Port-stewart Convention.  
8.45—National.  
9.5—BBC N. Ireland Orchestra.  
10.5-10.35—Regional.

### Scottish

9.30 a.m.—National.  
2.0 p.m.—"At the Exhibition;" The Services Pavilion and the Physical Fitness Pavilion.  
2.20—National.  
4.0—Scots Songs: Margaret Allan (Soprano); Philip Malcolm (Baritone), 4.30—Regional.  
7.55—Service (C. of Scotland) from Edinburgh, 8.45—National.  
9.5-10.35—Regional.

Hours of Transmission in British Summer Time.

### BERLIN

841 kc/s (356.7 m.); 100 kW.  
6.0 a.m.—Call; Weather; Gym.  
6.30—Hamburg Harbour Concert.  
8.0—Gym; Records.  
8.55—Chimes and Service from Potsdam Garrison Church.  
9.30—For Hitler Youth.  
10.0—Weather.  
10.5—Light Music by the Krepela Sextet and the Küster-Kiermeier Pfte. Duo.  
11.20—Records: The Seasons (Glazunov). Conductor: The Composer.  
12.0 noon—Light Music. Airmen's Band. Conductor: Böhm. Bund Band. Heinz Klink (Saxophone).  
2.0 p.m.—Greetings.  
2.5—Classical Records. Academic Festival Overture (Brahms). Conductor: Fiedler. Songs (Brahms) by Gerhard Hüsch: (a) Feldeinsamkeit, (b) Wie bist du, mein Königin. Excerpts from the Ballet Suite (Reger). Conductor: Zaun. Sigfrid Grundeis (Pfte.): (a) Leggierza (Liszt), (b) Hungarian Rhapsody (Liszt). Songs (Wagner) by Maria Müller: (a) Im Treibhaus, (b) Träume. Romeo and Juliet (Tchaikovsky). Conductor: Mengelberg.  
3.0—Reports: The Folk Festivals in Schneidemühl.  
3.30—Records.  
4.0—See Saarbrücken; at 5.0—Report from Mariendorf: The German Trotting Derby.  
6.0—Willi Stanke Band. Gallop (Pauch). Kegelanz (Strecke). Fantasia on "Gerde Marie" (Kowalski). Puppenparade (Czer-nik). Annabella (Wasata). Sonne die brauch' ich zum Leben (Kallies). Fräulein Mandarin (Pichelmann). Ländler and Tango (Stanke). Träume der Chrysantheme (Capelle). Aus aller Welt (Buder). Bergfrühling (Freundorfer).  
7.0—News; Sports; Records.

### SERVICES—SACRED MUSIC

A.M.  
10.0 Kalundborg: Service.  
11.0 Italian stations: Mass.  
12.0 (noon) Radio-Paris: Address.  
P.M.  
5.40 Hilversum 1: Service.  
6.0 Stockholm: Evensong.  
7.0 Brussels 1: Address.  
7.25—Sottens: Church choir.

8.0—Station Orchestra, Conductor: Köhler. Berlin Pfte. Trio. Tresi Rudolph (Soprano).  
10.0—News; Sports.  
10.30—Serenade. Kallies Band. Olschewski Quintet.  
1.0-3.0 a.m. (Monday)—Music from Hamburg.

### BEROMÜNSTER

556 kc/s (539.6 m.); 100 kW. Relayed by Basle and Berne, 1,375 kc/s (218.2 m.).  
9.30 a.m.—12.0 noon—From Basle.  
9.30—Records: Violin Concerto in D (Mozart), by Yehudi Menuhin.  
10.0—Roman Catholic Service.  
10.45—Concert by the "Schola Cantorum Basiliensis."  
11.30—Maria Modena reads.  
12.0 noon—Zürich Radio Orchestra. Conductor: Bernhard; at 12.30 p.m.—News.  
1.50-3.0—From Basle.  
1.50—Music.  
2.0—Dialect Talk.  
2.20—Folk Songs by the Oberwil Male Voice Choir from the "Sans - Souci." Conductor: Hartmann.  
3.0—Commentary by Werner Hausmann on the "Round the Houses" Motor-Cycle Races at St. Gall.  
3.40-7.45—From Basle.  
3.40—Reading and Records.  
5.0—Talk: The Clarinet.  
5.30—Records: Ticino Songs.  
6.0—Talk.  
6.20—Concert by the Stradella Club of Aarburg. Conductor: Diester.  
7.0—Countries and Peoples—Readings.  
7.35—Records.  
7.45—News; Sports.  
8.5 (from Berne)—Folk Songs—The 1938 Swiss Choral Festival at Berne.  
9.0-10.30—From Basle.  
9.0—"Spiel im Schloss"—Comedy (Molnar).  
10.15—Music.  
10.25—Announcements.

### BRATISLAVA

1,004 kc/s (298.8 m.); 13.5 kW. Transmits at intervals from 6.30 a.m.  
6.0 p.m.—Hungarian Transmission: Talk: Trio for Violin, 'Cello, and Pfte. (Albrecht).  
6.45—Record.  
6.50—News in German.  
7.0-8.10—See Prague.  
8.10—See Brno.  
8.45—Talk from Kosice.  
9.0-11.30—Orchestra; at 10.20—News in Hungarian.

### BRESLAU

950 kc/s (315.8 m.); 100 kW. Relayed by Gleiwitz and Görlitz, 1,231 kc/s (243.7 m.).  
5.0 a.m.—Records.  
6.0—See Hamburg.  
8.0—Motto; Records.  
8.50—Time; News; Greetings.  
9.0 (from Gleiwitz)—Roman Catholic Service.  
9.30—Herbert Reichert (Harpsichord).  
10.0—Emil Roos Band.  
11.0—Hitler Youth Choir.  
11.55—Weather.  
12.0 noon—See Berlin.  
2.0 p.m.—Weather.  
2.5—For Women.  
2.20—Wladimir Pogorelow (Balalaika) and the Schuricke Trio; Records.  
3.20—"Superstitions"—Radio Scenes (Kuhlmann).  
4.0—To be announced.  
6.0—"Happy Childhood"—Sequence (Sattler).  
6.30—Luise Fietz and Willie Kopmann (Pftes). Sonata in G (Bach). Variations on a Haydn Theme (Brahms).  
7.0—News; Sports.  
7.30—Wind Band. Conductor: Humpert.  
9.0—Song of Love—Variety Concert. Fierke Quintet. Anita Spada (Entertainer). Wladimir Pogorelow (Balalaika), Schuricke

Trio, Horst Preusker (Compère). In the intervals, Records.  
10.0—News; Sports.  
10.30—See Deutschlandsender.  
12.0 m't.-3.0 a.m. (Monday)—See Hamburg.

### BRNO

922 kc/s (325.4 m.); 32 kW. Transmits at intervals from 6.30 a.m.  
10.0 a.m.—Opening of the Provincial Exhibition at Velké-Mezirici.  
10.30 a.m.—1.50 p.m.—See Prague.  
1.50—For Farmers.  
2.5-2.30—For German Farmers.  
3.10—Folk Songs by a Girls' Choir.  
3.30-5.35—See Prague.  
5.35—German Transmission: Talk: Mikulov Castle; For Farmers.  
6.10—Orchestra from Moravská-Ostrava.  
6.50—News in German.  
7.0-8.10—See Prague.  
8.10—Folk Music. Station Orchestra. Conductor: Bakala. Brno Vocal Quartet. Pek (Bagpipes).  
8.45—Talk.  
9.0-11.0—See Prague.

### BRUSSELS (No. 1)

620 kc/s (483.9 m.); 15 kW.  
5.0-5.10 a.m.—Homing-Pigeon Notes.  
6.30-9.0—Records; Gym; News.  
9.0—Records.  
10.0—Alexys Orchestra from the Théâtre de l'Alhambra.  
10.30—Debussy Recital by Mme Devos-Fischbach (Pfte.). Hommage à Rameau. Mouvement. L'isle joyeuse.  
10.45—Orchestra (contd.).  
11.0—Humorous Programme.  
11.10—Alexys Orchestra.  
11.30—Mime Maelfeyt-Rovies (Pierné and Satie Songs). Suite, Shéhérazade (Pierné).  
11.45—Alexys Orchestra.  
12.0 noon—Sketches on Records: (a) "Le meilleur moyen" (Pauley-Lindor), (b) "Hortense, couche-toi" (Courteline), (c) "Une réunion électorale" (Quinel-Pauley).  
12.10 p.m.—Orchestra. Conductor: Souris. Selection from "Show Boat" (Kern). Hallelujah (Youmans).  
12.30—Weather; Shipping.  
12.35—Records: Cabaret and Music-Hall Artists.  
12.45—Records: Light Music.  
1.0—News.  
1.10—Orchestra. Conductor: Souris. Overture, "Mozart" (Hahn). Selection, "The Prophet" (Meyerbeer). Ballet Music, "Les Fantoccini" (Lecocq).  
1.35—Art Notes.  
1.40—For Farmers.  
2.0-2.15—Goblet (Accordion).  
2.30—Records: Light Music.  
3.0—Records: "I Pagliacci" (Leoncavallo).  
4.0—Join ("Cello). Histoires (Ibert). Berceuse (Bazelaire). Cache-cache (Bazelaire).  
4.15—"Likeke"—One-Act Play in Dialect (Evrard).  
4.45—Records: "Le Bal de Béatrice d'Este" (Hahn).  
5.0—Records: Light Music.  
5.20—Report: The Walloon Rally at Waterloo.  
6.0—For Children.  
7.0—Religious Address.  
7.15—Record: Brigg Fair (Delius).  
7.30—News.  
8.0—Théodore Botrel Songs—M. and Mme Alberty with the Salon Orchestra. Conductor: Féron.  
8.45—Orchestra. Conductor: Souris. Renée Claude (Songs). Ferrari (Violin). Bemers (Saxophone). Petite suite médiévale (Tomasi). Songs: (a) Parle-moi en patois (de Buxeuil), (b) Dans ma petite maison (de Buxeuil), (c) J'aime (Régnier), (d) Larmes d'amour (Lenoir). Violin and Orchestra: Valse caprice (Saint-Saëns-Ysaye). Selection, "La vie parisienne" (Offenbach). Saxophone and Pfte.: Jugglery (Macker). Songs (Misraki, Soler, Emer). Six Ukrainian Pieces (Akimenko). March, "Carmen" (Bizet).  
10.0—News.  
10.10—Omer Orchestra from the "Boeuf sur le Toit."  
11.0-12.0 m't.—At the Casino—Records. Overture, "Phédre" (Massenet). Ninon (Tosti). Violin Concerto in A minor (Dvořák) by Yehudi Menuhin. Le pas d'armes du Roi Jean (Saint-Saëns). Ballet, "Marouf" (Rabaud).

### BRUSSELS (No. 2)

932 kc/s (321.9 m.); 15 kW. Programme in Flemish.  
6.30-9.5 a.m.—Records; Gym; News.  
9.5—Records: "I Pagliacci" (Leoncavallo) (Scala Recordings).  
10.15—Vaes (Cinema Organ).  
11.0—Wolfaert (Flute). Two Pieces (Pessard). Concertino in D (Chaminade). Humoresque (Sarly). Sicilienne (Bach). Selection, "L'Arlésienne" (Bizet).  
11.55—Review of Reviews.  
12.0 noon—Records.  
12.31 p.m.—Schnyders Orchestra.  
1.0—News.  
1.10—Schnyders Orchestra.  
1.30-2.0—Film Records.  
2.15—Commentary on the Floreffé Cycling Championships.  
2.30—Records: Suite (Fischer).  
2.45—Military Band.  
3.45—Records of Vladimir Rosing: Mussorgsky Songs.  
4.30—Jos Gevers (Recitations).  
4.45—Commentary on the Floreffé Cycling Championships.  
5.0—Records.  
5.15—Sports Results.  
5.30—Records. Second Symphony (Beethoven) by the Belgian National Orchestra. Conductor: Kleiber. Overture, "Faust" (Gounod). Conductor: Sir Thomas Beecham.  
6.15—Flemish Music. Radio Orchestra. Conductor: Douliez. Petit ballet (Candael). Valsez viennoises (Gilsou). Poème (D'Haeyer).  
6.45—Roman Catholic Address.  
7.0—Light Music by the Radio Orchestra. Conductor: Douliez.  
7.30—Film and Book Reviews.  
8.0—Music of Flemish Composers. I.N.R. Symphony Orchestra. Conductor: Franz André; I.N.R. Mixed Choir. Conductor: Grus. Declercq (Pfte.) and Van Schoeland (Songs). Symphonic Movement (Pool). Ballad (Van Durme). Concerto for Pfte. and Five Clarinets (de Brahander). Concerto (Maes).  
8.45—Report from a Homing Pigeon Cote.  
9.0—Music of Flemish Composers (contd.). Le pays (Karel Albert); Paraphrase on "Kol Nidrei" (Sternefeld). Solo Voice, Choir and Orchestra: Lofzang aan de haven (Baeyens).  
9.40—Records: Quartet in F (Haydn) by the Pro Arte Quartet.  
10.0—News.  
10.10—Dance Records.  
11.0-12.0 m't.—Rutten Orchestra from the Brasserie Torenkelder, Antwerp.

