RADAR AND CONTROLLED MISSILES

COMBINED INTELLIGENCE OBJECTIVES SUB-COMMITTEE

LONDON-H.M. STATIONERY OFFICE

RADAR AND CONTROLLED MISSILES
PARIS AREA

Reported By

Maj. N.D. CRANE, Sig. C.
Team Leader

CIOS Targets Item 1
Radar

COMBINED INTELLIGENCE OBJECTIVES SUB-COMMITTEE
G-2 Division, SHAEF (Rear) APO 413

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Personnel of Team

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SUMMARY OF TECHNICAL FINDINGS

General Description of Results.

The primary objective of the CIPC Radar and Guided Missiles Team in the inspection of Target Paris was to obtain evidence about German Research and Development in Radar and Guided Missiles. The method used was to confer with engineers of the French Radio Companies and to inspect the work they had done for the Germans to attempt to learn the information they and their companies had gleaned from the Germans in either direct or indirect association. About 30 targets were investigated but relatively little new information was obtained.

In the totality of the factories inspected, numerous German Radio, Radar, DF, and similar equipment were to be found, some at a late stage in production, others partially produced and still others existing only as a prototype for French manufacture. In general this equipment was neither new or highly interesting to technical and scientific intelligence teams. A great number of these sets, although new to French manufacturing had been produced and used much earlier by the Germans. No significant radical changes in design nor any diminution of the quality of the German gear was noted.

From all that our team could learn, the Germans did not reveal their researches in the fields of Radar and Guided Missiles to the French. Principal information obtained by the French from the Germans was manufacturing detail concerning the equipment that they, the Germans, wanted the French to manufacture. Naturally there was considerable interchange on the latter.

The German scientists, technicians, and military men showed considerable interest in French research in UHF and Microwave as well as subjects like television which are closely akin to Radar. The French firms which did not want to collaborate with the Germans used devious means to conceal partly or completely the results of their own research.

It is very interesting and highly important to note that the greatest amount of information our teams obtained concerning German researches came from the Companies which showed us the results of their own research in the microwave region. This is to be expected since the Germans saw this same research and asked questions which could not help but reveal some of their own knowledge. Companies which preferred not to reveal their own research were not very profitable targets as far as scientific intelligence is concerned.

Information on German Developments.

Guided Missiles.

In the field of Guided Missiles, the Germans pretty much excluded French Industry. This is not at all unusual since this has always been a more secret subject than radar which itself is not revealed to French industry.

Radar Sets.

In the field of operating Radar Sets, nothing new was obtained.

UHF and Microwave Systems.

In the fields of UHF and Microwave systems it is noteworthy that there is ample evidence gained here of more researches on wavelengths down to 50 cms. On wavelengths from 50 to 20 centimeters there is some evidence of an extension of longer wave technique to cover this difficult region.

In the microwave field there is ample evidence that the German research group has now turned to development. Actually there is no good evidence for production except in the field of search receivers in the 5 to 15 cms region (See L.M.T., Kriegsmarine Extension reports).

UHF and Microwave Components.

Crystal Detectors. Samples and information about German Crystals used from 50 to 10 cm. have been obtained. It is evident from these that German crystal work is not up to British and American standards. Unquestionably German crystal detector development received a considerable impetus when they found from radar sets on allied crashed aircrsft that we used crystal detectors in the 10 cm. region. From the mechanical design of the German crystals, it looks as if they copied some of our work. (See L.M.T. report)

Valves. Our teams found a few examples of new techniques in German valves but nothing spectacular. A coaxial type tube with metal to ceramic seals was perhaps the most significant. (See Compteur report). Different methods of mounting tube elements were occasionally seen.

Klystrons. No detailed German work on Klystrons was uncovered but French engineers assured us that the Germans were developing them

Magnetrons. No German magnetron work was revealed but it was learned that there is a group of German scientists

working on their developments.

Appraisal of German UHF and Microwave work.

