The BAIRD "TELEVISOR"

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BAIRD

"TELEVISOR"

133 LONG ACRE, LONDON, W.C.2

Telephone: TEMPLE BAR 5401

Telegraphic Address: "TELEVISOR, RAND, LONDON."

J. L. Baird

JOHN L. BAIRD
The famous Scottish Scientist,
the inventor of Television

The
Origin and Progress
of
"TELEVISION"

by Clarence Tierney, D.Sc.

THE history of television is of comparatively recent date, though, if one may judge from some articleswhich have appeared in certain recent works of reference, there would appear to be some confusion of thought as to its origin. It is deemed desirable, therefore, to state as concisely as possible a few authenticated facts concerning its history and development, quoting where necessary from published records which are readily accessible and easily verified.

The first demonstration of television in the history of the world was given by J. L. Baird on 27th January 1926, at Frith Street, London. Prior to this demonstration nothing but the electrical transmission of silhouettes had ever been accomplished.

Now it is astonishing to find how many writers in technical and other journals fail to understand the difference between shadowgraphs and the living image, and a simple illustration will, it is hoped, make this clear. If a person is sitting in a room illuminated by a lighted candle from a table in the centre a shadow of that person will be projected on to the wall. If, now, we place a mirror on that wall we shall observe not a shadow but the living image of that person with all its gradations of light and shade and those delicate inflections of facial expression and movement. Just so with the electrical transmission of shadowgraphs, which is one thing, and the transmission of the living image which we call television. The one is merely a silhouette of the object, while the other, a very different thing, is the real image.

The original apparatus with which Baird first demonstrated his epoch-making discovery is now housed with the national collection of historical instruments in the South Kensington Museum, and the following is the inscription placed upon it by the authorities :

"ORIGINAL TELEVISION APPARATUS
MADE BY
J. L. BAIRD.

"This is the transmitting portion of the original apparatus used by Mr. J. L. Baird, in experiments which led him from the wireless transmission of outlines in 1925 to **the achievement of true television nine months later, when on**

Mr. J. L. Baird looking into one of his early Televisors.

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A group looking in to London from Hartsdale, N.Y., on the occasion of Baird's successful Transatlantic transmission of television.

January 27th, 1926, the transmission of living human faces with light, shade and detail was demonstrated before members of the Royal Institution, this being the first demonstration of true television ever given."

It will be observed that this original demonstration was well attested by competent witnesses, and in *The Times* of 28th January 1926 we read :

" Members of the Royal Institution and other visitors to a laboratory in an upper room in Frith Street, Soho, on Tuesday saw a demonstration of apparatus invented by Mr. J. L. Baird. . . .

" For the purpose of the demonstration the head of a ventriloquist's doll was manipulated as the image to be transmitted, though the human face was also reproduced, first on a receiver in the same room as the transmitter, and then on a portable receiver in another room, the visitors were shown recognisable reception of the movements of the dummy head and of a person speaking. The image as transmitted was faint and often blurred, but substantiated a claim that through the 'televisor,' as Mr. Baird has named his apparatus, it is possible to transmit and reproduce instantly the details of movement, and such things as the play of expression on the face."

Another independent witness, Dr. Alexander Russell, F.R.S., Principal of Faraday House, writing a few months later in *Nature*, 3rd July 1926, says :

" We saw the transmission by television of living human faces, the proper gradation of light and shade, and all movements of the head, of the lips and mouth, and of a cigarette and its smoke were faithfully portrayed on a screen in the theatre, the transmitter being in a room at the top of the building. Naturally, the results are far from perfect. The image cannot be compared with that repro-

Miss Dora Selvey photographed with Mr. Baird on the occasion when her image was televised to the " Berengaria," in mid-Atlantic, and recognised on board by her fiancé, Mr. S. W. Brown, the liner's chief wireless operator.

duced by a good kinematograph film. The likeness, however, was unmistakable, and all the motions are reproduced with absolute fidelity. This is the first time we have seen real television, and, so far as we know, Mr. Baird is the first to have accomplished this marvellous feat."

Thus the indisputable fact that Baird was the first to achieve and demonstrate television has been freely acknowledged, and not only in England but also in America, for in the *New York Times* of 6th March 1927, we read :

"No one but this Scotch minister's son has ever transmitted and received a recognisable image with its gradations of light and shade."

Transatlantic Transmission—Scene on "Berengaria."

And again in an editorial of the same journal for 11th February 1928, is the following definite acknowledgment :

"Baird was the first to achieve television."

America's leading wireless journal, the *Radio News*, also paid tribute to Baird's achievement by sending a special Commissioner to England in 1926 to witness a demonstration and investigate Baird's claim to priority. This commissioner, reporting upon his visit in the *Radio News* of September 1926, writes :

"Mr. Baird has definitely and indisputably given a demonstration of real television. It is the first time in history that this has been done in any part of the world."

Much more irreproachable evidence of the same kind could be cited, but it is surely neither desirable nor necessary to labour the matter to establish Baird's claim to priority or the fact that television is fundamentally and in practice a British invention, acknowledgment of which none but an unscrupulous person, whether by design or otherwise, would attempt to suppress.

Let us turn now to some subsequent developments, for it must be remembered that all the demonstrations above referred to had been conducted with only a short separation between the transmitter and receiver, and it was not long before the question was raised as to the possibility of transmitting over great distances.

Baird quickly realised the essential importance of demonstrating that long distances could be covered by these delicate signals between the transmitter and receiver if the system was to be of any practical value in bridging space. Thus he was patiently and unostentatiously pursuing his experiments to ascertain the effects and remedy of extraneous interference when, on 8th February 1928, he astonished the whole world by **transmitting across the Atlantic from a room in Long Acre, London, to Hartsdale, a suburb of New York (the longest distance ever recorded either before or since)**, the recognisable living image of a well known New York personality which was immediately identified.

Here again there is no lack of authentic evidence to establish priority in this epoch-making achievement which will for all time remain one of the most outstanding landmarks in the progress of this miracle of modern invention. Thus we read in the *New York Times*, 11th February 1928 :

A Milestone.

"Baird was the first to achieve television at all over any distance. Now he must be credited with having been the first to disembody the human form optically, and electrically flash it piecemeal at incredible speed across the ocean, and then reassemble it for American eyes. His success deserves to rank with Marconi's sending of the letter 's' across the Atlantic—the first intelligible signal ever transmitted from shore to shore in the development of trans-oceanic radio telegraphy. As a communication Marconi's 's' was negligible ; as a milestone in the onward sweep of radio, of epochal importance. And so it is with Baird's first successful effort in trans-atlantic television."

With such an accomplishment to his credit it is not surprising to find **that Baird was the**

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Jack Buchanan, the well-known actor, posing before Baird's daylight television transmitter.

first to transmit an image to an Atlantic liner in mid-ocean with the same astounding success. A portable receiver was installed on the s.s. "Berengaria," by means of which when the liner was in mid-Atlantic the ship's officers and others witnessed the reception of the living image of a person sitting before the transmitter in London, who was immediately recognised by Mr. Brown, the ship's wireless operator, as his fiance. In the *Television* of April 1928, Mr. Brown writes:

"It was a wonderful experience to be able to see Miss Selvey like that in mid-Atlantic, and the achievement clearly demonstrates the enormous progress which has been made in television."

Longest Wire Transmission.

Previous to these wireless demonstrations, however, Baird had already accomplished **the longest line transmission ever recorded,** i.e. from London to Glasgow. The ordinary trunk telephone line was used, and Professor Taylor Jones, writing in *Nature*, 18th June 1927, reports:

"The receiving apparatus was set up in a semi-darkened room, the lamp and shutter being enclosed in a case provided with an aperture. The observer looking into the aperture saw at first a vertical band of light in which the luminosity appeared to travel rapidly sideways, disappearing at one side and then reappearing at the other. When any object having 'contrast' was placed in the light at the sending end, the band broke up into light and dark portions forming a number of "images" of the object. The impression of side-way movement of the light was then almost entirely lost, and the whole of the image appeared to be formed simultaneously. The image was perfectly steady in position, was remarkably free from distortion and showed no signs of the 'streakiness' which was, I believe, in evidence in the earlier experiments.

"The size of the image was small, not more than about 2 inches across when the 'object' was a person's face, and it could be seen by only a few people at a time. The image was sufficiently bright to be seen vividly even when the electric light in the room was switched on, and I understand that there is no difficulty in enlarging the image to full size. I was told also that arrangements will soon be made for transmitting larger 'objects,' and for increasing the number of appearances of the image per second.

"The amount of light and shade shown in the image was amply sufficient to secure recognisability of the person being 'televised,' and movements of the face or features were clearly seen. At the second demonstration some of those present had the experience of seeing the image of Mr. Baird transmitted from London while conversing with him (over a separate line) by 'phone.

"My impression after witnessing these demonstrations is that the chief difficulties connected with television have been overcome by Mr. Baird, and that the improvements still to be effected are mainly matters of detail. We shall doubtless all join in wishing Mr. Baird every success in his future experiments."

Thus far I have dealt only with Baird's historical achievements.

Let us now examine some significant developments which have arisen out of these fundamental achievements. It was found in the very early stages of the discovery that one of the greatest hindrances to the development of practical television was the difficulty of obtaining absolute synchronism between the transmitting and receiving instruments, and it was not until this problem was satisfactorily and adequately solved that television attained the practical commercial application that it has to-day.

An examination of the published work upon this problem shows that it had intensively engaged

many minds and laboratories in this and other countries, but for the sake of brevity I need not enter here into an examination of the failures of the several methods attempted by the various workers. It will be sufficient to observe that at the first and only satisfactory solution was the auto-synchronism method developed by Baird in which he utilised the impulses of the glow discharge valve of the receiver, whereby electro-magnetic control is effectively obtained.