### BUCHAREST

823 kc/s (364.5 m.); 12 kW. Relayed by Radio-Romania, 160 kc/s (1,875 m.).  
7.30-8.50 a.m.—News, Music, etc.  
8.55—Religious Programme.  
10.30—For Peasants.  
10.50—Folk-Music.  
11.20—Hints for Peasants.  
11.40—Strajeri Choir.  
12.15 p.m.—Time; News; Sports.  
12.25—Predesco Orchestra.  
1.15—Time; News.  
6.0—Time; Weather; Medical Talk.  
6.17—Military Band.  
6.58—Sports Results.  
7.0—Radio Orchestra. Conductor: Rogalsky; Aida Helta (Songs).  
8.0—News.  
8.10—Orchestra, Songs (contd.).  
8.30—A Play.  
9.15—Records.  
10.0—Sports Results.  
10.15-12.0 m't.—Concert.

### BUDAPEST

546 kc/s (549.5 m.); 120 kW.  
9.30 a.m.—News.  
10.0—Roman Catholic Service.  
11.15—Protestant Service.  
12.30 p.m.—Opera Orchestra. Conductor: Rajter. Overture, "The Italian Girl in Algiers" (Rossini). Symphonic Poem, Phaëton (Saint-Saëns). Lyric Suite (Antalfy-Zsross). Oriental Dance (Fuchs). Finlandia (Sibelius). Siegfried Idyll (Wagner). Waltz, "Der Rosenkavalier" (Strauss).  
2.0—Records.  
3.0—For Farmers.  
3.45—Orchestra. Conductor: Bertha.  
4.30—Dr. Cecil Bognár.  
5.0—Imre Völgyi Cigány Band.  
6.0—Talk.

6.30—Ilonka Szabó (Songs).  
7.0—Dr. Sándor Eckhardt.  
7.30—Budapest Concert Orchestra. Conductor: Fridl. Children's Overture (Quilter). Peer Gynt Suite (Grieg). Sunset (Sámy). Two Arabesques (Debussy). Fantasia on Two Russian Themes (Glinka).  
8.20—Comedy (Peterdy).  
9.30—News.  
10.0—Buttola Jazz Band from the Piccadilly Restaurant.  
11.0—Csorba Cigány Band from the Café Szeifert.  
12.5 a.m. (Monday)—News.

**COLOGNE**

658 kc/s (455.9 m.); 100 kW.  
6.0 a.m.—See Hamburg.  
8.0—Weather; Water Level; Talk.  
8.15—Ernst Kaller (Organ) from Münster University.  
9.0—For Hitler Youth.  
9.30—Sunday Programme.  
10.15—Records.  
11.20—Heinrich Lersch Songs.  
11.30—Bach Choir of Cologne. Conductor: Schneider. Villanelle alla Napolitana (Donati). Barcarolle (Gastoldi). Eia (Othmayr). Einmal das Kind Cupido klein (Friedrich). Songs (Brahms): (a) Von edler Art, (b) Mit Lust tät ich ausreiten, (c) Bei nächstlicher Weil, (d) In stiller Nacht, (e) Die Wollust in dem Maien, (f) Ich fahr' dahin.  
12.0 noon—See Leipzig; at 1.0-1.10 p.m.—News; Greetings.  
2.0—Cologne Melodies.  
3.0—Orchestra. Conductor: Hagedstedt. Station Sextet and Schrammel Ensemble. Solo Accordion Band. In the intervals, Sports Reports.  
7.0—News.  
7.10—Gaden Dance Band on Records.  
7.35—Sunday Events and Sports.  
8.0—Variety Concert. Station Orchestra. Conductor: Breuer. Hans Salcher, Antonie Pütz-Fricke, Karl Urbach, etc.  
10.0—News.  
10.30—See Deutschlandsender.  
12.0 m't.-3.0 a.m. (Monday)—See Hamburg.

**DEUTSCHLANDSENDER**

191 kc/s (1,571 m.); 60 kW.  
6.0 a.m.—See Königsberg.  
8.0—Weather; Records; Talk.  
9.0—Herbert Fröhlich Band, Rolf Heide (Bass), Curt Hosemann (Cello), Felix Schröder and Herbert Jäger (Pftes.), Fritz Kröger (Duplephone) and Elmer Bantz (Comperé).  
10.0—Meditation.  
10.30—Dante (Liszt) by Waldo Favre Vocal Ensemble and the Berlin Philharmonic. Conductor: Andreae (Recorded).  
11.15—Weather.  
11.30—Erwin Schreck-Berger (Cinema Organ) from the Neue Philharmonie, Berlin.  
12.0 noon—See Munich.  
12.55 p.m.—Time; Greetings.  
1.10—Music from Munich.  
2.0—A Fairy Play.  
2.30—Portuguese Folk Songs and Dances (Recorded).  
3.0—Records: Favourite Melodies.  
4.0—See Königsberg.  
5.25—"Verloren an ein Saitenspiel"—Sequence after Josef Weinheber (Melichar). Carl Schmidt-Walter (Songs). Ludwig Andersen (Speaker).  
6.0—"Lohengrin" (Wagner) from Vienna: Berlin State Opera cast visiting Vienna.  
10.0—News; Sports.  
10.20—Report: The Cycle Tour of Germany—Tenth Lap, Frankfurt-Cologne.  
10.30 p.m.—12.55 a.m. (Monday)—Perpetuum mobile. Kaiser Dance Band, Krepela Sextet, The Metropole Singers and Lisel Koch. Records of Erwin Schreck-Berger (Wurlitzer Organ); at 10.45-11.0—Weather.  
12.55 a.m.—Time.  
1.6-2.0—Music from Frankfurt.

**FRANKFURT**

1,195 kc/s (251 m.); 25 kW. Relayed by Cassel, Coblenz, Freiburg and Trier, 1,195 kc/s (251 m.).  
6.0 a.m.—See Hamburg.  
8.0—Water Level; Weather.  
8.10—Roman Catholic Service from St. Emmeran's Church, Mainz.  
8.50—Records: Ballet Suites.  
9.30—Choral Concert from Nahstätten. Conductor: Geisler.  
10.0—See Königsberg.

10.30—Records. Overture, "Genoveva" (Schumann) by the Stuttgart Station Orchestra. Conductor: Buschköttler. Variations on a Mozart Theme (Reger). Conductor: Böhm.  
11.15 (from Coblenz)—Heinrich Lersch—Sequence (arr. Kremer). Hitler Youth Choir, String Quartet, Walter Lorenz (Baritone), Emma Sagebiel (Pfte.) and Peter Kremer and Erhard Steinke (Speakers).  
12.0 noon—See Berlin; at 1.0-1.10 p.m.—Report: The Cycle Tour of Germany.  
2.0—Sketch for Children (Frey).  
2.30—Records: Light Music.  
3.15 (from Freiburg)—"In the Glottal"—Folk Programme.  
4.0—Orchestra from Wiesbaden. Conductor: Vogt. Overture, "Preciosa" (Weber). Liebeslied and Wanderlied (Kämpf). Habanera and España from the Rapsodie espagnole (Chabrier). From the Fields and Groves of Bohemia (Smetana). Excerpts, "Der Trompeter von Säckingen" (Nessler). Suite, Jeux d'enfants (Bizet). Pesther-Walzer (Lanner). Selection, "The Tsarvitch" (Lehár). Overture, "Der Opernball" (Heuberger); at 5.0-5.20. Sports.  
6.0—"From Debreczin to Budapest"—Hungarian Dance and Light Music. Station Orchestra. Conductor: Hauck. Erwin Hartung (Refrains).  
7.0—Time; News.  
7.10—Hungarian Music (contd.).  
7.30—Sports.  
7.50—Report: The Cycle Tour of Germany, Tenth Lap, Frankfurt—Cologne.  
8.0—See Stuttgart.  
10.0—Time; News; Sports.  
10.25—Community Singing on the Römerberg (Recorded).  
10.40—Programme from Deutschlandsender.  
12.0 m't.-3.0 a.m. (Monday)—Serenade (Recorded). Part I. Light and Dance Music. Station Orchestra. Conductor: Hauck. Elfriede Draeger (Soprano) and Ottokar Smrtscheck. Part II. Light Classical Music. Conductor: Cuje.

**HAMBURG**

904 kc/s (331.9 m.); 100 kW. Relayed by Bremen, Flensburg, Hanover, Magdeburg and Stettin, 1,330 kc/s (225.6 m.).  
6.0 a.m.—Harbour Concert.  
8.0—News; Talk; Gym; Records.  
9.0—For Hitler Youth.  
9.30—Rading Quintet.  
10.15—Protestant Service from the University Church, Kiel.  
11.0—Topical.  
11.15—Records: Pfte. Concerto in C (Beethoven) by Walter Gieseking and the Berlin Opera Orchestra. Conductor: Rosbaud.  
11.45—Meditation.  
12.0 noon (from Flensburg)—Orchestra from "Deutsches Haus." Conductor: Thon. Overture, "The Daughter of the Regiment" (Donizetti). Waltz, Nordseebilder (Joh. Strauss). Preludes, "Carman" (Bizet). Selection, "Preciosa" (Weber). Ballet Suite, "Esmeralda" (Drigo). Orientalischer Zug (v. Blon). Overture, "Die Musikanten" (Plotow). Waltz, Lustige Brüder (Vollstedt). Song, "Boccaccio" (Suppé). Selection, "Coppélia" (Delibes). Suite "Juel-Frederiksen"; at 12.55 p.m.—Time; Weather.  
2.0—"De Fuurenboom"—Dialect Play for Children (Krönke).  
2.45—(from Flensburg)—Folk Music. Flensburg Chamber Choir. Conductor: Gallert. Gertrud Trenktrog (Pfte.).  
3.30—"Autoreisen fein, aber nur—allein!"—Humorous Play (Weissbach). Music by Keiper.  
4.0—See Saarbrücken.  
6.0—To be announced; at 7.0-7.10—News.  
7.30—Sports; Weather.  
8.0—Waltz Time and March Time—Heinemann Band. Regimental Band. Conductor: Knoch.  
10.0—News.  
10.15 (from Kiel)—Report: Kiel Week.  
10.30—See Deutschlandsender.  
12.0 m't.-3.0 a.m. (Monday)—Serenade. Part I. Popular Music. Station Choir and Orchestra. Conductors: Gregor and Richard Müller-Lampertz. The Berlin Pfte. Trio and Peter Igelhoff. Part II. Light Music. Station Orchestra. Conductor: Secker. Jungherr Accordion Band. Willi Althoff (Mandoline, Guitar and Banjo). Wolfgang Hattenbach (Pfte.).

**HILVERSUM (No. 1)**

160 kc/s (1,875 m.); 10 kW until 8.40 p.m.; 150 kW from 8.40 p.m. Also on Jaarsveld, 722 kc/s (415.4 m.); 17 kW.  
8.10-9.10 a.m.—KRO Religious Programme.  
9.10-11.55—NCRV Programme.  
9.10—Records: Sacred Music.  
9.30—Service from the Evangelical Church, Leeuwarden; Records of Sacred Music.  
11.55 a.m.-4.40 p.m.—KRO Programme.  
11.55—KRO Orchestra, Conductor: van 't Woud; Wessling (Pfte.). March (Meyerbeer). Two Pieces for Pfte. and Orchestra. Selection, "Fidelio" (Beethoven). Ave Maria (Gounod). Czardas (Grossmann). Sons of the Brave (Bidgood). Overture, "The Black Domino" (Auber). Rundgesänge (Hellmesberger). Serenade (Davidoff). Eine kleine Dorfgeschichte (Bund). March (Friedmann); at 12.40-1.0 p.m.—Literary Talk.  
1.30—Talk; Letter-box; Records.  
2.30—Records and Talk.  
3.10—KRO Melodists. Conductor: Lustenhouwer.  
4.10—For Hospitals; Records.  
4.45-7.25—NCRV Programme.  
4.45—Herzog (Organ). Prelude and Triple Fugue in E flat (Bach). Andante (Franck). Sonata on a Choral (Lange). Choral (Franck). Fantasia.  
5.40—Service from the Juliana Church, The Hague; Records of Sacred Music.  
7.25 till Close—KRO Programme.  
7.25—Sports Notes; Talk.  
7.50—News; Records.  
8.10—Melody and Rhythm—KRO Orchestra, Conductor: van 't Woud; KRO Melodists, Conductor: Lustenhouwer; Klein (Refrains).  
9.10—Royal Palace Guards Band. Conductor: Capt. Walther Boer. March (Grieg-Linden). Polonaise (Liszt-Bouwman). March (Lauwerjns). Selection, "The Three Bears" (Coates). The Stars and Stripes (Souza). Selection, "The Daughter of the Regiment" (Donizetti-Blumentritt).  
10.10—News.  
10.20—Choral Epilogue.  
10.40-11.10—Esperanto Talk.