Summarizing the information and impressions gained concerning German UHF and Microwave research and development, it is evident that their engineering is good. However, the Germans apparently never realized that microwave equipment was operationally possible until as shown by the Allies. It is common knowledge among French Engineers that the Allies have radar working in the centimeter region. Now unquestionably the Germans are developing operational gear in the centimeter region yet there is no very good evidence of the quality.

Estimated German Knowledge of Allied Developments.

There was no significant information gained in Paris to the effect that the Germans had any more knowledge of Allied Radar developments than one would expect from the fact that they have captured large numbers of our X and S band sets from aircraft

The French Radio Industry

Extensive information on the French Radio Industry was obtained from M.Giboin, who has acted as Co-ordinator of the French Radio Industry from the French Ministry of Supply, both now and during the occupation. As co-ordinator he determined not only the nature of the contracts but to some extent the nature of the research carried out by each firm.

M.Giboin also supplied information on the German restrictions on Radio. The French were prohibited, under severe penalties from manufacturing transmitters and receivers without knowledge of the Germans. The Germans forbade all radio teaching on high frequencies in Northern France during the occupation.

M.Giboin further supplied information on the complete organization of the French Industrial Production. The text of M.Giboin's remarks on the French Radio Industry follows:

1. General information.

Excluding consideration of manufacturers special radio measuring equipment, as they form a special branch group 13 of COCLEC (electrical measuring instruments) the radio industry makes up three groups of COCLEC (Comite d'Organisation de la Construction Electrique) numbers 18, 23, and 24.

Group 18: Amateur equipment and individual components (primarily broadcast receivers and public address systems.)

Group 23: Professional equipment.

Group 24: Tubes (transmitting, receiving, and special electronic tubes).

This division is a recent one made for administrative rather than technical reasons; for three years the whole French radio industry was administered by a single professional group. From a technical viewpoint, this industry is a single one; nevertheless specialization of firms for manufacture of various items has made the subdivision an easy one.

Group 18 consists of 1500 firms of all sizes, some few large ones, mostly medium sized ones, many very small shop type enterprises and over 500 individual entrepreneurs. About 150 firms mostly of medium size are specialized component manufacturers, each one normally making only a single type of part: loud speakers, variable condensers, coils, potentiometers, resistors, etc. Other firms manufacture broadcast receivers or amplifiers from parts either brought from other firms or manufactured by themselves.

Group 23 consists of over 100 firms including the largest ones in the radio industry and also some small firms and even a few individual entrepreneurs. Included also in this group are some operating concerns which run radio communications services. The manufacturer's principal and sometimes only client is the Government (departments) or public services.

Group 24 includes six receiving tube manufacturer's, 8 transmitting tube manufacturers, and a few manufacturers of special electronic tubes or separate parts for tubes. There are fewer than 50 enterprises in all in this group.

In all these three groups employ about 17,000 people and do business of real financial importance amounting to about one fourth of that done by the electrical manufacturing industry as a whole.

As a general comment on this branch of industry one may say that it consists of far too many enterprises resulting in dispersal of facilities and excessive competition. This is less true of group 24 (professional equipment) than in the other groups. As a matter of fact the largest concerns in group 24 have quite important research laboratories and offices for study.

2. Situation of the Radio Industry during the German Occupation.

The occupying authorities attempted to get all French industry for their war ends, and therefore to prevent satisfaction of purely civilian needs.

To achieve their ends they forbade manufacture of various products, closed down certain types of enterprises and moved worker personnel about. On the French side the effort was, on the contrary, to keep as much activity to satisfy French civilian or apparently civilian both public and private, as possible.

The primary interest of the occupying power was production. Factories were classified as Rustung Betrieb (factories attached to armament factories) V Betrieb (priority factories) and other enterprises. The first were administered by armament inspectors, the second by economic occupation authorities, and those not belonging to either Rustung or V categories were obliged to shut down.