The first public demonstration of a self-synchronised television receiver took place at the Radio Exhibition in 1928 (by wire), and the first public wireless demonstration of a self-synchronised television receiver, working under commercial conditions, took place before the Postmaster-General and a representative committee of members of Parliament, engineers and officials of the B.B.C. and Post Office, when television was transmitted from Savoy Hill (on 5th March 1929) through 2LO, and received at St. Martin's-le-Grand and simultaneously at the B.B.C. head-quarters, no separate synchronising channel being used, but only the usual broadcasting facilities as used for speech. Only one wave-length was employed for television and synchronising, 2LO being used. Speech was transmitted and received simultaneously, using a separate wave-length.

Prior to this demonstration it had been maintained by the majority of critics that a special wave length was necessary for synchronism, and that television, therefore, was not commercial. This demonstration proved beyond question that the television impulses themselves could be used to obtain complete synchronism. Baird was the first to demonstrate his practical solution of the synchronising problem, which had proved the greatest barrier to commercial television.

These facts are adequately attested, and in *The Times* of 28th March 1929, an official letter was published from the Postmaster-General referring to the test demonstration by wireless which he and others had witnessed. In this letter it is stated that in the Postmaster-General's opinion the (Baird) system represents a noteworthy scientific achievement. The letter also records the following facts:

"The Postmaster-General has considered the results of the recent television demonstration in conjunction with the British Broadcasting Corporation and his technical advisers, and he has

Interested members of the British Association, watching a demonstration of colour television at Glasgow, September 1928.

reached the following conclusions, which accord generally with the opinions of those who witnessed the demonstration. The demonstration showed that the Baird system was capable on that occasion of producing with sufficient clearness to be recognised the features and movements of persons posed for the purpose at the transmitting point."

Equally notable in the rapid sequence of these phenomenal developments was the television of subjects illuminated, only by diffused daylight, the first demonstration of which was given by Baird early in June 1928; and in *Television* for the following month we read, from no less an authority than Sir Ambrose Fleming, F.R.S.:

"The writer has had the opportunity of seeing in practical operation in Mr. Baird's laboratory a very striking advance in the apparatus for television which has been recently made by Mr. Baird.

"In this vast improvement it is not necessary for the face or object, the image of which is to be transmitted for television or 'televised' (if one may venture to coin such a word), to be scanned by a brilliant beam of light traversing it, or to be flooded by powerful infra-red rays as explained below. The object whose image is to be transmitted can be simply placed in diffused daylight, just as if the ordinary photograph of it had to be

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Sir Oliver Lodge and Mr. Baird photographed before the latter's noctovisor at the Leeds Meeting of the British Association in 1927.

taken. The transmitting apparatus is then placed near to the object, and the image of it appears on the screen at a distance when proper synchronism is secured. The advantage of this important advance will be clear. It means that the face of a singer or speaker can be transmitted by television at the same time that the voice is being picked up by a microphone for ordinary wireless broadcasting. It means a great step forward in the possibility of transmitting to a distance the image of moving objects or persons as seen in ordinary daylight, without exposing them to rapidly moving beams of light, or to dazzling illumination or dark heat radiation.

"The television transmitter becomes, in fact, a more complicated kind of camera, in which the screen on which the image appears is not immediately behind the lens, but may be miles or hundreds of miles away."

Major Archibald Church, D.S.O., M.C., another competent witness, writing in *Television* for August 1928 reports :

"On 18th June I was again invited to the (Baird) Long Acre laboratory to further demonstrations. In the first one the persons were seated on the roof in front of the transmitter, the object being illuminated only by daylight. (Incidentally it was an exceptionally dull day.) *At the receiver I had no difficulty in distinguishing between the features of one person and another, or in detecting their slightest movement, there was, in fact, more detail observable than I had seen at the February demonstration when the object was artificially illuminated.*"

Still another remarkable chapter in this romance of applied physics was opened when the television of objects in natural colours was made possible for the first time through the same inventive genius. Thus we find that in July 1928, Baird had solved this problem and gave demonstrations of transmitting and receiving objects in their natural colours with remarkable fidelity. In *Nature* of 18th August 1928, which describes the method, we read :

"The colour images we saw which were obtained in this way were quite vivid. Delphiniums and carnations appeared in their natural colours, and a basket of strawberries showed the red fruit very clearly."

A further interesting and novel development was achieved in the following month. August 1928, when Baird first demonstrated television in stereoscopic relief. Professor F. J. Cheshire, C.B.E., describing this demonstration in *Television* of September 1928, says :

"These pictures, when viewed by an ordinary stereoscope, gave a picture in relief of the object—a human head—transmitted. In this simple way has another milestone been passed on the way to the achievement of that magical combination of the wireless transmission of perfect hearing with that of perfect seeing."

It is also recorded that Baird gave demonstrations of both colour and stereoscopic television at the meeting of the British Association at Glasgow in September 1928.

It would be a regrettable omission were no mention made in this review of two remarkable and noteworthy developments intimately connected with television. I refer to what are known as Noctovision and Phonovision.

It was in 1926, while Baird was studying light intensities and their photo-electric response, that he investigated and succeeded in utilising the infra-red

or invisible rays of light for the transmission of television signals. By this method it was found possible to dispense with visual illumination altogether and to transmit to great distances a brilliant image of a person seated before the transmitter in total darkness. As is well known, one of the peculiar characteristics of the infra-red rays is their power to penetrate fog, which renders this method of incalculable value to navigation and other essential services where visibility is dangerously obscured by either fog or dense mist. Thus Noctovision, another marvel of universal admiration, was achieved and demonstrated by Baird for the first time in history to members of the Royal Institution, London, as early as December 1926.

PHONOVISION is the method evolved by Baird by which the image sound is permanently recorded. By means of these records the original scene can be reproduced repeatedly in the televisor at any time, and the significance and value of this method for the storage and reproduction of the original images of living and other subjects are obvious and as important for vision as is the gramophone record for speech and music.

Of original contributions from other countries to our knowledge of the problems of practical television and their successful solution we find very little that calls for attention.

In 1925 Jenkins in America, using prismatic discs and synchronous motors, fed from a common A.C. supply, succeeded in transmitting and receiving shadows of simple objects. Similar results were achieved in 1926 by Belin and Holweck in France, using oscillating mirrors and A.C. motors synchronised from a common supply.

In 1927 the American Telephone and Telegraph Company gave a spectacular demonstration of television, to accomplish which nearly one thousand engineers were employed. The image was sent by land line from Washington to New York and later by wireless from Whippany, N.J., to New York (30 miles), and much publicity has been given thereto. Dr. M. A. Beauvillier, a distinguished French physicist, writing upon these demonstrations in *Revue Generale de l'Electricite*, Tome XXIII. No. 1, January 1928, says:

"At last the Bell Telephone Company has recently succeeded in transmitting to a great distance by wireless the human face, using (without acknowledgment!) the method of Baird."

In Germany in 1928 Mihaly gave widely advertised demonstrations of the formation of shadows, using what appeared to be an exact copy of one of Baird's earliest experimental models as sold to amateurs by Messrs. Selfridge, Ltd. The special correspondent of *Popular Wireless*, 11th August 1928, reported upon these demonstrations as follows:

"His apparatus is simply the Plotnow or Lipkow—or call it the Selfridge, if you like—disc system. . . . With his discs Von Mihaly showed me names and designs drawn on glass as well as letters. I tried a simple photographic negative, but at the receiving end the detail was hardly perceptible."

Such, then, is the record of facts. In the short space at my disposal I have obviously not attempted to write anything in the nature of a history of television, but rather to review some outstanding facts concerning its origin and progress with special reference to the only practical system at present known. If, therefore, I appear to have dealt at length with the work of any one man it is because to him we are the more indebted for his epoch-making discovery. It is a strange and sinister reflection upon our modern civilisation to find how many a famous inventor, faced with the struggle for existence, finds himself confronted by powerful organisations and vested institutions insidiously using their great influences to oppose and obstruct the progress of an invention in order to acquire or maintain a monopoly upon their own terms.

Equity, it would appear, is the last thing which enters into such considerations. Thus it is that development is impeded for lack of those facilities and support essential to progress. One can only feel glad that we have outgrown the days when such men of genius as Galileo and others were incarcerated for daring to discover and enunciate some fundamental truth. Other days, other methods, but the results are the same. Nevertheless, truth remains. To quote Sir Ambrose Fleming "Baird was the first to demonstrate practical Television and to inaugurate a new departure in electric technics which will have immense developments in present and future years."