**HILVERSUM (No. 2)**

995 kc/s (301.5 m.); 10 kW until 8.40 p.m.; 60 kW from 8.40 p.m.  
8.35-9.40 a.m.—VARA Programme.  
8.35—Records.  
8.40—Homing-Pigeon Notes.  
8.45—Gardening Talk.  
9.10—Records.  
9.20—Talk by M. Pleysier.  
9.30—Homing-Pigeon Notes.  
9.40-11.40—VPRO Programme.  
9.40—For Children.  
10.10—Service from the Mennonite House, Elspcet.  
11.30—Talk by Mlle. Oosting.  
11.40 a.m.-4.40 p.m.—AVRO Programme.  
11.40—Time; Motto; Top. Naeff (Songs).  
11.45—Film Review.  
12.10 p.m.—Aeolian Orchestra; Cobi van der Pas Middelraad (Songs).  
12.55—Records.  
1.10—Palla (Organ).  
1.40—Weekly Book Talk.  
2.10—Male Voice Choir.  
2.40—Concert from the Kurhaus, Scheveningen. The Hague Orchestra. Conductor: Ignaz Neumark; Alannah Delias (Pfte.). Overture, "The Hebrides" (Mendelssohn). Pfte. Concerto in G (Mozart). The Enchanted Lake (Lyadov). Selection, "The Tales of Tsar Saitan" (Rimsky-Korsakov). Letzter Frühling (Grieg). Minuet, Dance of the Sylphs and Hungarian March (Berlioz). In the interval, Records.  
4.10—Records; Sports.  
4.40-7.40—VARA Programme.  
4.40—Records.  
5.40—Orchestra. Conductor: Silbermann.  
6.10—Sports Review.  
6.30—Report on the International Chess Tournament at Noordwijk; Records.  
6.40—"Ramblers" Dance Band, "Esmeralda" Septet and Recitations.  
7.40 till Close—AVRO Programme.  
7.40—Time; News.  
7.55—Kovacs Lajos Orchestra; Palla (Organ).  
8.40—A Play.  
9.10—Tino Rossi (Tenor).  
9.55—Talk.  
10.5—Radio-Journal.  
10.20—Records.

**SUNDAY (June 19)**

10.30—Chess Notes.  
10.40—News.  
10.50-11.40—AVRO Orchestra, Conductor: Treep.

**KALUNDBORG**

240 kc/s (1,250 m.); 60 kW. Relays Copenhagen, 1,176 kc/s (255.1 m.).  
8.0 a.m.—Gym; Weather.  
8.45—French Talk: "L'échec de Gustave Weil."  
9.0—German Talk: Benzin und Gummi aus Kohle.  
9.15—English Anecdotes and Conversation.  
9.30—Carillon and Fanfare from Grøndahl Church Tower.  
10.0—Service from Grøndahl Church.  
11.28—Weather; News.  
12.0 noon—Radio Orchestra, Conductor: Grøndahl. Overture, "Le maçon" (Auber). Zorahayde (Svendsen). Die Schönbrunner (Lanner). Cradel Song (Gislason). Polonaise, "Struensee" (Meyerbeer). Molly on the Shore (Grainger). Vid Frösö kyrka (Peterson-Berger). Sommarsang (Peterson-Berger). March, "Der arme Jonathan" (Millöcker). Symphonic Rhapsody (Ludolf Nielsen). Prelude to Act II, "Dyveke" (Bartholdy). Efteraarssang (Sandby). Excerpt, "Gaucho" (Reesen). Vinterdag (Glass). I Høsegaarden (Glass). El Capitan (Souza); at 12.50 p.m.—Reading (Fischer).  
2.0—Danish Missionary Society's Golden Jubilee, from Aalborg.  
3.20—Choral Festival from Fredericia. Address by Frans Hansen. Folk Song; Vort Modersmaal er dejligt. Der er et yndigt Land (Nielsen). Der vokser Skov paa Heden (Ring). Fædrelandssang (Jacobsen). Spillemaendene (Jacobsen). Frydeligt with Jubelkor (Nielsen). Hvor klart dog Stjerner ses i Nat (Hamburger). Jeg ser de bagelyse Oer (Aagaard). Folk Songs: (a) Vaegtterserv, (b) Lad vaje højt vort Kongeflag, Danmark, i tusind Aar (Nielsen).  
4.15—Open-air Band, Conductor: Hye-Knudsen. Fantasia, South Jutland (Hansen). Waltz, Crown Princess Ingrid (Hye-Knudsen). Flaget (Rygaard). Gurre (Rung). March, Prince Frederick (Schmidt). Ten minutes interval. Cadets March (Souza). Kaiserwalzer (Strauss). Overture, "Poet and Peasant" (Suppé). Selection, "Tales of Hoffmann" (Offenbach). Polka (Kling). Lørdagsvalsen (Johanson). March of the Tin Soldiers (Jessel).  
5.50—Report: The Danish Derby at Klampenborg.  
6.5—Records: "The Dubarry" (Millöcker-Mackeben).  
6.20—Talk: Country Holidays for Viennese and Copenhagen Children.  
6.50—Weather; News.  
7.30—Talk: Julius Lange.  
8.0—"The Hansens"—Sketch (Locher).  
8.15—Radio Orchestra, Conductor: Tuxen. Overture, "A Night in Venice" (Strauss). Mein Lebenslauf ist Lieb und Lust (Strauss). Ballet, "La belle Hélène" (Offenbach). Waltz, "Die Kaiserin" (Fall). Spring Suite (Coates). Selection, "Tiptoes" (Gershwin).  
9.15—"An Afternoon with Johan Herman Wessel"—Sequence.  
9.45—Variety with the Golden Blonde.  
10.0—News.  
10.15—Serenade. Radio Orchestra. Conductor: Tuxen. Movements from the Serenade in D (Mozart). Overture, "Rosamunde" (Schubert). Allegro molto and Rondo from the Serenade in D (Brahms).  
11.15 p.m.-12.30 a.m. (Monday)—Peterson Dance Band; at 12.0 m't.—Chimes.

**KÖNIGSBERG (Heilsberg)**

1,031 kc/s (291 m.); 100 kW. Relayed by Danzig, 1,303 kc/s (230.2 m.).  
6.0 a.m.—Börschel Band, Peasant Band and Heinrich-Albert Choir.  
8.0—"Was eine Bäuerin einst schrieb"—Sequence (Ruth Geede).  
8.30—Records.  
9.10—Protestant Service.  
10.0—For Hitler Youth.  
10.30—For Young People.  
10.40—Weather; Topical.  
11.0—Demonstration in Connection with the East Prussian Party Congress.

1.0 p.m.—Station Orchestra. Conductor: Brückner.  
2.0—Chess.  
2.30—Variety.  
3.15—Fairy Story.  
3.45—Topical.  
4.0—Light Music. Station Orchestra. Conductor: Wilcken. March, Gross-Deutschland (Koch). Fest-Ouverture (Hartung). Waltz, Von Land zu Land (Löhrl). Suite, Im Variété (Scheibe). Minuet (Eilers). Sicilian Serenade (Winkler). Selection, "The Land of Smiles" (Lehár). Diavoletta (Lindemann). Dance Rhapsody (Knümann). Waltz, Deutsche Grösse (Jos. Strauss). March, Schützen des Friedens (Lutz). In the intervals, Echoes of the Sports Contests in connection with the East Prussian Party Congress.  
6.0—Topical Report.  
6.30—Comrade, where are you?—Programme for Ex-Servicemen.  
7.0—News; Weather.  
7.10—Records: Marches.  
7.45—Echoes of the East Prussian Party Congress.  
8.0—Station Orchestra and Börschel Band.  
10.0—News; Weather.  
10.15—See Hamburg.  
10.20—Echoes of the Sports Contests in Connection with the Party Congress.  
10.40—Programme from Deutschlandsender.  
12.0 m't.-3.0 a.m. (Monday)—See Hamburg.

**LEIPZIG**

785 kc/s (382.2 m.); 120 kW. Relayed by Dresden, 1,285 kc/s (233.5 m.).  
6.0 a.m.—See Hamburg.  
8.0—Protestant Service.  
8.30—Austrian Music by Georg Winkler (Organ).  
9.0—Literary and Musical Programme.  
9.45—Hitler Youth Band.  
10.15—Records: Light and Dance Music.  
11.30—Reports: Students' Day in Central Germany.  
12.0 noon (from Dresden)—Dresden Orchestra. Conductor: Merten. Hans Richter-Haaser (Pfte.). Carnival Overture (Dvořák). Pfte. and Orchestra: Spanish Rhapsody (Liszt-Busoni). Styrian Dances (Holenia). German Dances (Schubert-v. Webern). Overture, "The Thieving Magpie" (Rossini). Overture, "A Night in Venice" (Strauss). Pfte.: Hungarian Dances (Brahms). Ballet Music, "Ritter Pasman" (Strauss). Waltz, "Gipsy Love" (Lehár). Overture, "The Vintager's Bride" (Nedbal). Teufelstanz (Hellmesberger).  
2.0 p.m.—Time; Weather.  
2.5—Classical Records. Overture, "Euryanthe" (Weber), by the Berlin Opera Orchestra. Conductor: Max v. Schillings. Ecossaises (Beethoven), by Wilhelm Kempff (Pfte.). Erlkönig (Schubert), by Heinrich Schlusnus. Moment musical (Schubert) by Casals (Cello). Scherzo from the Third Symphony in D minor (Buckner), by the Vienna Symphony Orchestra. Conductor: Konrath. Hungarian Rhapsody No. 2 (Liszt), by Wilhelm Backhaus (Pfte.). Fourth Movement from the Fifth Symphony (Tchaikovsky), by the Concertgebouw Orchestra. Conductor: Mengelberg. Songs (Wagner), by Tiana Lemnitz: (a) Schmerzen, (b) Träume. Prelude to Act III, "The Mastersingers" (Wagner), by the Berlin Opera Orchestra. Aria, "The Mastersingers" (Wagner), by Paul Schöffler and the Leipzig Symphony Orchestra. Conductor: Hilmnar Weber.  
3.10—Fairy Tales.  
3.30—Quintet in D minor (Kleemann), by the Leipzig String Quartet and Theodor Blumer (Pfte.).  
4.0—See Saarbrücken.  
5.30—Handball Match Report.  
6.0—"Lied über Deutschland"—Sequence (Eva Kuhn and Ernst Kochan), by a Hitler Youth Ensemble.  
6.30—Football Match Report.  
6.45 (approx.)—Report: The International Tennis Tournament at Leipzig.  
7.0—News.  
7.10—Cabaret with Annemarie Hentzschel (Songs), Fred Dömpe (Bandonion), Wladimir Pogorelow

## SUNDAY (June 19)

(Balalaika), Fritz Bendel (Xylophone), and Heinz Munkel (Pfte.).

8.0—Leipzig Kaleidoscope. Station Choir and Leipzig Symphony Orchestra. Conductor: Kretzschmar. Edith Hasselmann (Soprano). Leonore Eichhorn (Contralto). Paul Reinecke (Tenor). Siegfried Niemann (Compère).

10.0—News; Sports.

10.30—See Deutschlandsender.

12.0 m't.-3.0 a.m. (Monday)—See Hamburg.

## LILLE (Radio PTT Nord)

1,213 kc/s (247.3 m.); 60 kW. Transmits at intervals from 6.55 a.m. 4.45 p.m.—Concert.

5.30—Chopin Pfte. Recital from Alpes-Grenoble.

6.30—Records: Military Music and Songs.

6.50—Talk: Careers.

7.0—See Paris (Radio-Paris).

7.30—Radio Journal; Weather.

8.0—Records of Clara Clairbert.

8.9—Sports; Dance Records.

8.30—Station Orchestra. Liliane Yvens (Songs). Duminy (Baritone). Overture, "Preciosa" (Weber). Canzonetta from the Concerto romantique (Godard). Suite à l'antique (de Tacye). Ballet, "Hérodiade" (Massenet). Songs: (a) Aubade d'amour (Monti), (b) Indian Love Call, "Rose Marie" (Friml), (c) J'ai rêvé d'un amour (Pesse), (d) Aria, "Le Roi d'Ys" (Lalo). Piece (Weninger). Selection, "Lohengrin" (Wagner). Paysages normands (Sporek). Sérénade (Soret). Baritone: (a) Aria, "Rigoletto" (Verdi), (b) Les trois Hussards (Liaunet), (c) Le fou de Notre-Dame (Desmoullins). Monôme d'étudiants (Casadesus). Suite bergamasque (Debussy). Selection, "Mignon" (Thomas). Bosnian Dance (Balceron).

10.30 (approx.)—News.

## MONTE CENERI

1,167 kc/s (257.1 m.); 15 kW. 10.30 a.m.—Records. In the intervals, Commentary on the "Round the Houses" Motor-Cycle Race.

11.30—Bible Reading.

12.0 noon—Band from Chiasso; at 12.30 p.m.—News.

1.0-1.30—Records: Verdi Opera Arias.

6.30—Nino Herschel (Harpisichord). Fantasia (Bach). Variations (Sweetlink). Suite (Handel). Sarabande and Minuet (Bach). The Egyptian (Rameau).

7.0—Sports; Records.

7.50—News.

8.0—"Passaggio a Livello"—Play (Ferioli).

9.0—Guido Agosti (Pfte.). Two Chorals (Bach-Busoni). Pathetic Sonata in C minor (Beethoven). La soirée dans Grenade (Debussy). Feux d'artifice (Debussy); at 9.20—Eugenio Montale reads his Poems.

9.45-10.15—Records: French Sailor Songs.

## MOSCOW

172 kc/s (1,744 m.); 500 kW. 12.30 p.m.—Talks (Italian, Swedish).

5.0—Music; News; Talks.

9.30—News; Kremlin Chimes.

10.0—Talks (English, French).

12.0 m't.—Talks in Spanish.

## MUNICH

740 kc/s (405.4 m.); 100 kW. Relayed by Nürnberg, 1,267 kc/s (236.8 m.).

6.0 a.m.—See Hamburg.

8.0—Roman Catholic Service.

8.30—Hans Kunz (Baritone), Günther Küssbauer (Pfte.).

9.0—Records.

10.0—Address and Music.

10.30 (from Nürnberg)—Folk Music. Military Band. Conductor: Lobenhofer. Esche Choir. Else Baumann (Contralto). Gretel Alt (Songs to the Lute). The Kriegers (Songs). Gustl-Dengler (Accordion). The Günthers (Recorders). In the interval, Report: Rhön Woodcutters (Recorded).

12.0 noon—Military Band from the Feldherrnhalle.

12.55 p.m.—Time; Weather.

1.0 (from Augsburg)—Orchestra. Conductor: Herre. Menzel (Harp).

3.0-3.30—"Rübezahl geht einmal tanzen"—Play after an Old Silesian Legend (Dolata) (Recorded).

3.45—A Painter wanders through the Alps—Reminiscences of Ludwig Richter.

4.0—See Saarbrücken.

6.0 (from Augsburg)—Oberstdorf Guides at the Microphone.

7.0—Time; News; Weather.

7.10—Baier Instrumental Double Quartet.

7.40—Sports.

7.45—Report: The Storm-Troopers' Summer Sports at Bad Tölz.

8.0—Russian Opera Excerpts. Station Choir and Orchestra. Conductor: Winter. Hans Decker, Annemarie Bischoff, Wilhelm Hezel, Martha Martensen, Anton Gruber-Bauer, etc. "The Queen of Spades" (Tchaikovsky), "The Fair at Sorochintsi" (Mussorgsky), "Kashtchei the Deathless" (Rimsky-Korsakov), and "Prince Igor" (Borodin).

10.0—Time; News; Sports.

10.30—See Deutschlandsender.

12.0 m't.-3.0 a.m. (Monday)—See Hamburg.

## NAPLES GROUP

Naples (No. 1), 1,104 kc/s (271.7 m.); 10 kW. Florence (No. 1), 610 kc/s (491.8 m.); Rome (No. 3), Bari (No. 2), Milan (No. 2), Turin (No. 2), and Genoa (No. 2), 1,357 kc/s (221.1 m.).

8.30 a.m.-2.15 p.m.—See Rome Group.

4.30—"Don Pasquale" (Donizetti) (Recorded). In the interval, Talk and Sports. After the Opera, Sports.

7.0—Lucca Dopolavoro. Mandoline Band. Overture, "Nebuchadnezzar" (Verdi). Suite marinara (Amadei). Selection, "Fedora" (Giordano). Overture, "Le maschere" (Mascagni).

7.25-8.30—See Rome Group.

8.30—"Il re della graticola"—Folk Play (Bonelli), Music by Cremonini.

9.0—Light Music.

9.20—"At the White Cat"—Song Revue.

10.0 (approx.)—Dance Music.

11.0-11.55—News; Dance Music.

## OSLO

260 kc/s (1,153.8 m.); 60 kW. Relayed by Fredrikstad, 722 kc/s (415.4 m.); Hamar, 519 kc/s (578 m.); Notodden, 1,357 kc/s (221.1 m.); Porsgrund, 850 kc/s (352.9 m.); Rjukan, 1,348 kc/s (222.6 m.); and Trondelag, 629 kc/s (476.9 m.).

4.0 p.m.—Variety Concert.

5.5—Norwegian Folk Music by Haugerud (Hardanger Fiddle) and Brekke (Songs).

5.55—Talk.

5.55—Turkish Music. Conductor: Naess.

6.55—News; Talk.

7.30—Station Orchestra. Conductor: Kramm. Overture, "Orpheus in the Underworld" (Offenbach). Variations on a German Folk Song (Ochs). Solveig's Song (Teilmann). Potpourri (Morena).

8.10—Report on Records.

8.30—Community Singing with the Station Orchestra. Conductor: Kramm.

9.0—Play.

9.15—Waldemar Johnsen (Songs). Songs (Schumann): (a) Widmung, (b) Du bist wie eine Blume, (c) Mondnacht, (d) Die beiden Grenadiere—Schubert: Am Meer and Ständchen.

9.40—News; Sports Notes.

10.15-10.50—Dance Music.

## PARIS (Eiffel Tower)

1,456 kc/s (206 m.); 7 kW. Transmits at intervals from 7.30 a.m. 3.15 p.m.—Lucien Verroust (Songs), Maillard - Verger (Pfte.) and Jacques Quesnel (Violin). Sonata (Debussy). Pfte.: Three Preludes (Debussy). Les Saintes du Paradis (Déré). Violin: (a) Berceuse (Moret), (b) Slav Song and Dance (Moret). Pfte.: Two Preludes (Tournemire). Les harmonies intimes (Lesur). Excerpts, "A l'amie perdue" (Dupré).

4.30—Records.

4.45—See Lille.

5.30—Chopin Pfte. Recital from Alpes-Grenoble.

6.30—Jany Delille (Songs) and Gisèle Kuhn (Pfte.).

7.0—Orchestra from Toulouse (PTT).

7.30—Radio Journal; News.

8.0—Janine Andrade (Violin) and Eliane Magnan (Cello). Il Piastor Fido (Vivaldi-Bazelaire). Sonatine (Rivier).

8.30—Variety Programme by Ex-Servicemen: "Parpagnol craint l'hiver"—One-Act Comedy (Baudin - Brisart); "Monsieur, Madame, et l'autre"—Sketch (José de Bérlys-Léon Granier); Bouillon Band.

10.30—Records.

11.0-11.15—News; Weather.

## PARIS (Poste Parisien)

959 kc/s (312.8 m.); 60 kW. Transmits at intervals from 8.0 a.m. 8.45 a.m.—The French Cycling Championships—Report by Georges Briquet from Monthéry.

9.0—Records: Light Music.

11.0—Programme presented by Jacques Breteuil.

11.40—Letter-box; Announcements.

12.5 p.m.—The French Cycling Championships: The Start—Report by Georges Briquet from Monthéry; Records.

12.30—News.

12.35—"Si je gagnais les cinq millions," with Robert Darthez.

12.52—Amusement Guide.

12.55—The Treasure Hunt, with Pierre Dac.

1.10—Vocal Quintet, with Raymond Souplex and Jane Sourza.

1.45—Talk: Yolanda.

2.0—News; Records.

4.15—The French Cycling Championships: The Finish—Report from Monthéry.

4.30—Records: "Samson and Delilah" (Saint-Saëns).

5.0—Records: Light Music.

7.0—News; Racing; Sports.

7.30—Racing; Band Records.

8.0—Topical Review.

8.5—Les Frères Jacasse.

8.10—Song Records—Massenet, Fauré (Duparc).

8.20—"Gibier de Potence"—One-Act Comedy (Feydau), with Charles Dechamp, etc.

8.45—"La bonne histoire".

9.0—Amateurs' Programme.

9.50—News.

10.0—Cabaret.

10.30—Records: Light Music.

11.30—News.

## PARIS (PTT)

695 kc/s (431.7 m.); 120 kW. 7.0 a.m.—News; Records.

7.45-8.30—News; Records.

9.0—For Farmers; Records.

10.0—Laurent Orchestra; at 10.30—Sound News; Sports.

11.45—Talk.

12.0 noon—Andolfi Orchestra. Suite pittoresque (Pessard). Extase (Ganne). Sérénade à Paussillipe (Andolfi). Negro Lullaby (Clutsam). Selection, "The Gipsy Baron" (Strauss). Entr'acte Pizzicati (Thomé). Pieces (d'Ambrosio): (a) Gavotte and Musette, (b) Réve, (c) Napoli. Scherzo (Raff). Waltz, An der schönen grünen Narenta (Komzak). Romance in F minor (Tchaikovsky). Fantasia on Hungarian Dances (Brahms-Lotter); at 12.45 p.m.—News; and at 1.15—Christiane Gaudel (Songs).

2.0—"Boumpernikel"—Play in Three Acts (Variot).

4.0—"Street Scenes in Paris a Century Ago"—Radio Fantasy (Champigneulle), with Germaine Corney, Jane Morlet, Suzanne Perrault, Camus and René Hérent.

4.45—Dance Records.

5.0—Commentary on the International Football Cup Final from Colombes Stadium.

7.0—Radio Journal; News.

8.0—"Les Frères Jacques" present Gretl Vernon.

8.30—Plays: (a) "Le tragique mystère de Verdun (1792)" (Lespine); (b) "La mort due Duc d'Enghien" (Hennique).

10.30—News; Dance Records.

11.0—See Paris (Radio-Paris).

## PARIS (Radio-Paris)

182 kc/s (1,648 m.); 80 kW. 6.50 a.m.—Programmes; Records.

7.15—Time; News; Gym; Records.

8.0—News; Press Review.

8.30—German Lesson.

8.45—Book-keeping Lessons.

9.15—Talk: China.

9.30—English Lessons.

10.10—Spanish Lesson.

10.30—Italian Lessons.

11.0—See Prague.

12.0 noon—Roman Catholic Address by the Rev. Fr. Gicqueau.

12.20 p.m.—Litaize (Organ). L'apparition de l'Eglise éternelle (Messiaen). Intermezzo pastoral (Litaize). Stèle pour un enfant défunt (Vierne). Hymne d'actions de grâces (Langlais).

12.40—Goldy Band.

1.0—Time; News.

1.15—Goldy Band.

1.30—Yvonne Guillet (Songs).

1.45—Goldy Band.

2.0—Sound News.

2.10—For Children: "Ida la Sauvageonne"—Opératta (Marie-Antoinette de Miollis), with Félix Bellet as Père François.

3.0—Gras Orchestra. Alsatian March (Staz). Sérénade provençale (Lavagne). Oh! si les fleurs avaient des yeux (Massenet). Selection, "Le Postillon de Longjumeau" (Adam). Scènes alsaciennes (Massenet).

3.30—Commentary on the "Grand Steeple-Chase" from Auteuil.

4.30—"Les Compatriotes"—One-Act Play (Monnier).

5.30—Sevrane (Songs).

5.45—Regor (Songs).

6.0—Records: Les Songs (Milhaud). Conductor: The Composer.

6.15—Eddie Foy Band.

7.0—"Le Guet-Apens"—Detective Play (Cossin) with the Author as Marcel.

7.30—Radio-Paris Guignol by Bilboquet and Company: "Un petit voyage d'agrément" (Crozière). In the interval, Polichinelle.

7.59—Time; Home Affairs.

8.0—Foreign Affairs.

8.15—Lyane Mayrève (Songs).

8.30—Symphony Concert. Conductor: Bruno Pleier. Denyse Bertrand (Violin), Marcelle Gérard, Souchal and Jean Hazart. Symphony in C (Mozart). Violin and

Bartered Bride" (Smetana). Triumphant March (Glazunov).

5.45—Talk.

6.0—Moravská-Ostrava Station Orchestra and a School Choir (Recorded).

6.30—Brno Station Orchestra, Visváry (Violin), etc. (Recorded).

7.0—News; Weather; Topical.

7.20—Sokol Notes.

7.25—"Harvest-time"—Music, Songs and Literature.

8.10—See Brno.

8.45—Talk: Prague Sixty Years Ago.

9.0—Orchestra from Kosice.

9.55—News; Racing Results.

10.35-11.30—Records.

## RADIO EIREANN

565 kc/s (531 m.); 100 kW. Relayed by Dublin, 1,348 kc/s (222.6 m.); and Cork; 1,235 kc/s (242.9 m.).

1.30-3.0 p.m.—Records.

5.30—Fairview Church Choir.

6.0—Programme of Contrasts—Records. Hungarian Dances (Brahms). Spanish Dances (Granados). German Dances (Mozart).

6.35—Variety Programme in Irish—Cumann Liteardha Corcaigh.

7.35—Louis Lee's Accordion Band, with Songs.

8.15—Tell us your Grievance—Programme compered by Roger McHugh.

8.45—Dublin Metropolitan Ceilidhe Band relayed from the Carnival, Richmond Park.

9.30—Variety Programme.

10.30—News.

10.45—Gaelic Sports Talk by Sean O'Ceallachain.

11.0—National Anthem.

## RADIO-NORMANDIE

1,411 kc/s (212.6 m.); 15 kW. 7.10 a.m.—Call.

7.15—Press Review; News.

7.45—Service from All Saint's Church, Rouen.

8.0—March of Melody.

8.15—Time; Breakfast with Music.

8.30—Songs we know them by.

8.45—George Formby and Beryl with John Firman's Orchestra.

9.0—Time; Light Music.

9.15—The Music Box.

9.30—Felix Mendelssohn's Orchestra with Muriel Kirk and Ronald Sherwood.

9.45—Fun Fair, with Fred Douglas, Wyn Richmond, Barrel-Organ arrangements by Signor Pesarani.

10.0—Waltz Time—Billy Bissett's Waltz Time Orchestra, Hugh French, Esther Coleman and the Waltz Timers.

10.15—Carson Robison and his Pioneers.

10.30—Eddie Pola (Pfte.).

10.45—Family Favourites.

11.0—Time; Donald Peers—Cavalier of Song.

11.15—Radio Parade with Wyn Richmond, Wilfrid Thomas and Bobby Howell's Band. Compered: Eddie Reinhart.

11.45—Report: The 24-hour Motor Cycle Race at Le Mans.

12.15 p.m.—Excerpts, "L'enfant de troupe" (Jane Bos).

12.30—News.

12.40—Roman Catholic Address.

1.0—Request Music.

1.30—Les Allen, Paula Green, Arthur Young, and Reginald Foresythe (Pfte.).