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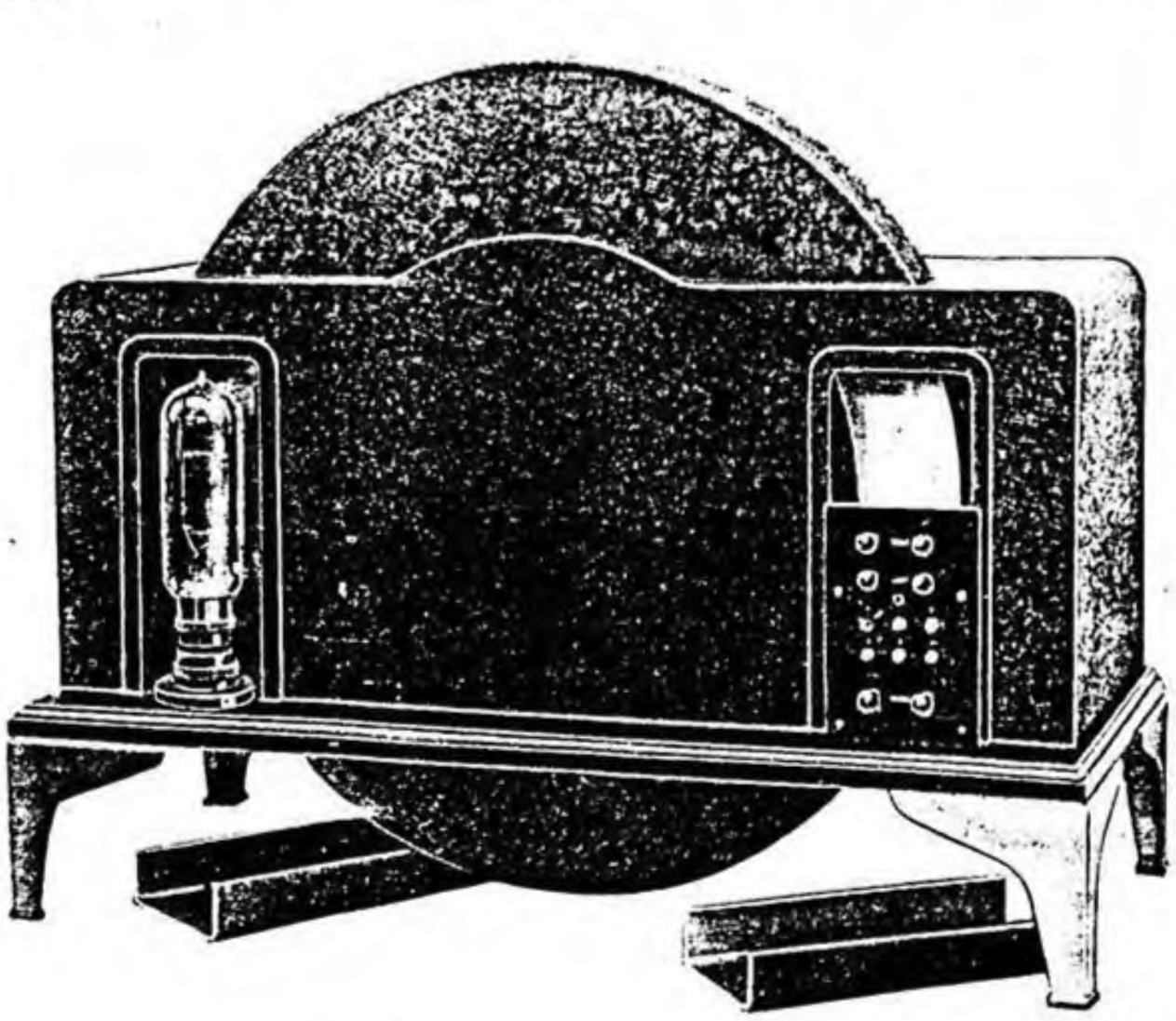
THE BAIRD "TELEVISOR" Front view



THE BAIRD "TELEVISOR" Back view

Reception of TELEVISION BROADCAST

Instructions for Operating

BAIRD "TELEVISOR"

Home Reception Set

IN order to obtain the best results in connection with the broadcasting of Television pictures, it is advisable to have a brief knowledge of the principle of the Baird system. From the transmitting station which at present is situated at 133 Long Acre, W.C.2, animate and inanimate objects are regularly "Televised" and transmitted over the ether by the B.B.C.

The transmission is in the form of ordinary "wireless waves," but is made up of two elements. These two elements, after passing through your receiving equipment, can be described as follows :—

(*a*) *The element which is responsible for the light variations in the neon lamp.*

(*b*) *The element which is responsible for the electric impulse supplied to phasing coils of the Televisor.*

The object of the former is to produce, in conjunction with the scanning disc of the Televisor the light and shade of the picture, and the latter to ensure that your machine keeps absolutely in step with the transmitting machine in the Baird studio.

RADIO RECEIVING SET

YOUR receiver should be capable of delivering good quality output of the order of 1½ watts on optimum load. Extreme selectivity is not necessary or desirable and any form of sharp tuning which tends to distort or reduce the upper frequencies of the signal should be avoided. Similarly it is important to preserve as much as possible of the lower frequencies in the amplifier stages. We strongly recommend the use of

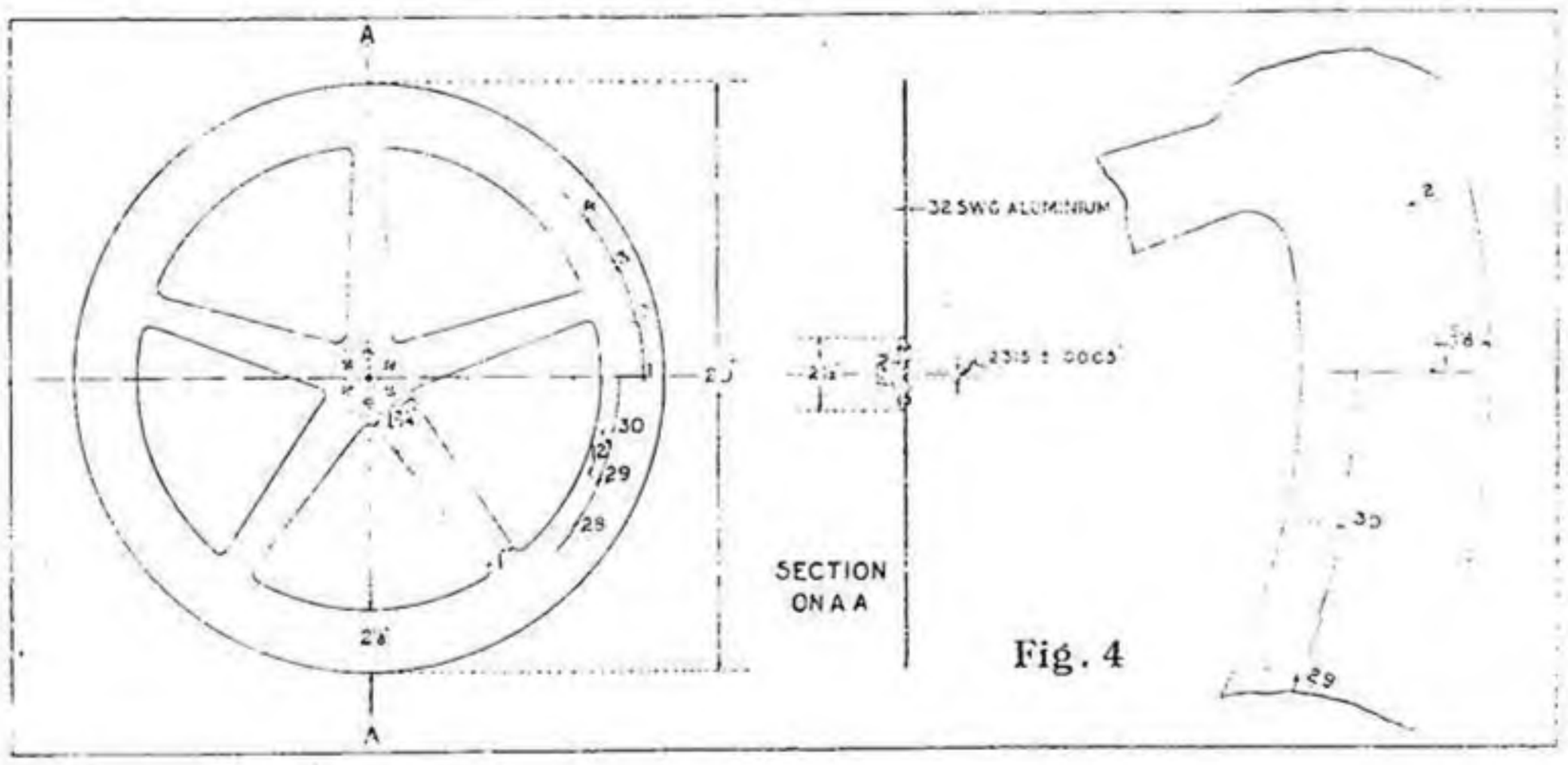


Fig. 4

resistance capacity low frequency coupling in preference to transformer or choke coupling. An effective volume control is very desirable, but this should not be in the form of reaction or any other method affecting the stability of the receiver.

The Baird "Televisor" consists of four essential parts :—

(1) The Baird Graduated Disc.
(2) The Baird Motor.
(3) The Baird Automatic Synchronising Gear.
(4) The Baird "Televisor" Neon Lamp.

1. **THE BAIRD GRADUATED DISC** is shown in the Diagram Fig. 4. It is 20 inches in diameter, made of light aluminium, and perforated with a series of 30 apertures, arranged in a spiral.

It will be noticed that the first three and the last three of these apertures are not squares but rectangles, the effect of this being to give an image with more detail in the centre than at the edges. This effect, which is known as "graduated exploration" makes the most efficient use of the detail permitted by the 10-kilocycle band, which is all that can be transmitted through the B.B.C. stations at present. The ratio of width to length of the picture is 1 wide to 2.3 long. This rather long picture has been found, after extensive experiment, to make the most efficient use of the detail available on the 10-kilocycle waveband, where most of the images transmitted are of the heads and shoulders of persons speaking, and the picture is long in relation to its width.

2. **THE BAIRD MOTOR** to rotate the disc is a universal motor—that is to say, it will run on either alternating current or direct current, and is wound to run at 750 r.p.m. at 100 volts, 50 cycles A.C. If A.C. supply is not available, the motor may be run off D.C., the required voltage in this

case being 45 volts. A fixed resistance, with a variable resistance in series with it, is contained in the "Televisor" to step down the supply voltage to the required value.