2.0—Billy Cotton and his Band with Fred Duprez, Peter Williams, Alan Breeze and Jack Doyle.

2.30—Phil Park (Organ).

2.45—The Open Road.

3.0—Serenade to Melody, with Jack Jackson and his Orchestra, Barbara Back and a Star of Tomorrow.

3.30—The Gaieties, with Leslie Henson, Roy Royston, Ginger Matthews, Yvonne Orner, George Neil, Rob Currie and the Gaiety Rhythm Boys.

3.45—Report: The 24-hour Motor Cycle Race—The Arrival at Le Mans.

4.15—Picture House with Hughie Green, Beatrix Lehmann, Vic Oliver, Georges Metaxa, Niela Goodelle, Al Bowly, Jack Raine, the Rhythm Brothers, the Voice of Walt Disney and Orchestra. Conductor: Debroy Somers.

5.0—Backstage with Sir Seymour Hicks, Jean Colin, Denis Van Thal and his West End Theatre Orchestra, etc.

5.15—Carroll Lewis and his Radio Discoveries.

5.30—Hutch—Romantic Singer.

5.45—Variety with Uncle George, Helen McKay and Johnnie Johnston.

6.0—Harold Ramsay (Organ).



Exclusive "World-Radio" Picture

Mme. Janine Crispin, who takes the part of Fanny in "Les Compatriotes" (Radio-Paris 4.30 p.m.)

Orchestra: Ballad (Bachelet). Spanish Rhapsody (Albeniz). Edmond et Calixte (Madeleine Perissas); at 9.30—News; Press Review.

10.35—Sound News.

10.45—Time; News.

11.0—Bouillon Dance Band.

1.0 a.m. (Monday)—Programme Notes.

## PRAGUE

638 kc/s (470.2 m.); 120 kW. 6.30 a.m.—Records; News.

7.0—Orchestra from Podebrady.

8.0—Police Messages.

8.10—Sokol Gymnastics.

8.40—Meditation; Record.

9.0—For Workers; Sketch.

9.30—Report: Sokol Olympic Games, 1938—the March through Prague.

9.45—Records.

10.0—Opening of the Provincial Exhibition at Nachod.

10.30—Czech Women and the Baroque Period—Talk and Reading.

11.0—Mass of St. Wenceslas (Michna of Otradovice) from St. Nicholas' Church.

12.0 noon—Chimes: Press Review.

12.25 p.m.—FOC Orchestra, Sroubek (Violin), Station Choir, etc. (Recorded).

1.50—For Farmers.

2.5-2.30—Records.

3.30—Commentary from the Sokol Stadium: Sokol Olympic Games.

4.40—Brass Band Records.

5.0—One-Act Comedy (Chekhov-Kares).

5.15—FOC Orchestra, Conductor: Parik, Station Choir, Conductor: Kühn, and the Ondrick Quartet (Recorded). Waltz, "Eugene Onegin" (Tchaikovsky). Andante cantabile from the String Quartet (Tchaikovsky). Excerpts, "The

6.15 — Showland Memories — A Musical Cavalcade of Theatre-land Past and Present with Webster Booth, Olive Groves and the Showlanders.  
 6.30 — Radio Revue with Jack Hylton, etc.  
 7.0 — The Ace of Hearts Orchestra.  
 7.15 — The Biggest Little Programme, with Louise Brown, Billy Scott-Coomber, Monia Litter and Evelyn Corry.  
 7.30 — News; Sports Notes.  
 8.0 — Concert.  
 9.0 — Humorous Items.  
 9.50 — Talk.  
 10.0 — Radio Normandie Calling — Alfredo and his Gipsy Band, Joe Young and Company, Belles of Normandy, Marie and Laura Carson and Maimie Weldon. Compère: Roy Plomley.  
 10.30 — John Goodwood; Music.  
 10.45 — Bohemian Holiday.  
 11.0 — Film News and Music.  
 11.15 — From the Hill-Billy Cabin.  
 11.30 — Normandie Playbill — Announcements; Music.  
 11.45 — Sweet Music.  
 12.0 m't. — Melody at Midnight.  
 12.30-1.0 a.m. (Monday) — Time; Dance Music.

**RENNES-BRETAGNE**  
 1,040 kc/s (288.5 m.); 120 kW. Transmits at intervals from 7.0 a.m.  
 3.15 p.m. — "Quatre fois sept, vingt-huit" — Play in Three Acts (Coolus).  
 5.0 — See Paris (PTT).  
 7.0 — News; Sports; Records.  
 8.0 — See Paris (PTT).  
 8.30 — To be announced.  
 10.30 (approx.) — News; Concert.

**ROME GROUP**  
 Rome (No. 1), 713 kc/s (420.8 m.); 120 kW. Bari (No. 1), 1,059 kc/s (283.3 m.); Palermo, 565 kc/s (531 m.); Bologna, 986 kc/s (304.3 m.); Naples (No. 2), 1,348 kc/s (222.6 m.).  
 8.30-8.50 a.m. — Time; News.  
 9.15 — For Soldiers.  
 10.0 — For Farmers.  
 11.0 — Mass from the Basilica of the Annunciation, Florence.  
 12.0 noon — Bible Reading.  
 12.20 p.m. — Sports; Choir.  
 1.0 — Time; News.  
 1.15 — A Competition.  
 1.45-2.15 — Records: Light Music.  
 5.0 — Band. Conductor: Marchesini. Overture, "Torvaldo e Dorlika" (Rossini). Selection, "Romeo and Juliet" (Bellini). The Flight of the Bumble Bee (Rimsky-Korsakov). March, Il castello di Macallé (Marchesini); at 5.45 — Sports; Weather.  
 6.30-6.45 — Sports; Records.  
 7.25 — Sports; Light Music.  
 8.0 — News; Talk; Music.  
 8.30 (Palermo and Naples (No. 2)) — Light Music.  
 9.0 — "The Barber of Seville" (Rossini). Conductor: Previtali. Chorus Master: Costantini. Cast: Giovanni Manurita, Luigi Bernardi, Lina Pagliughi, Carlo Tagliabue, Nicola Moscona, Agnese Dubbini. In the intervals, Topical Talk; Talk in Danish; News. After the Opera, Dance Music.

**SAARBRÜCKEN**  
 1,249 kc/s (240.2 m.); 17 kW. Relayed by Kaiserslautern, 1,429 kc/s (209.9 m.).  
 6.0 a.m. — See Hamburg.  
 7.50 — Topical.  
 8.0 — Roman Catholic Service.  
 8.30 — Time; Variety Records.  
 9.0 — Beautiful Melodies — Records.  
 10.0 — Music and Address.  
 10.30 — Franz Schubert — Three Scenes (Anna Müller), with Songs.  
 10.50 — Listeners' Youthful Pranks.  
 11.0 — Military Band.  
 12.0 noon — See Berlin; at 1.0-1.5 p.m. — Time; Weather; Greetings.  
 2.0 — See Frankfurt.  
 2.30 — Konkordia Choir. Conductor: Peter Marx. Lied der Deutschen (Hensel). Deutschlands Erwachen (Stier). Songs (Lang): (a) Unser Vetter Veit, (b) Soldatenleben, (c) Es ritten drei Reiter, (d) Schatz mein Schatz. Five Songs (arr. Willms).  
 3.0 — Records: Allegro and Andantino from the String Quartet in E minor (Verdi), by the Prisca Quartet.  
 3.15 — Reading.  
 3.30 (from Mannheim) — Trio in D (Beethoven) by Max Kergl (Violin), Ernst Koenig (Viola), and Karl Müller (Cello).  
 4.0 — Station Orchestra. Conductor: Hörner. Hedwig Jungkurth (Soprano), Mimi Thoma, Friedrich Engels (Tenor). Franz Wolf (Baritone).  
 6.0 — "Der Weg des Helden" — Sequence (Wenzel). Music by Sattler.

7.0 — Time; News; Weather.  
 7.10 — Talk and Records.  
 7.30 — Sunday Sports and Events.  
 8.0 — To be announced.  
 10.0 — Time; News; Weather.  
 10.30 — See Deutschlandsender.  
 12.0 m't.-3.0 a.m. (Monday) — See Hamburg.

**SOTTENS**  
 677 kc/s (443.1 m.); 100 kW. Relayed by Geneva, 401 kc/s (748 m.).  
 9.55 a.m. - 12.30 p.m. — From Geneva.  
 9.55 — Chimes and Protestant Service.  
 11.15 — Records.  
 12.30-2.0 p.m. — News; Weather; Records.  
 3.45-4.40 — Sports Commentary.  
 6.0-7.50 — From Geneva.  
 6.0 — Records.  
 6.25 — Ellen Benoit (Songs—Grétry, Scarlatti, Cavalli, Debussy, Honegger).  
 6.55 — Roman Catholic Address.  
 7.25 — Gregorian Choir from the Eglise Sainte-Croix. Conductor: Carraz.  
 7.45 — Announcements.

12.0 noon — Orchestra. Conductor: Bour. March (Suppé). Russian Song and Dance (Schulenburg). Overture, "Les Cloches de Comeville" (Planquette). Two Songs without Words (Rust). Waltz, Mon rêve (Waldteufel). Selection, "Polenblut" (Nedbal).  
 12.45 p.m. — News.  
 1.15 — Orchestra (contd.). Suite, Gitaneries (Razigade). Venetian Song and Hindu Song (Rimsky-Korsakov). Czardas, Kossuth (Michiels). Suite (Loehr). Two Slav Dances (Dvořák).  
 2.0 — For Farmers.  
 2.30 — Sunday Review.  
 2.45 — Medical Talk; Records.  
 3.15 — Excerpts from Opéra-Comique and Operetta.  
 4.0 — Fidelia Choir of Algerne. Les paysans (Saintis). Des Sängers Sonntagsfeier (Kretschmer). Pastorale (Saintis). O grüß sie mir (Kaysler).  
 4.30 — "The Strawberry" — Alsatian Folk Festival from Lingolsheim.  
 5.55 — Commentary on the Second Half of the International Football Cup Final from the Colombes Stadium, Paris.



Photo: Paganini  
 Scene from "The Barber of Seville" which will be broadcast by the Rome group of stations at 9 p.m. (and from the Turin group at 9 p.m. on Tuesday).

7.50 — News; Weather.  
 8.0 till Close Down — From Geneva.  
 8.0 — Sunday Sports.  
 8.20 — Geneva Radio Ensemble.  
 8.50 — Interlude.  
 9.0 — "L'Arlésienne" (Bizet) by the Chariot Company.  
 10.30-11.0 — Dance Records.

**STOCKHOLM**  
 704 kc/s (426.1 m.); 55 kW. Relayed by Motala, 216 kc/s (1,389 m.); Göteborg, 941 kc/s (318.8 m.); Hörby, 1,131 kc/s (265.3 m.); and Boden, 392 kc/s (765 m.).  
 9.50 a.m. — For Farmers.  
 10.0 — Records: Pfte. Concerto in B flat (Brahms) by Schnabel and the BBC Symphony Orchestra. Conductor: Sir Adrian Boult.  
 11.0 — Service.  
 12.40 p.m. — Weather; News.  
 1.0 — Ake Claesson (Songs to the Lute).  
 1.20 — Commentary on the International Football Match, Denmark v. Sweden at Copenhagen.  
 3.15 — Light Music by the Waldimir Orchestra.  
 4.0 — Reading; Records.  
 5.30 — Choir. Conductor: Anderson.  
 6.0 — Evensong from Hälsingborg.  
 7.15 — News; Weather; Talk.  
 8.0 — Musical Guessing Competition. Radio Orchestra. Conductor: Lars-Erik Larsson.  
 9.15 — "Crusenstolpes kravaller" — Historical Play (Nerman).  
 10.0 — News; Sports.  
 10.30-11.0 — Henning Mankell Concert. Signe Rappe (Songs). Herbert Westrell (Pfte.). Suite in F minor. Songs.

**STRASBOURG**  
 859 kc/s (349.2 m.); 100 kW.  
 6.45 a.m. — Gymnastics.  
 7.0-8.30 — News (French, German).  
 9.0 — For Farmers.  
 9.15 — Schumann Records. Violin Concerto in D minor by Georg Kulenkampf and the Berlin Philharmonic. Conductor: Schmidt-Isserstedt. Dichterliebe, by Gerhard Hüsch (Baritone) and Hanns Müller (Pfte.). Violin Concerto in D minor by Yehudi Menuhin and the New York Philharmonic. Conductor: Barbirolli.  
 10.45 — Protestant Service.  
 11.30 — Roman Catholic Service (German).

7.0 — News; Weather.  
 7.30 — Operetta Music by Viard (Saxophone).  
 7.45 — News (German, French).  
 8.30 — Military Band from Metz. Conductor: Capt. Leroy. Bieuez (Violin). Marche lorraine Ganne. Overture, "Rammuntho" (Pierné). Danse macabre (Saint-Saëns). Violin: Hindu Song (Rimsky-Korsakov). Rédemption (César Franck). Violin: Romance in F (Beethoven). Overture, "Tannhäuser" (Wagner). March (Leroy-Rabault).  
 9.45 — Fantini Mandoline Quartet. Overture, Myrthalia (Maciocchi). March, L'esprit français (Mezzacapo). Selection, "William Tell" (Rossini). Mattinata (Leoncavallo). Waltz, España (Cottin). Wolgalkänge (Ritter). Ronda misteriosa (Manenete). Chitarrata alla bella (Coletta). American March (Billi).  
 10.30 — News (French, German).  
 11.0 — Dance Music from Paris.

**STUTTGART**  
 574 kc/s (522.6 m.); 100 kW.  
 6.0 a.m. — Military Band, Accordion Band, Stuttgart Folk Music Ensemble and Boys' Choir.  
 7.0 — Orchestra from Bad Mergentheim.  
 8.0 — Water Level; Weather; For Peasants; Gym.  
 8.30 — Roman Catholic Service from Mannheim.  
 9.0 — See Berlin (Deutschlandsender).  
 10.0 — See Königsberg.  
 10.30 — Variety Records.  
 11.30 — Symphony Orchestra from Baden-Baden. Conductor: Lessing.  
 12.30 p.m. — Military Band and Aviation College Band.  
 1.0 — Topical.  
 1.15 — Station Orchestra. Conductor: Görlich.  
 2.0 — See Frankfurt.  
 2.30 — Records.  
 3.30 — Stuttgart Choir. Conductor: Müller. Lebewohl (Silcher). Folk-Song, Drei Reiter am Tore. Es bleibt nicht dabei (Löffler). Der Wirtin Töchterlein (Silcher). Folk-Song, Es waren zwei Königskinder. Waldesnacht (Brahms).  
 4.0 (from Mannheim) — Heidelberg Municipal Orchestra. Conductor: Bohne. Friedrich Schery (Pfte.). In the intervals — Reports: The International Rowing Regatta at Mannheim.

6.0 — "Würzburg" — Sequence (arr. Wulff).  
 7.0 — Variety Records.  
 7.30 — News; Sports.  
 8.0 — "Everything for Men, Women, and Children" — Sketches from a Large Store (Stauder): (a) "In the Office," (b) "Shop Window Models," (c) "Two Men Shop Window-gazing," (d) "A Man and a Woman before the Microphone." Music by Station Orchestra, Karl Jautz (Tenor), etc.  
 10.0 — Time; News; Sports.  
 10.15 — Echoes of Reich Theatre Festival Week.  
 10.30 — See Deutschlandsender.  
 12.0 m't.-3.0 a.m. (Monday) — See Frankfurt.

**TOULOUSE (Radio-Toulouse)**  
 913 kc/s (328.6 m.); 60 kW.  
 11.40 a.m. — For Mothers.  
 11.45 — Extase (Ganne) — Orchestra.  
 11.50 — Roman Catholic Address.  
 12.5 p.m. — Film Music.  
 12.30 — News; Talk.  
 12.45 — For Children.  
 12.50 — Orchestra.  
 1.15 — Selection, "Le chanteur de minuit" (Misraki).  
 1.30 — Salon Orchestra.  
 1.45 — Chansonnettes.  
 1.55 — News.  
 2.0-2.15 — Protestant Address.  
 6.0 — News.  
 6.15 — Scotto Operetta Music. Excerpts, "Ceux de la légion" and "Les gangsters du chateau d'If".  
 6.40 — Light Orchestral.  
 6.55 — News; Sports Notes.  
 7.15 — Bal Champêtre.  
 7.45 — Film Music; News.  
 8.0 — Operetta Music. Excerpts, "Ginette et moi" (Messier). "The Three Waltzes" (O. Strauss) and "The Circus Princess" (Kálmán).  
 8.25 — Talk; Variety.  
 8.45 — Light Music.  
 9.30 — "El Pampero" — Argentine Cabaret.  
 10.0 — News; Chansonnettes.  
 10.15 — Salon Orchestra.  
 10.35 — Light Music.  
 11.0 — Marches; Light Music.  
 11.45 — Dance Music.  
 12.0 m't. — News.

**TURIN GROUP**  
 Turin (No. 1), 1,140 kc/s (263.2 m.); 7 kW. Milan (No. 1), 814 kc/s (368.6 m.); Genoa (No. 1), and Trieste, 1,140 kc/s (263.2 m.); Bolzano, 536 kc/s (559.7 m.); Florence (No. 2), 1,258 kc/s (238.5 m.); and Rome (No. 2), 1,222 kc/s (245.5 m.).  
 8.30 a.m.-2.15 p.m. — See Rome Group.  
 5.0 — Light Orchestral.  
 5.45 — Sports; Weather.  
 6.0 — Song Revue.  
 6.30-6.45 — Sports; Records.  
 7.19 (Rome (No. 2) only) — News and Talk (English).  
 7.25-8.30 — See Rome Group.  
 8.30 — Light Music; at 8.36 (Milan (No. 1), Rome (No. 2) and Bolzano) — News and Talk (German).  
 9.0 — "Acqua sul fuoco" — One-act Play (Morselli).  
 9.40 (approx.) — Band of the Carabineers. Triumphal March (Cirenei). Danza esotica (Mascagni). Albulblatt (Wagner). Overture, "William Tell" (Rossini). In the interval, Talk.  
 11.0 — News.  
 11.15-11.55 — Dance Music.

**VIENNA**  
 592 kc/s (506.8 m.); 100 kW. Relayed by Graz and Linz, 886 kc/s (338.6 m.); Innsbruck, 519 kc/s (578 m.); Klagenfurt and Vorarlberg, 1,294 kc/s (231.8 m.); and Salzburg, 1,348 kc/s (222.6 m.).  
 6.0 a.m. — See Hamburg.  
 8.0 — Motto; Gym.  
 8.25 — For Hitler Youth.  
 9.0 — Records.  
 9.55 — Missa Lauda Sion (Springer) and Address by Dr. Jakob Weinbacher from St. Stephan's Cathedral.  
 11.10 — Josef Wollner Peasant Band and the Edelweiss Male Voice Choir. Conductor: Streitenberger.  
 11.55 — Time; Cathedral Chimes.  
 12.0 noon — Light Orchestral. Conductor: Max Schönherr. Rudolf Nahlitschek and Wilhelm Drahozal (Violins).  
 1.0 p.m. — Station Orchestra. Conductor: Sandauer. Overture, "Wiener Frauen" (Lehár). Waltz, Perlen der Liebe (Jos. Strauss). Sefira (Siede). Suite. Nordlicht

(Ortleb). Träume am Meer (Zander). Das Sommerfest (Brückner). Pusztanacht (Borchert). Polka, Trisch-Tratsch (Joh. Strauss). Wach auf! Deutsche Wach auf! (Strecker).  
 2.0 — Records: New Operetta Music.  
 3.0 — "Rumpelstilzchen" — Fairy Play (Grimm-Nothardt).  
 3.35 — String Quartet in C (Haydn) by the Pops Grama Quartet.  
 4.0 — See Saarbrücken.  
 6.0 — Adventures in the Forests of Amazonas.  
 6.20 — Soldiers' Choir. Conductor: Pallmann.  
 7.0 — News.  
 7.10 — Senta Benesch (Cello), Christa Richter-Steiner (Violin), Roland Raupenstrauch (Pfte.). Czardas for Cello (Fischer). Perpetuum mobile for Pfte. (Weber). Caprice in E for Violin (Paganini). Tarantella for Pfte. (Chopin). Mazurka for Violin (Zarzycki). Tarantella for Cello (Piaff). Concert Etude in F minor for Pfte. (Liszt).  
 7.40 — Sports.

8.0 — German Opera Music. Mixed Choir and the Vienna Symphony Orchestra. Conductor: Konrath. Maria Gerhart (Soprano). Karl Ziegler (Tenor). George Monthy (Baritone). George Puntchart (Bass). Excerpts, "Das Nachtlager im Granada" (Kreutzer). "The Taming of the Shrew" (Goetz). "Der Waffenschmied" (Lortzing). "Tsar and Carpenter" (Lortzing), and "The Barber of Bagdad" (Cornelius). Overture, "Christelflein" (Pfitzner). Entry of the Guests, and Bass Aria from "Tannhäuser" (Wagner). Selection, "Die toten Augen" (d'Albert). Soprano Aria, "Ariadne auf Naxos" (R. Strauss). Waltz, "Der Rosenkavalier" (R. Strauss).  
 10.0 — News; Sports.  
 10.30 — Light Music. Station Orchestra. Conductor: Sandauer. Herma Vitas (Songs). Jaro Schmied (Violin).  
 12.0 m't.-3.0 a.m. (Monday) — See Hamburg.

**WARSAW**  
 224 kc/s (1,339 m.); 120 kW. Relayed by Cracow, 1,022 kc/s (293.5 m.); Katowice, 758 kc/s (395.8 m.); Łódź, 1,339 kc/s (224 m.); Lwów, 795 kc/s (377.4 m.); Poznań, 868 kc/s (345.6 m.); Torun, 986 kc/s (304.3 m.); and Wilno, 536 kc/s (559.7 m.).  
 Transmits at intervals from 7.15 a.m.  
 8.0 a.m. — News.  
 8.15 — For Country People.  
 9.15-11.45 (from Lwów) — Programme from Stanisławów: Report on the Town High Mass from the Church. Programme from the Orphanage; The Lower Carpathians — Musical and Literary Sequence.  
 11.45 — Cultural Review.  
 11.57 — Time; Fanfare.  
 12.1-1.0 p.m. (from Lwów) — Programme from Stanisławów.  
 12.1 — Talk by the Voivode.  
 12.3 — Symphony Concert from the Theatre, Choir and Symphony Orchestra. Posh (Songs). Overture, "Halka" (Moniuszko). Musical Miniatures (Hausman). Songs of Stanisławów Composers (Jancki, Stadler, Hausman). Choir and Orchestra: Dance Suite, The Return (Noskowski).  
 1.0 — Reading.  
 1.15 — Light Music. Transport Workers' Band; Burski Sisters (Songs); Jablonski and Guitar Trio.  
 3.0 — For Country People.  
 4.30 — "Towards Hongkong" — Radio Adaptation of K. Brintzer's Play (Husarski).  
 5.0 — Sonata (Rachmaninoff) by Lifan (Cello) and Rabcewicz (Pfte.).  
 5.30 — Topical Report.  
 6.0 — "The Land of Smiles" — Three-Act Operetta (Lehár). Conductor: Nawrot.  
 8.0 — Programme Notes.  
 8.5 (from Torun) Pomeranian Youth Congress — Concert by Massed Choirs.  
 8.40 — Political Review.  
 8.50 — News.  
 9.0 — "Maciek is dead" — Radio Fantasy (Bohdziewicz-Czysciecki).  
 9.40 — Commentary on the International Football Match, France v. Poland (Recorded); Sports Notes.  
 10.15 — Dance Music by the Station Orchestra.  
 11.10-11.15 — News; Weather.

# MONDAY June 20

## National

Time Signals (normally: Big Ben, 10.15 a.m., 5.15 p.m., 12. midnight. Greenwich, 10.30 a.m., 2.0, 6.0, 9.0, 11.30 p.m.)

10.15 a.m. (D)—Service.

10.30 (D)—Weather Forecast.

10.45 (D)—"A Lion in the Drawing Room"; The Rt. Hon. Godfrey Locker-Lampson.

11.5 (D)—Records. 11.30 (D)—German for Schools.

11.45 (D)—Records.

12.0 (D)—Church History.

12.25 p.m. (D)—Percy Whitlock (Organ). 1.0 (D)—Dance records.

1.30 (D)—The Harp Trio.

2.5 (D)—For Schools.

3.0 (D)—Arthur Salisburys Orchestra. 3.35 (D)—German.

4.0 (D)—Horace Finch (Cinema Organ). 4.30 (D)—Records.

5.0—All-English Lawn Tennis Championships: account of to-day's play by F. H. Grisewood.

5.10—Charles Brill's Orchestra: Enid Cruickshank (Contralto).

6.0—The First News.

6.20—Nina Milkina (Pfte.).

6.40—Music in Everyday Life: Herbert Howells, Mus.Doc.

7.0—"The Bungalow Club," with Anona Winn, Morris Harvey, Harold Clemence, Marcel Boulestin, Tommy Tucker and The Beachcombers.

7.45—Reginald Foort (BBC Theatre Organ).

8.20—The Wild Life Around Us: J. Wentworth Day.

8.40—Miriam Licette (Soprano).

9.0—The Third News.

9.20—World Affairs.

9.35—BBC Orchestra, conducted by Leslie Heward: Paul Makano-witzky (Violin).

10.40—Beside Anthology of Diaries and Letters.

11.0—Maurice Winnick's Orchestra.

11.30-12.0—Benny Goodman's Orchestra.

## London Regional

Time Signals (normally: Big Ben, 10.15 a.m., 5.15 p.m., 12. midnight. Greenwich, 10.30 a.m., 7.0, 10.0, 11.30 p.m.)

10.15-10.45 a.m.—National.

10.45—Records.

11.15—Eric Smith (Cinema Organ).

12.0—BBC Scottish Orchestra.

1.0 p.m.—Maria Donska (Pfte.).

1.30—Royal Marines Band: Cyril Pinch (Baritone).

2.30—Beryl Reid in Impersonations.

2.40—"Wheels," and "Now He's Been Warned:" short stories.

3.0—Buxton Spa Orchestra.

4.0—Bryan Gippis (Violin); Helene Gippis (Pfte.).

4.30—Vest-pocket Vaudeville.

5.0—The Children's Hour.

6.0—Dale Smith (Baritone); The Little Orchestra.

6.40—Phyllis Scott and John Rorke.

7.0—The Second News.