3. **THE BAIRD AUTOMATIC SYNCHRONISING GEAR** makes use of the thin black strip dividing consecutive pictures to provide the synchronising impulse. This synchronising impulse is fed to coils actuating electro magnets pulling upon the teeth of cogged wheels. These teeth are separated by gaps four times wider than the width of the teeth. In operation, part of the received current passes through the coils of the correcting magnets; if the transmitter and receiver are running in step (i.e. in synchronism) at the moment each tooth is under the magnets it receives an impulse. If the receiving motor runs too slow or too fast this impulse either pulls the tooth back or forwards as the case may be, and provides a rectifying force pulling it into step.

Isochronism or "phasing" is obtained by rotating the synchronising gear around the centre of the motor shaft. This adjustment is made by turning the central knob on the front of the Televisor. When two portions of a picture appear, one vertically above the other, it shows that a phasing adjustment is required.

The cogged wheel must not be confused with a phonic wheel. A phonic wheel has teeth equal in width to the separating gaps. A Baird cogged wheel has teeth very narrow compared to the gaps and operates in a different way to a phonic wheel. This is most important, as a phonic wheel will not give successful results.

4. **THE TELEVISOR.** This consists a of universal motor which is coupled to a scanning disc. Behind the scanning disc and on the right hand side of the instrument is a neon lamp, and in front of the disc in line with the lamp is a lens system through which the object is viewed.

The motor is designed to run at 750 r.p.m. at 100 volts 50 cycles A.C. or 45 volts D.C., and in order that the machine may be run off existing lighting mains a resistance system is provided inside the Televisor cabinet. The current consumed is approximately $\frac{1}{3}$ of an ampere.

The resistance arrangement consists of a tapped fixed resistance which is connected to the terminals marked A., B., C., D., E., F. on the panel, and a variable resistance whose control knob is situated on the front of the cabinet at the left hand side.

By consulting the Chart which will be found inside the Terminal cover of the Televisor it can be ascertained to which terminal you should join

the wander lead from T in order to get the speed of the motor approximately correct for your particular voltage supply.

Please note that the voltage for which the Televisor is suitable (whether 200 to 250 or 100 to 125), is clearly indicated by the label attached to the machine. The fine adjustment necessary to the resistance in the motor circuit is accomplished by operating the variable resistance, previously referred to as being on the left hand side of the cabinet. By this means the speed of your machine may be made to approximately correspond with the speed of the transmitting machine—the feature which is essential in obtaining perfect pictures.

FIG 1

FIG 1A

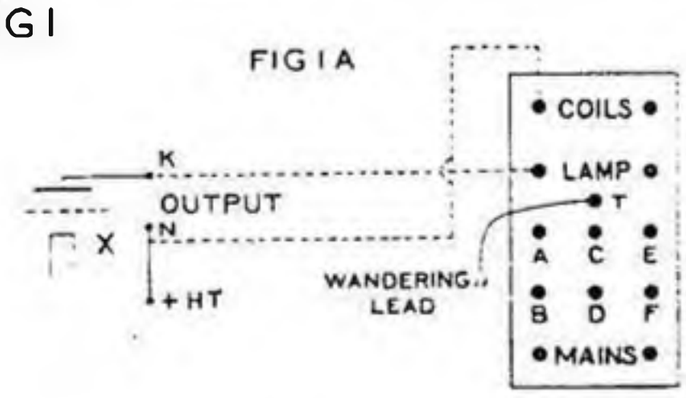
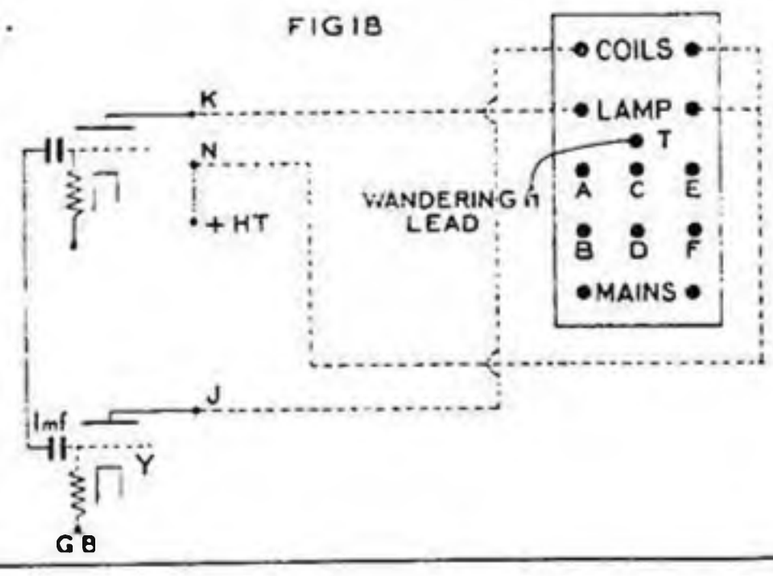


FIG 1B



On the end of the motor shaft remote from the scanning disc there is a mechanism called a synchronising unit. This unit keeps the motor speed absolutely the same as the speed of the motor at the transmitting station, when once you have obtained the approximate speed as described above.

The coils of this synchronising unit are joined to the terminal panel as indicated thereon.

A further object of this synchronising unit is to enable you to get your picture in the middle of the lens system. This operation is accomplished by rotating the knob on the front of the Televisor case underneath the escutcheon plate.

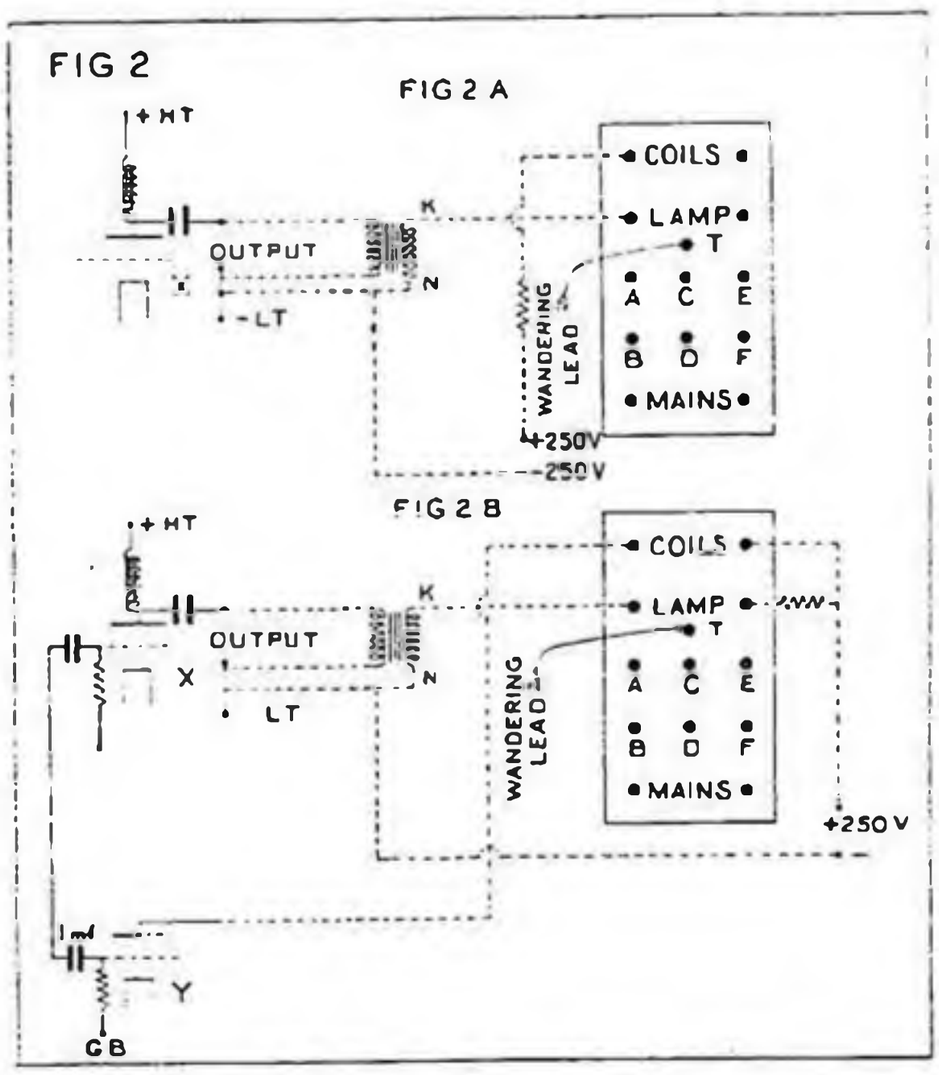
With reference to the neon lamp, this should be fitted to its socket in such a manner that the round rod which lies horizontally behind the plate is nearest to you when you are standing at the back of the Televisor.

HOW TO CONNECT UP

Motor. After having joined the wander lead to the correct terminal on the panel as described above, join your supply to the terminals marked "Mains" by means of the lead supplied.

WIRING BETWEEN THE TELEVISOR AND THE WIRELESS RECEIVER

(i) *Sets in which the output circuit is as shown in Figs.* 2A *and* 2B.



(ii) *Sets in which the output circuit is of the type shown in Figs.* 2A *and* 2B. In a circuit of this type the primary of a transformer should be connected across the output terminals of the set and the secondary joined up as shown.

The H.T. supply to the neon may be obtained either from the same source as that from which the radio set is fed, or from a separate supply.