7.30—The Trial of Sir Walter Raleigh, with Leon Quartermaine, Robert Farquharson, Harold Scott, Ralph Truman, Anthony Cope, Philip Wade, George Woodbridge, Peter Henschel, Charles Spencer, William Ashley, Arthur Vivian, Jarvis Walter, Spencer Trevor, Beatrice Gilbert.

8.20—"Radiolympus," with Elsie Eaves, Joan Tuckett, Leonard Henry, Horace Percival, Barry Kendall, Dennis Anderson, Derek Gill-Davies, Michael Holloway, Clifford Bean.

9.0—Welsh Guards Band.

9.30—Peter York's Orchestra.

10.0—News Summary.

10.25—Maurice Winnick's Orchestra. 11.30—Records.

11.50-12.0—Late News Summary.

## Midland

10.15 a.m.—5.0 p.m.—Regional.

5.0—The Children's Hour.

6.0—Regional.

7.20—"This Week's Programmes."

7.30—Regional.

8.30—May Cree (Pfte.); Mark Mellers (Baritone); Edwinstowe Choral Society.

9.0—BBC Midland Orchestra.

9.30-12.0—Regional.

## Northern

10.15 a.m.—5.0 p.m.—Regional.

5.0—The Children's Hour.

6.0—Regional.

7.20—Northern Bulletin for Farmers. 7.30—Regional.

8.20—Brief Variety.

8.40—London Log.

9.0—Harrogate Municipal Orchestra. 9.30-12.0—Regional.

## Western

10.45 a.m.—6.0 p.m.—National.

6.0—Regional.

7.20—Western Announcements.

7.30-10.25—Regional.

## Welsh

10.15 a.m.—3.0 p.m.—Regional.

3.0—For Schools in Wales.

3.25-5.0—Regional.

5.0—The Children's Hour.

6.0—Burry Port Schools Children's Choir: Betty Davies (Soprano).

6.30—E. J. Hughes (Organ).

7.0—The Second News.

7.20—Welsh Announcements.

7.30—Regional.

8.20—Cystadieuath Cynganeddu.

8.50—BBC Welsh Orchestra.

9.30—Ronald Hill (Tenor); Lena Griffiths (Pfte.).

10.0-12.0—Regional.

## N. Ireland

10.15 a.m.—5.0 p.m.—Regional.

5.0—The Children's Hour.

6.0—Roland Powell's Quintet.

6.40—Regional.

7.20—N. Ireland News.

7.30—Regional.

9.0—Royal Ulster Constabulary Band: R. Leslie Graham (Baritone).

9.45—"Farmers' Work and Worry:" Peter FitzPatrick.

10.0-12.0—Regional.

## Scottish

10.15 a.m.—2.0 p.m.—National.

2.0—For Schools. 3.35—National.

5.0—The Children's Hour.

6.0—Scottish Studio Orchestra.

6.25—June in the Garden: Alexander Keith. 6.40—Regional.

7.20—Gaelic News. 7.30—Regional.

7.30—Scottish Dance Music.

8.45—New Books in Scotland.

9.0—Ten Minute Revueette.

9.10—James Hincliffe (Organ).

9.30-12.0—Regional.

## Hours of Transmission in British Summer Time.

## BERLIN

841 kc/s (356.7 m.); 100 kW. Transmits at intervals from 6.0 a.m.

12.0 noon—See Leipzig.

2.0 p.m.—News.

2.15—Hans Bund Band.

3.15—Exchange; Markets; Records.

4.30—Silesian Dances and Songs.

5.0—Records: Pfte. Concerto in D minor (Mozart) by Erdmann and the Station Orchestra.

5.30—Walter Bloem—Talks and Readings.

6.0—Orchestra.

7.0—News.

7.10—Hans Raue Band.

7.45—Evening Echoes.

8.0—"A Masked Ball" (Verdi) (Recorded), with Helge Roswaenge, Hans Reinmar, Hildgard Ranzack, Station Choir, Chorus Master: Weigel, and Orchestra, Conductor: Heinrich Steiner.

10.0—News.

10.30 p.m.—3.0 a.m. (Tuesday)—See Cologne.

## BEROMÜNSTER

556 kc/s (539.6 m.); 100 kW. Relayed by Basle and Berne.

1,375 kc/s (218.2 m.).

6.15-6.35 a.m. (from Berne)—Gym.

12.0 noon—Supp. Records.

12.20-1.30 p.m.—Time; News; Records.

4.30—For Women.

4.40—Talk: Women Journalists.

5.0—Viennese Songs and Couplets followed by records.

6.0—Records: Children's Songs.

6.30—For Young People.

7.0—Time; Aviation Report; Records.

7.20—Talk: Animals in Mythology.

7.45—Weather; News.

7.55—Young Swiss Conductors—Ernst Klug conducts the Zürich Radio Orchestra.

9.10—Announcements.

9.15—Review for Swiss Abroad.

9.30-10.30—See Monte Ceneri.

## BRATISLAVA

1,004 kc/s (298.8 m.); 13.5 kW. Transmits at intervals from 6.0 a.m.

8.20 p.m.—Classical Music. Station Orchestra, Conductor: Schimpf. Macudzinski (Pfte.). Overture in

F (Mysliveček). Rondo brillante for Pfte. and Orchestra (Hummel). Scherzi notturni (Benda).

9.0—Talk.

9.15-10.15—See Prague.

10.15-11.0—New (Hungarian); Records.

## BRESLAU

950 kc/s (315.8 m.); 100 kW. Relayed by Gleiwitz and Görlitz.

1,231 kc/s (243.7 m.).

Transmits at intervals from 5.0 a.m.

12.0 noon—Airmen's Band.

1.0 p.m.—News.

1.15—Concert from Hamburg.

2.0—News; Records.

4.0—Orchestra; at 5.0—Sports.

6.0—Talk: Films.

6.10—Talk: Zeebrugge, 1918.

6.25—Schubert and Brahms Records.

6.55—Programmè Notes.

7.0—News; Markets.

7.10—"Princess Nefertiti" (Dostal).

9.0—Concert from Stuttgart.

10.0—News.

10.30 p.m.—3.0 a.m. (Tuesday)—See Cologne.

## BRNO

922 kc/s (325.4 m.); 32 kW. Transmits at intervals from 6.0 a.m.

4.15 p.m.—Cello Concerto in B minor (Dvořák) by Krenek and the Station Orchestra. Conductor: Bakala; Reading.

5.0-6.0—See Prague.

6.0—German Transmission: Talks; Records.

6.35—Talk: Sociology.

6.45—News in German.

7.0-7.50—See Prague.

7.50—Talk.

8.5—See Prague.

8.25—"Nošáček"—Sequence (Guttmanova-Weilenova). Music by Tausky.

9.15-11.0—See Prague.

## BRUSSELS (No. 1)

620 kc/s (483.9 m.); 15 kW.

6.30-9.5 a.m.—Records; Gym; News.

12.0 noon—Records: Light Music.

12.30 p.m.—Weather; Shipping.

12.35—Bogaert Orchestra.

1.0—News.

1.10—Bogaert Orchestra.

1.30—Records: Variety Music.

2.0-2.3—Art Notes.

4.55—News.

5.0—Radio Orchestra, Conductor: Gason. Overture, Burlesque (Méhul). Waltz, Myosotis (Waldteufel). Tarantella (d'Ambrosio).

5.15—On a Walloon Farm.

5.30—Radio Orchestra, Conductor: Gason, Mme. Stradel (Songs), Bethune (Violin). Ballet, "Coppelia" (Delibes). Meditation, "Thais" (Massenet). Love Song (Tchaikovsky). Two Songs, "The Merry Widow" (Lehar). Suite variée (Pierné).

6.0—Talk: Industry on the Meuse.

6.15—Hout (Viola). Lied (d'Indy). Chaconne (Vitali-Chaumont).

6.30—Reading: Pêcheurs d'Islande (Lott).

6.45—Nicolas Amato (Songs).

7.0—Reviews: (a) Educational Books, (b) Holidays; Interview.

7.15—Organ Records.

7.30—News.

8.0—English Music. Radio Orchestra, Conductor: Gason. African Suite (Coleridge-Taylor). Dances, "Nell Gwyn" (German). Salut d'amour (Elgar). Trees (Rasbach). Deep river (Coleridge-Taylor).

8.30—"Le peuple aux yeux clairs"—Play (Théo Fleischman).

9.40—Radio Orchestra, Conductor: Gason. Overture, Veronique (Messager). March of the Tin Soldiers (Pierné). Valse des blondes (Ganne). March of the Grenadiers (Schertzingler).

10.0—News.

10.10-11.0—Records, Symphony (J. C. Bach). Fifth Symphony (Beethoven).

## BRUSSELS (No. 2)

932 kc/s (321.9 m.); 15 kW. Programme in Flemish.

6.30-9.0 a.m.—Records; Gym; News.

12.0 noon—Request Records.

12.31 p.m.—Salon Orchestra, Conductor: Féron.

1.0—News; Shipping.

1.10—Brenders Jazz Band.

1.30—Records: Light Music.

4.55—News.

5.0—Records: Variety Music.

5.45—For Children.

6.30—Records; Talk.

7.0—Arsenieff (Pfte.). Moonlight Sonata (Beethoven). Pathetic Sonata (Beethoven).

7.30—Sports Report.

8.0—Salon Orchestra, Brenders Jazz Band, Elisabeth Bellina (Soprano).

8.45—Talk.

9.0—Orchestra, etc. (contd.).

10.0—News.

10.10-11.0—Request Records. Overture, "The Thieving Magpie" (Rossini). Arias from "Norma" (Bellini). "Lucia di Lammermoor" (Donizetti). "I Pagliacci" (Leoncavallo). "La Bohème" (Puccini) and "The Barber of Seville" (Rossini) Overture, "Sicilian Vespers" (Verdi). March (Hall).

## BUCHAREST

823 kc/s (364.5 m.); 12 kW. Relayed by Radio-Romania, 160 kc/s (1,875 m.).

Transmits at intervals from 5.30 a.m.

6.0 p.m.—Time; Topical; Records; Talk.

7.5—Radio Orchestra. Conductor: Rogalsky; Badesco (Songs).

8.15—Talk.

8.35—Wind Quintet (Gieseking).

9.10—Stefanescu-Goanga (Songs). Aria, "Khovanschina" (Mussorgsky). Mein Mädel hat ein'n Rosenmund (Brahms). Gia in' sole del Gange (Scarlatti). Aria (Delibes). Le Cor (Flégler).

9.30—News; Sports.

9.45—Café Concert.

10.45—News (French, German).

## BUDAPEST

546 kc/s (549.5 m.); 120 kW. Transmits at intervals from 6.45 a.m.

12.5 p.m.—Salon Quintet; at 12.30—News.

1.30—Light Orchestral.

2.35—News.

4.15—For Schools.

5.0—Dr. Viola Tomori.

5.30—Pál Kiss (Pfte.).

6.5—Mihály Korék.

6.35—Gyula Kerékgyártó (Violin).

7.5—Talk with Song Illustrations: Rousseau.

7.35—Dance Records.

8.25—News.

8.45—Rác Cigány Band.

9.50—Budapest Concert Orchestra. Conductor: Kojetinsky. Symphonic Variations on a Choral Theme (Jerger). First Symphony (Bayer).

11.0—News (English, French).

11.10—Talk in English: Turkish Times in Hungary.

11.25—Heilig Jazz Band.

12.5 a.m. (Tuesday)—News.

## COLOGNE

658 kc/s (455.9 m.); 100 kW. Transmits at intervals from 6.0 a.m.

12.0 noon—See Hamburg.

2.0 p.m.—News; Light Music.

3.0—For Children.

3.30—Book Review; Markets.

4.0—See Frankfurt; at 5.0—Folklore.

6.0—Talk: Johann Georg Hamann.

6.20—Chamber Music (Haydn, Weber).

6.50—Do you remember?

7.0—News.

7.10—Records.

8.0—Mandoline Band.

8.40—Review of the Week.

9.0—Contemporary Music. Orchestra. Drissen (Baritone). Heldisches Prelude (Siebert). Landknechtskantate (Anders). Overture and Presto from Sommer-nachtstraum (Fritzen). Hamburger Humoresken (Udald). Hessian Peasant Dances (Gerster).

10.0—News.

10.20—The Round-Germany Cycle Race: Eleventh Stage, Cologne-Bielefeld.

10.30—Station Orchestra. Conductor: Hilgers. Arenz (Cello). Excerpt, "The Italian Girl in Algiers" (Rossini). Cello and Orchestra: Gesangsszene (Kaun). Eine kleine Nachtmusik (Mozart). Ballet, "Faust" (Gounod). Overture, "The Caliph of Bagdad" (Boieldieu). Lotosblumen (Ohlsen). Lyric Pieces (Grieg). Waltz, "The Arabian Nights" (Strauss). Polka, Bahn frei (Strauss).

12.0 m.t.—3.0 a.m. (Tuesday)—Serenade by the Station Orchestra (Recorded).

## DEUTSCHLANDSENDER

191 kc/s (1,571 m.); 60 kW. Transmits at intervals from 5.0 a.m.

12.0 noon—See Hamburg.

1.45 p.m.—News.

2.0—Jäger Band and Records.

3.0—Markets; Records.

3.40—Loite Möller, Scientist, interviewed.

3.55—Programme Notes.

4.0—See Frankfurt; at 5.0—Topical.

6.0—"Der Brennspiegel"—Poems about Animals, with Music.

6.35—Records.

7.0—News.

7.10—"June Dreams"—Words and Music.

8.0—See Stuttgart.

9.0—Topical Talk.

9.15—Berlin Philharmonic String Quartet. Quartet in G (Grieg). Italian Serenade (Wolf).

10.0—News.

10.20—See Cologne.

10.30-10.45—NSKK Military Sports.

11.0—Concert from Vienna. 12.0 m.t.—See Stuttgart.

1.6-2.0 a.m. (Tuesday)—Concert from Cologne.

## FRANKFURT

1,195 kc/s (251 m.); 25 kW. Cassel, etc. See Sunday.

Transmits at intervals from 5.0 a.m.

12.0 noon—See Hamburg.

2.0 p.m.—Time; News; Operetta Records.

3.0-3.30—For Children.

4.0—Orchestra; in the interval, The Roving Microphone.

6.0—Topical.

6.30—The Merry Loud Speaker.

7.0—News; Weather.

7.10—"German Proverbs"—Sequence with Haydn Music (Fraenger).

8.0—See Stuttgart.

10.0—Time; News; Sports.

10.15—"Comrade, where are you?"

10.35—Music from Cologne.

12.0 m.t.—3.0 a.m. (Tuesday)—See Stuttgart.

## HAMBURG

904 kc/s (331.9 m.); 100 kW. Bremen, etc. See Sunday.

Transmits at intervals from 5.45 a.m.

12.0 noon—Hanover Castle Concert.

2.0 p.m.—News.

2.15—Music.

3.0—Shipping; Markets.

3.25—Old Music for Flute, 'Cello, and Pfte.

4.0—Orchestra. Erna Kroll-Lange (Soprano) and Records. Talks in the intervals.

6.0—Liszt Music by Béla Böszörményi-Nagy (Pfte.). Fantasia on "Weinen, Klagen, Jeux d'eau à la Villa d'Este. Funerailles. Rakoczy March. Hungarian Rhapsody.

6.45—Weather; Shipping.

7.0—News.

7.10—Marches by a Military Band.

8.0—"African Wedding"—Play (Paetzmann).

9.0—"Tropical Impressions"—Records. Impressions from Brazil (Respighi). Argentine Song, La mariquita. Peruvian Song, Muchacha. Cuban Song, Habanera Flore (Rimac). Brazilian Song, Lenda do caboclo (Villa-Lobos). Bolivian Song, De blanca tierra. Cuban Song, El manisero. Cuban Dance, Maxixe (Rimac). Oriental Dance (Glazunov). Indian Dragon Dance and Mogul Serenade. Persian Dance (Mussorgsky). Hindu Song (Rimsky-Korsakov). Arab Dance (Grieg). Festival in Bagdad from Scheherazade (Rimsky-Korsakov).

10.0—News.

10.25—Report: Kiel Week, 1938.

10.30 p.m.—3.0 a.m. (Tuesday)—See Cologne.

## HILVERSUM (No. 1)

160 kc/s (1,875 m.); 10 kW until 8.40 p.m.; 150 kW from 8.40 p.m. Also on Jaarsveld, 722 kc/s (415.4 m.); 17 kW.

NCRV Programme.

7.40 a.m.—Bible Reading; Meditation; Records; at 9.10—Greetings.

10.10—Religious Programme.

10.40—Bible Reading.

11.10—Records; at 11.40-11.55—Police Messages.

12.10 p.m.—The Goolanders.

1.40—Records.

1.55—Alexandra Michaeli (Pfte.).

2.40—Talk: House Plants.

3.20—Records; Bible Reading.

4.25—Records.

4.55—For Children; Records.

6.10—Letter-Box; at 6.40—Police, Church, and Sports Notes.

7.25-7.40—Report.

7.45—News; S O S Messages.

7.55—Amersfoort Military Band, Conductor: v. d. Glas. Overture, "Maximilian Robespierre" (Litolff). Selection, "Alessandro Stradella" (Flotow). Potpourri of Sacred Songs (Lureman). Groet aan Assen (v. d. Glas). Norwegian Rhapsody (Lalo). Festival Anthem (Friedmann); at 8.40—Talk.

9.40—News.

9.45—Dumky Trio (Dvořák) by the Amsterdam Trio.

10.25—Gym; Records.

11.30-11.40—Bible Reading.







BRUSSELS (No. 1)

620 kc/s (483.9 m.); 15 kW. 6.30-9.5 a.m.—Records; Gym; News.

BRUSSELS (No. 2)

932 kc/s (321.9 m.); 15 kW. Programme in Flemish.

BUCHAREST

823 kc/s (364.5 m.); 12 kW. Relayed by Radio-Romania, 160 kc/s (1,875 m.).

BUDAPEST

546 kc/s (549.5 m.); 120 kW. Transmits at intervals from 6.45 a.m.

COLOGNE

658 kc/s (455.9 m.); 100 kW. Transmits at intervals from 6.0 a.m.

DEUTSCHLANDSENDER

191 kc/s (1,571 m.); 60 kW. Transmits at intervals from 5.0 a.m.

FRANKFURT

1,195 kc/s (251 m.); 25 kW. Cassel, etc. See Sunday.

Duet, "The Force of Destiny" (Verdi). Habanera, "Carmen" (Bizet).

HAMBURG

904 kc/s (331.9 m.); 100 kW. Bremen, etc. See Sunday. Transmits at intervals from 5.45 a.m.

HILVERSUM (No. 1)

160 kc/s (1,875 m.); 10 kW until 8.40 p.m.; 150 kW from 8.40 p.m.

HILVERSUM (No. 2)

995 kc/s (301.5 m.); 10 kW until 8.40 p.m. 60 kW from 8.40 p.m.

3.0—Jetty Cantor Orchestra. 4.10—Children's Choir. 4.40—For Children.

KALUNDBORG

240 kc/s (1,250 m.); 60 kW. Relays Copenhagen, 1,176 kc/s (255.1 m.).

KÖNIGSBERG (Heilsberg)

1,031 kc/s (291 m.); 100 kW. Relayed by Danzig, 1,303 kc/s (230.2 m.).

LEIPZIG

785 kc/s (382.2 m.); 120 kW. Relayed by Dresden, 1,285 kc/s (233.5 m.).

bini). Aria, "Alceste" (Gluck). Ballet, "Austin" (Marschner).

LILLE (Radio PTT Nord)

1,213 kc/s (247.3 m.); 60 kW. Transmits at intervals from 6.30 a.m.

LYONS (PTT)

648 kc/s (463 m.); 100 kW. Transmits at intervals from 6.30 a.m.

MONTE CENERI

1,167 kc/s (257.1 m.); 15 kW. Transmits at intervals from 12.0 noon.

MOSCOW

172 kc/s (1,744 m.); 500 kW. 12.30 p.m.—Talks in Italian.

MUNICH

740 kc/s (405.4 m.); 100 kW. Relayed by Nürnberg, 1,267 kc/s (236.8 m.).



Fräulein Flora Berthold, who takes the principal part in the comedy of Berlin life which that station broadcasts at 8 p.m.

cordion Duo), Beuster (Bass) and Engels (Guitar); at 10.0-10.15—News.













THURSDAY (June 23)

NAPLES GROUP
Naples (No. 1), 1,104 kc/s (271.7 m.); 10 kW. Florence (No. 1), etc. See Sunday.
Transmits at intervals from 8.30 a.m. 7.0 p.m.—Music; Topical; Records.

OSLO
260 kc/s (1,153.8 m.); 60 kW. Fredrikstad, etc. See Sunday.
Transmits at intervals from 10.30 a.m. 5.5 p.m.—Stavanger Orchestra. Conductor: Knudsen.

PARIS (Eiffel Tower)
1,456 kc/s (206 m.); 7 kW. Transmits at intervals from 6.30 a.m. 3.45 p.m.—Cycle of the Trojan Wars: "Hercuba in Thrace"—Play after Euripides (Dujardin).

PARIS (Poste Parisien)
959 kc/s (312.8 m.); 60 kW. Transmits at intervals from 7.10 a.m. 5.0 p.m.—Cabaret.

PARIS (PTT)
695 kc/s (431.7 m.); 120 kW. Transmits at intervals from 6.30 a.m. 3.10 p.m.—See Tallinn.

PARIS (Radio-Paris)
182 kc/s (1,648 m.); 80 kW. 6.28 a.m.—Programmes; Records. 6.40—News; Gym; Records.

1.0—Time; News; Exchange. 1.30—Morturier (Songs). 1.45—Cantrelle Orchestra.

1.45—Cantrelle Orchestra. 2.0—Programmes. 2.5—Talk: King Carol of Romania. 2.20—Talk: Nineteenth Century Moralists.

6.30—Racing; Talks; Programmes. 7.0—Educational. 7.30—Talk: England. 7.45—Talk: Gambetta.

PRAGUE
638 kc/s (470.2 m.); 120 kW. Transmits at intervals from 6.0 a.m. 6.0 p.m.—For Farmers.

9.30—Slav Dances (Dvořák) by Strauss and Litzko (Pfte. Duo). 9.55—News; Review; Sports.

RADIO EIREANN
565 kc/s (531 m.); 100 kW. Dublin, etc. See Sunday. 1.30 p.m.—Records.

5.30—Reading (Mille). 5.45—Grammar Lesson; Talk. 6.0—For Farmers.

RADIO-NORMANDIE
1,411 kc/s (212.6 m.); 15 kW. 7.10 a.m.—Call. 7.15—Press Review; News.

12.15 p.m.—Military Band. 12.30—News; For Children. 2.30—Miniature Matinée. 3.0—Favourites of Yesterday.

5.30—Request Music. 6.0—Markets. 6.5—Orchestra. Offenbachiana (Conrad—Daebnitz).

9.0—Concert—Musette Orchestra, Moque (Saxophone), M. Babault and Arlette Theresol. In the interval, Talk.

RENNES-BRETAGNE
1,040 kc/s (288.5 m.); 120 kW. Transmits at intervals from 6.30 a.m. 8.30 p.m.—Offenbach Concert—Singers and the Station Orchestra.

ROME GROUP
Rome (No. 1), 713 kc/s (420.8 m.); 120 kW. Bari (No. 1), etc. See Sunday.

5.50—Aviation Notes; Weather. 6.0—For Merchant Shipping. 6.25-6.35—Talk. 7.0—Talk in Czech.

SAARBRÜCKEN
1,249 kc/s (240.2 m.); 17 kW. Relayed by Kaiserslautern, 1,429 kc/s (209.9 m.).

10.0—Time; News; Frontier Notes. 10.20—Chopin Recital by Ludwig Resch (Pfte.). Preludes. Nocturnes. Impromptu. Waltz. Ecoussais.

SOTTENS
677 kc/s (443.1 m.); 100 kW. Relayed by Geneva, 401 kc/s (748 m.).

5.0—Geneva Radio Ensemble. 5.30—Odette Robert (Pfte.). 6.0—For Children. 6.40—Records: Sonata for Flute and Pfte. (Casadesu).

8.30—"La Femme de Claude"—Play (Dumas, fils) by the Compagnie des Deux Masques. 10.0-11.0—Symphony Concert—Radio Suisse romande Orchestra.

STOCKHOLM
704 kc/s (426.1 m.); 55 kW. Motala, etc. See Sunday. Transmits at intervals from 7.20 a.m. 5.5 p.m.—Gluntarna (Bellman) sung by Olle Wahlström and Carl Skylling.

STRASBOURG
859 kc/s (349.2 m.); 100 kW. Transmits at intervals from 6.30 a.m. 7.30 p.m.—Mme Manlet-Guntz (Mezzo-Soprano) and Jeanne Wolfertadtter (Pfte.).

STUTTART
574 kc/s (522.6 m.); 100 kW. Transmits at intervals from 5.45 a.m. 12.0 noon-2.0 p.m.—See Frankfurt. 2.0-3.0—Records.

TALLINN
731 kc/s (410.4 m.); 20 kW. 7.0 a.m.—Records. 8.0—Military Parade and Address by the President of the Republic. 8.55—Service from the Cathedral.

TOULOUSE (Radio-Toulouse)
913 kc/s (328.6 m.); 60 kW. Transmits at intervals from 8.0 a.m. 6.55 p.m.—News; Sports Notes. 7.15—Operetta Music.

7.45—Dance Refrains; News. 8.0—Light Music. 8.25—Talk; Light Music. 9.10—Talk; Light Music. 9.30—"Un beau dimanche"—Fantasy.

TURIN GROUP
Turin (No. 1), 1,140 kc/s (263.2 m.); 7 kW. Milan (No. 1), etc. See Sunday. Transmits at intervals from 8.30 a.m. 5.0 p.m.—News.

VIENNA
592 kc/s (506.8 m.); 100 kW. Graz, etc. See Sunday. Transmits at intervals from 6.0 a.m. 12.0 noon—Orchestra. Conductor: Schönherr.

6.20—Records: Erna Berger (Soprano) (Mozart, Strauss). Day in Heidelberg. 7.0—News; Pfte. Records. 7.25—"I Pagliacci" (Leoncavallo), from the Vienna State Opera.

WARSAW
224 kc/s (1,339 m.); 120 kW. Cracow, etc. See Sunday. Transmits at intervals from 6.15 a.m. 3.50 p.m. (approx.) (from Poznan)—Lithuanian, Latvian, Estonian and Finnish Folk Songs.