(iii) *Sets in which the output circuit is of the type shown in Figs.* 3A *and* 3B.

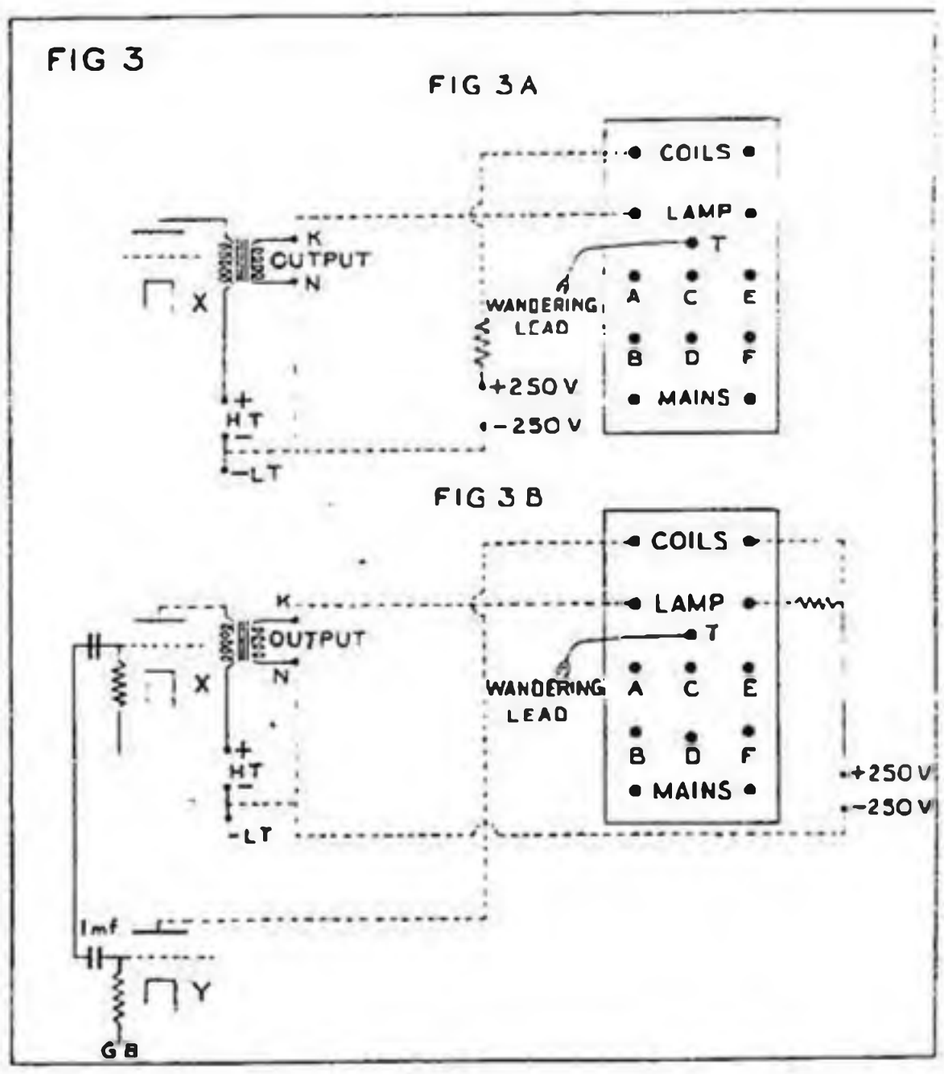
In a circuit of this type the output terminals should be connected up as shown.

Long leads of twin flex between the receiver and the Televisor should be avoided.

Of the two schemes shown in Figs. 1A and 1B the Fig. 1B scheme entails the use of an extra valve, but this arrangement is sometimes preferable to that of Fig. 1A.

Fig. 1A *Scheme.* The valve X shown is the low frequency output valve of the receiver, and this valve should be capable of passing an anode current of at least 25 milliamps. An H.T. voltage of not less than 300 volts should be used.

Fig. 1B *Scheme.* In this scheme valves X and Y should each be capable of passing an anode current of at least 25 milliamps. An H.T. voltage of not less than 300 is required.



Operation

Tune in the radio station which is sending Television, in the same way as you would tune in for ordinary broadcast reception. The television note may be described as a high pitched steady note with another high pitched chirrup superimposed on it.

It is not necessarily the strongest signal that will give the best picture. The volume control of the receiver should be used to regulate the intensity of the picture until the most pleasing effect is obtained.

Having tuned in, switch off your receiving set and start the motor of the Televisor; when the motor is up to speed switch on your receiving set again and look in the opening on the right hand side. You should now see some form of image (probably distorted) having a dull red background. Assuming that your variable resistance was in its minimum position (that is, turned around to its extreme position in an anti-clockwise direction) the next step to take is to rotate this resistance knob gradually in a clockwise direction, thereby causing the motor to increase its speed.

A series of black lines will soon be seen to appear and sweep downwards across the lens. At first these lines will be only slightly inclined from the vertical, but they will gradually, with increasing motor speed, assume a more horizontal inclination, the picture, meantime, appearing between them.

The speed of the motor must be increased until the lines lie horizontally. When this state of affairs is reached, the Televisor is synchronised and the synchronising gear should now automatically maintain this condition; the picture by this time should be plainly visible. If one overshoots the mark, by increasing the motor speed too much, the lines will appear to sweep upwards across the lens. Always remember that lines sweeping *downwards* signify that the motor is running *too slow*, or that the knob must be turned in a clockwise direction. Lines which sweep *up* show that the motor is running *too fast*, and the knob must therefore be turned in an anti-clockwise direction.

Assuming we have the Televisor synchronised, it may be found that we get a double picture. Two portions of a picture may be seen lying side by side, or two portions may appear, one vertically above the other. If the former state of affairs is present the motor speed must be increased slightly until the images start moving slowly downwards. Let this go on until the double picture resolves itself into a single one, and then quickly bring back the speed of the motor to normal again.

Two portions of a picture appearing one vertically above the other, indicate that a phasing adjustment is required. In this case the control knob in the centre of the Televisor must be turned either to left or right until one picture only is seen.

Negative Pictures :

Under certain conditions, a negative picture instead of a positive picture may be obtained. A negative picture is one in which the light portions of the image come out dark, and *vice versa*. The question of whether the picture seen in the Televisor is a negative or positive is dependent on several factors, amongst them being the number of valves in use and the type of rectification employed.

Turning a Negative Picture into a Positive Picture :

In the case of the wiring schemes outlined in Figs. 2A, 2B, 3A, 3B, a negative picture may be turned into a positive by interchanging the leads at K and N.

In the case of the Figs. 1A, and 1B, schemes, it will be necessary to connect the primary of a transformer across KN, turning the circuit arrangement into that of Figs. 2A or 2B.

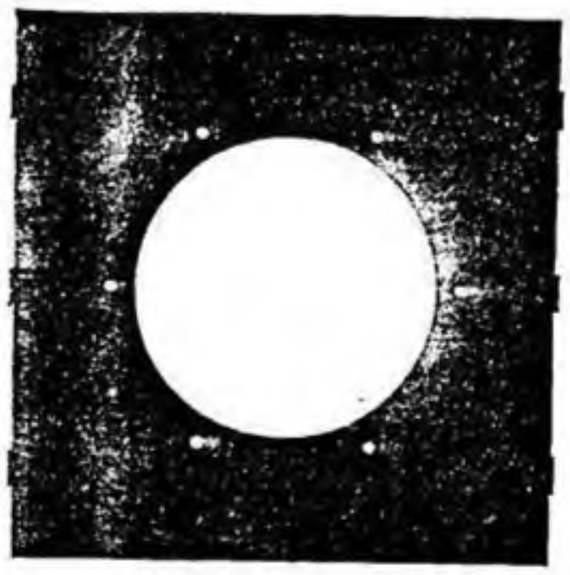
NOTABLE DATES
in the history of the
BAIRD TELEVISION

Progress in the Development of the Baird System of Television

1923. The Production of Shadowgraphs.
1925. (April)—Demonstration at Selfridges.
1925. (Oct.)—Mr. Baird obtained the first true image of "Stukey," the dummy figure.
1926. (Jan.)—Demonstration of True Television to members of the Royal Institution.
1926. (Aug.)—Opening of 2TV, the first experimental Wireless Broadcasting station for Television. Opening of Harrow experimental Wireless Broadcasting and Receiving Station.
1926. (Dec.)—Demonstration of Noctovision to the Royal Institution.
1927. (April)—Demonstration of Vision through Fog, to Admiral Kerr and others.
1927. (26th May)—London to Glasgow Television Demonstration, transmission by land line.
1928. (8th and 9th Feb.)—London to New York television transmission.
1928. (7th March)—London to the " Berengaria " in mid-ocean. Transmission repeated 8th March.
1928. (2nd July)—First Television Demonstration by daylight.
1928. (6th July)—Demonstration of Colour Television.
1928. (4th to 10th Sept.)—Demonstration of Stereoscopic Television to British Association at Glasgow.
1928. (22nd Sept.)—Demonstration of Commercial Model at Olympia.
1930. (Feb.)—Television and Baird's Products on the market.

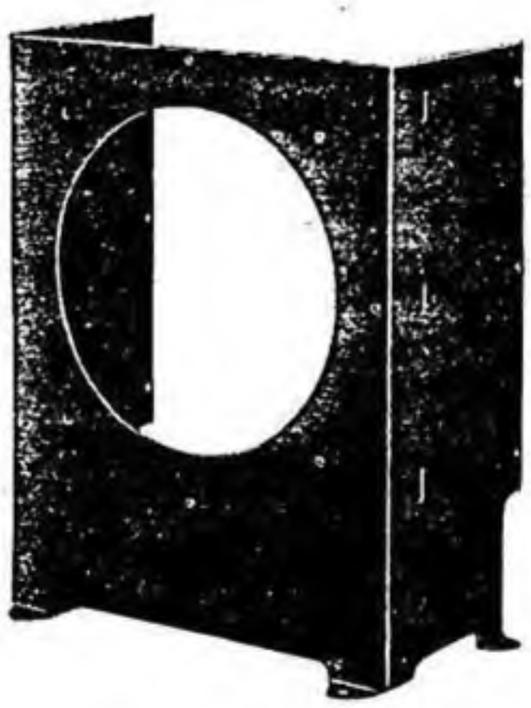
BAIRD BRANDED COMPONENTS

Lens Box Assembly (1)



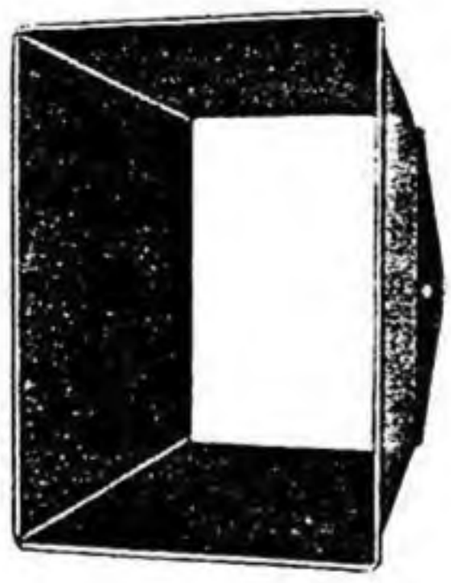
Lens Box Assembly (2)

Lens Box Assembly (3)



Lens Box Assembly (4)

Lens Box Assembly (5)



Lens Box Assembly (6)

Spindle

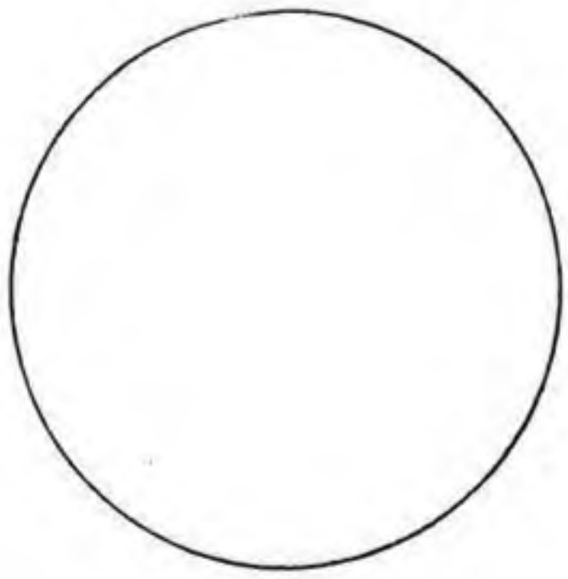
Knob

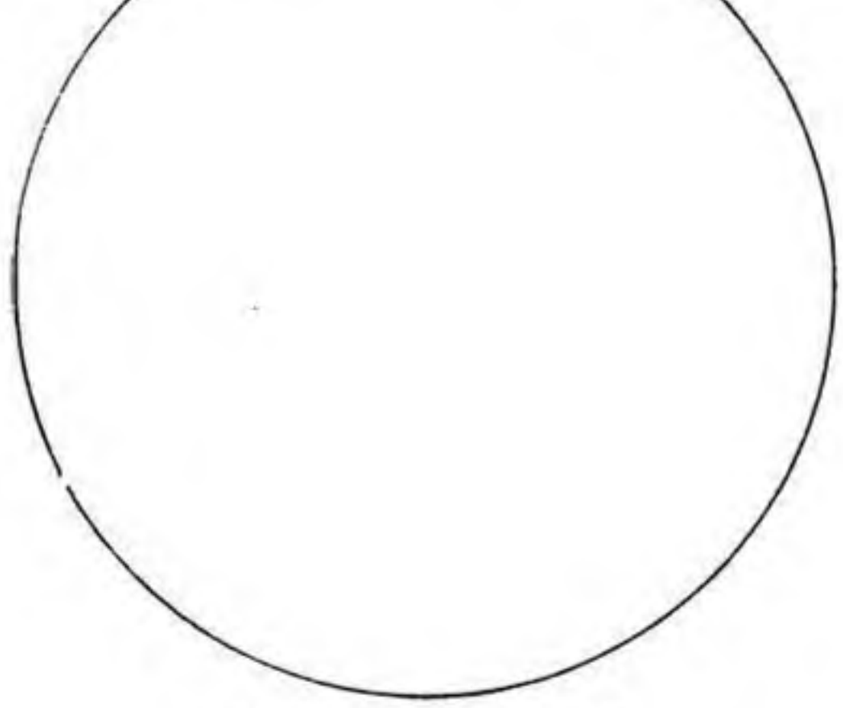
Collar

Pinion

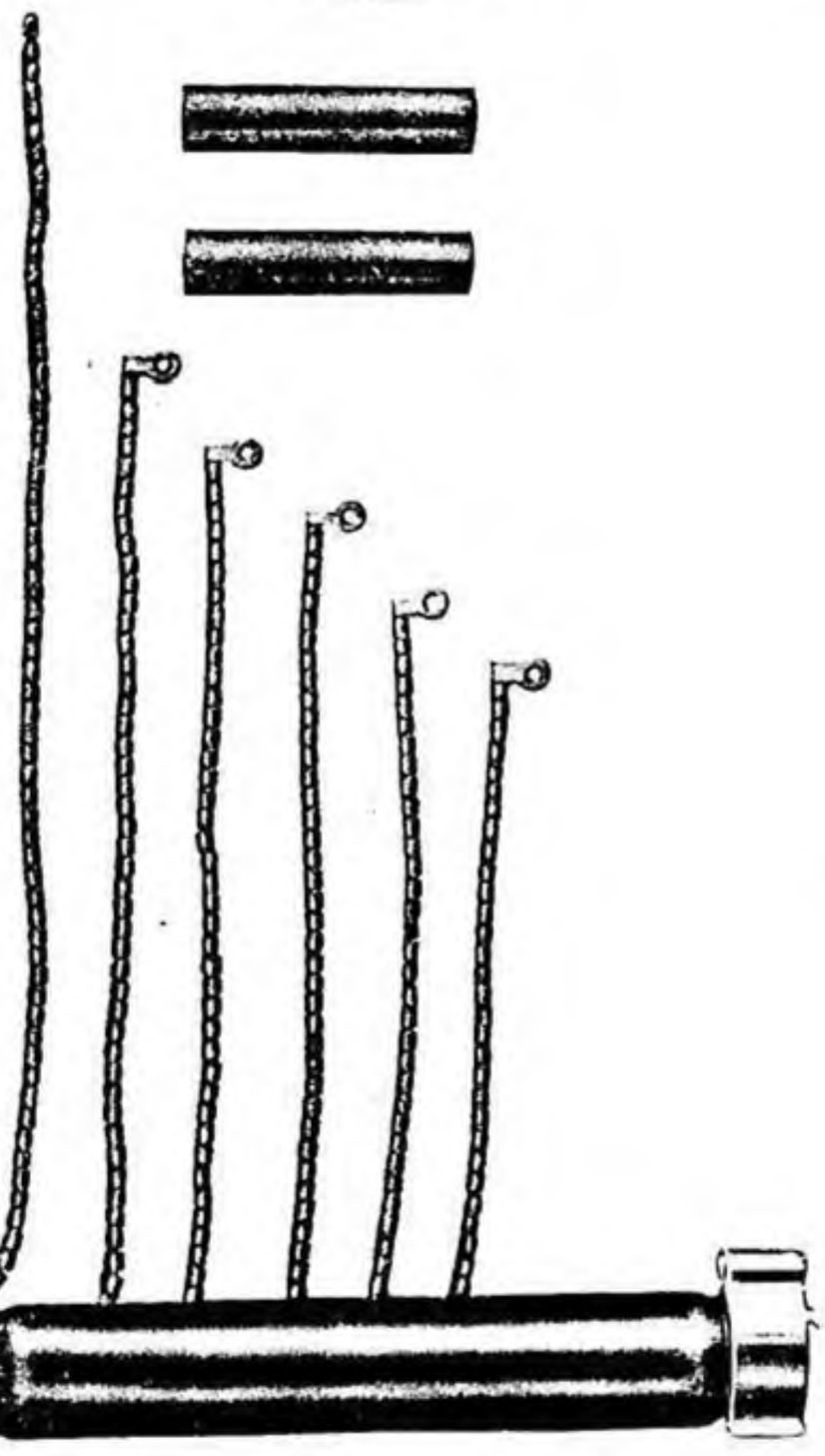
SPINDLE ASSEMBLY

BAIRD BRANDED COMPONENTS

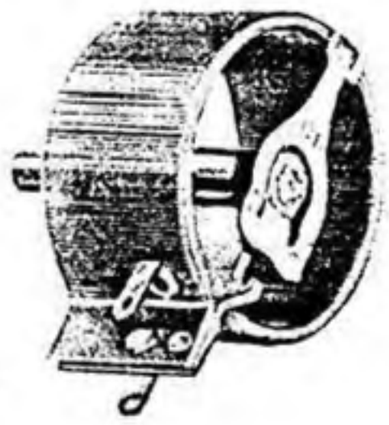


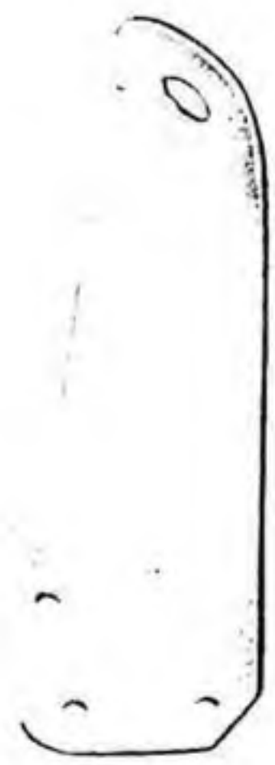


Lenses (large and small)



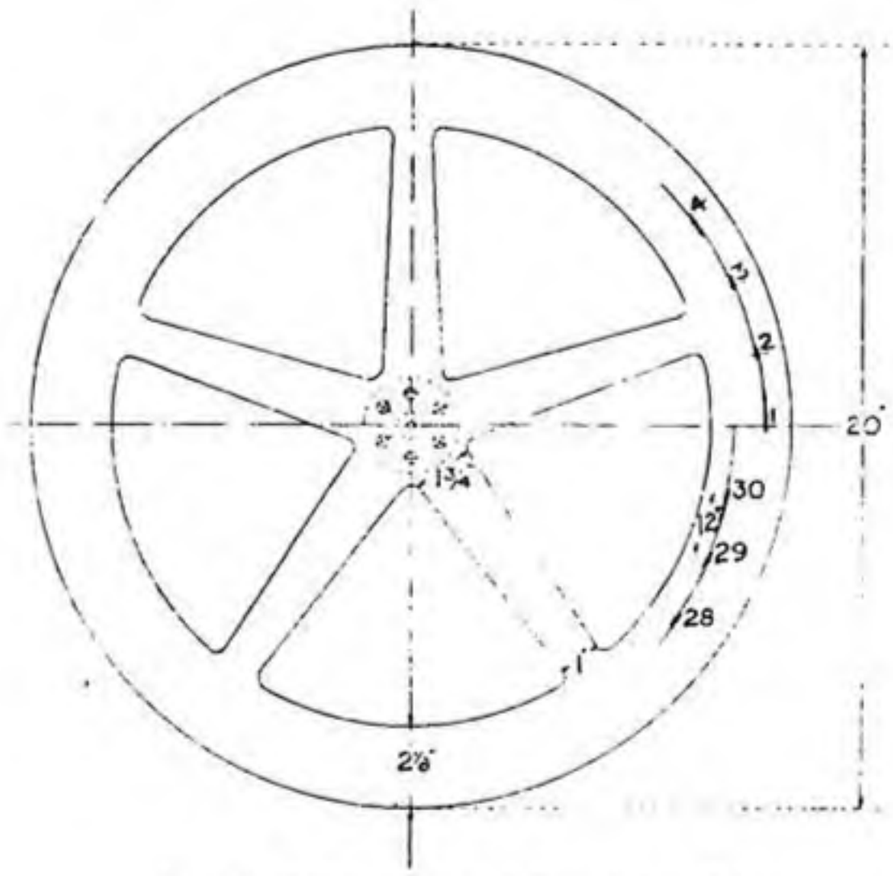
Zenite Resistance and Ebonite supports



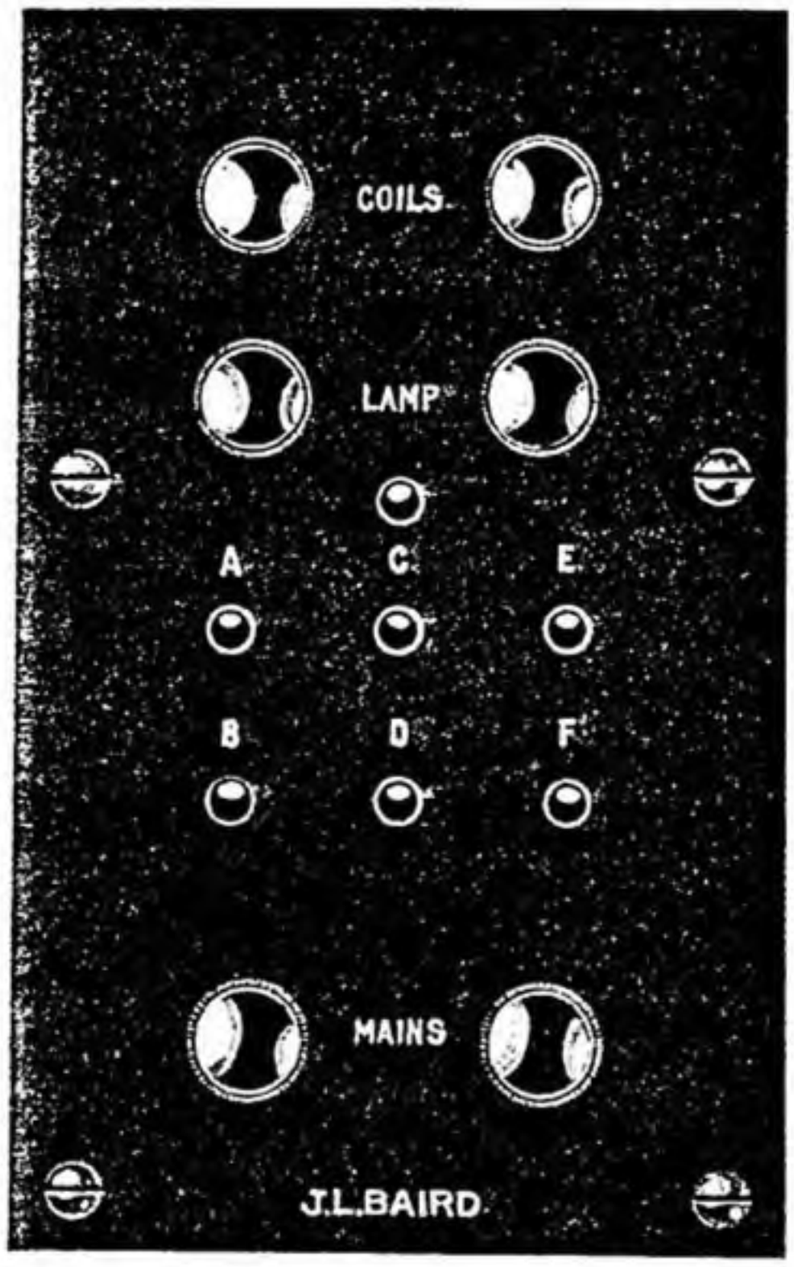


Variable Resistance and Bracket

BAIRD BRANDED COMPONENTS



The Baird Graduated Receiving Disc

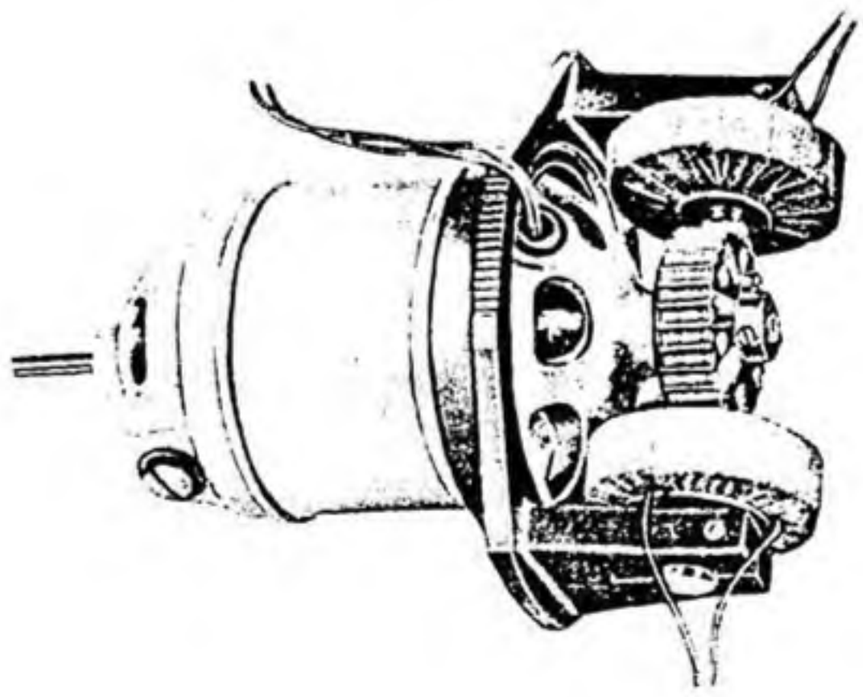


Terminal Board Assembly

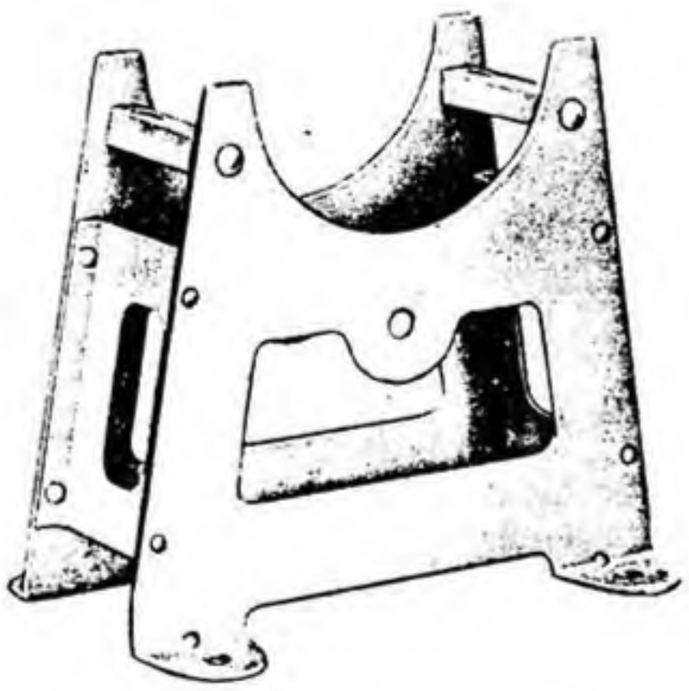
Flexible Lead and Adapter

T.C.C. Condenser

BAIRD BRANDED COMPONENTS



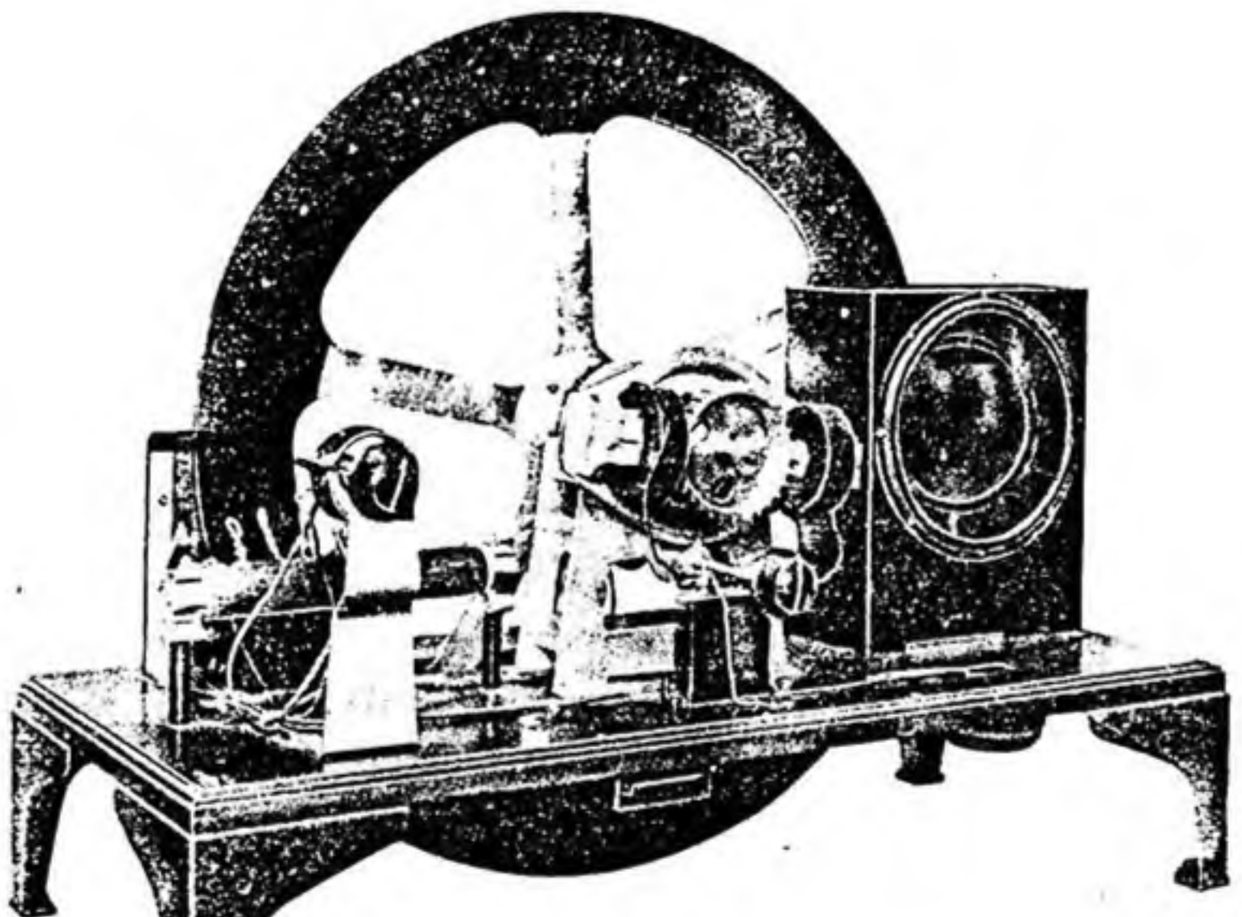
Universal Motor, complete with synchronising gear



Straps and Motor Bracket

Flat Electrode Neon Tube and Holder

The BAIRD 'TELEVISOR'



Baird Branded Components for Home Construction

IN addition to the "Televisor" Home Reception Set we can supply complete range of Baird branded parts for the home constructor. We can also provideany singlepart of the apparatus thus enabling the experimenter to build his own experimental apparatus.

We feel that all those who are keenly interested in television should know and definitely realise that Baird branded products are the only genuine television components. The successful reception of the Baird transmission is dependent upon the use of *Baird* instruments only. Perfect reception is then guaranteed.

What the great Marconi has done for wireless Baird has done for television. We, as producers of his apparatus, wish to ask our public to join us in furthering the cause of television by co-operating with us to ensure longer hours and better programmes to which end all television enthusiasts must work.

BAIRD BRANDED COMPONENTS

for perfect reception

BAIRD

Service

for the Owners of

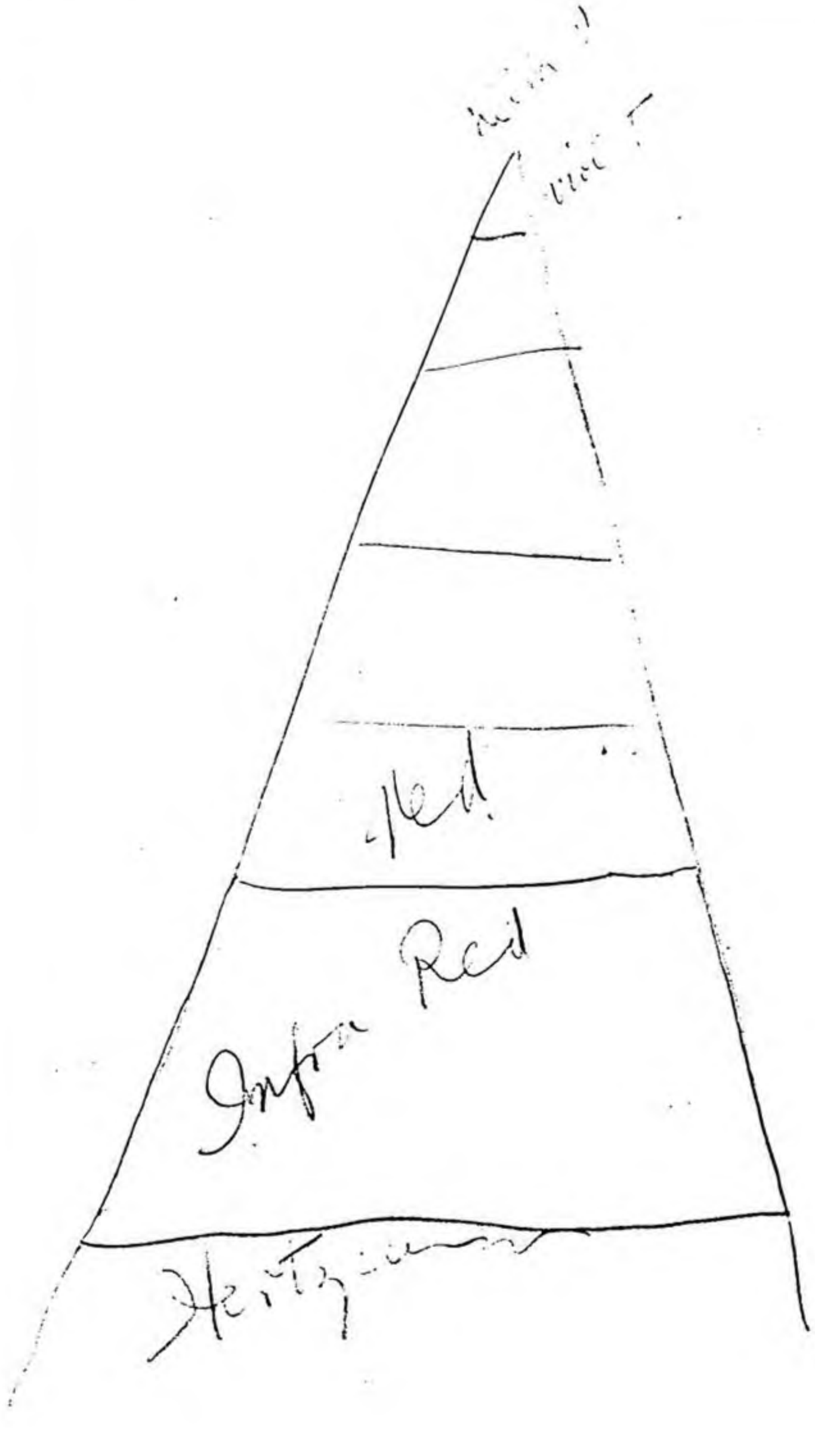
BAIRD

"TELEVISORS"

OWNERS of Baird Television Sets will be supported by an efficient service including a staff of trained service men. Should any owner get into difficulties, a telephone call or a postcard to his dealer will bring him technical advice. In return for the support we know we are getting from the public, we are prepared to give every possible assistance in installing, running and maintaining their "Televisors."

133 LONG ACRE, LONDON, W.C.2

Telephone: TEMPLE BAR 5401



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