Generally speaking, German firms were given control of the French firms and were to flood them with orders. In the professional radio equipment industry these firms were: Telefunken, Lorenz, Opta (i.e. formerly Loewe), Siemens and Elektro Spegial (i.e. Phillips). In spite of all their efforts, the occupants were unable to exact a toll of more than about 70% of the productive capacity put at their disposal.

With regard to facilities for study and research, the Germans were hardly interested. They confined themselves to asking without insisting very much that most of the engineers connected with these activities be transferred to production. Of course there was a maximum amount of inertia opposing these requests. Never were the Germans kept up on details of studies which were continued, and even less of the results.

Nevertheless the few efforts made by the Germans to pass on research problems to French industry, were met with extreme reluctance. The only instance worthy of mention in the radio industry is the company "des Compteurs" (at Montrouge) which did such spectacular television research for Telefunken that the laboratory was given considerable freedom of action.

Of course the presence of the Germans was quite annoying insofar as research for French benefit was concerned, particularly when the experiments required radiation. Thus, in general such research was done in unoccupied zones until

November 1942, and the freedom which existed until then has subsequently disappeared. It must also be conceded that there has often been prevarication and much time lost, but nevertheless there has been real progress on some problems.

3. The CCTI

Formed in November 1940 at Vichy, the CCTI (Committee for Coordination of Imperial Telecommunications) was set up to coordinate the needs and research of the various French agencies. It is this committee which supervised research done by the radio industry and has been most useful in forestalling duplication and excessive dispersal of effort. This committee is not only continuing but will be called on to expand its work. It is well to bear in mind that CCTI is competent to deal with all of the field of telecommunications including both wire and radio communications. Material in the wire field falls under groups 19 and 20 of COCELEC. Group 19 covers electric wire and cable while group 20 covers telephone and telegraph material.

4. Role and Work of the Ministry of Industrial Production.

Basically responsible for the organization of the professions, the Ministry of Industrial Production has tried through the Committees of professional organization to persuade both the industrialists and their clients to use the methods in each branch of their production which are best adapted to the realization of the final aim. Insofar as telecommunications equipment for the French is concerned the work of the Ministry is easy inasmuch as the clients are all grouped together in the CCTI. The German client however to a large extent worked against the committee as he often acted in a fashion contrary to the wishes of the French Ministry. Thus he gave orders to enterprises which the French would have felt it desirable to have go out of business, and on the other hand tried to put out of business some concerns which the French considered worthwhile. This client was very reluctant to permit interference on the part of the Ministry and the Committee of organization.

The efforts of the Ministry of Industrial Production have the double object of concentration of effort and of specialization.

Concentration to be primarily directed toward a reduction in the number of enterprises in order that their research and production facilities may be increased (which is not to say that trusts are to be favored) and implies primarily regulation and coordination of competition.

Specialization is a means of encouraging technical progress.

5. Detailed Information on Manufacturers of Professional Radio Equipment.

The list given below includes the principal manufacturers of this type of equipment and gives some details about them.

In order to give an idea of the productive capacity of the various firms, the list cites the number of employees and the value of business done in francs. It is very difficult to give this information accurately: the figures may vary widely depending primarily on the nature of the orders received by the factories. In addition to permanent staff (research, study executives, and specialized skilled labor) the concerns always have quite an amount of transient labor. As far as the money value of work is concerned, this is obviously different for manufacture of prototypes and quantity production.

Moreover one must remember that serious delays are inevitable in starting up production whether it be large scale production (because of the tooling up problem) or small scale production of varied units (hand work).

One of the characteristics of French industry which is made up of many small enterprises which are in general ill adapted to large scale production is its flexibility for the production of small lots of varied equipment.

This list does not include individual workers nor does it include those enterprises which should preferably not have been included in the branch under consideration as for instance those which are in it as a result of German orders and whose normal activity was in the field of amateur equipment (Ors Grandin of Radio-LL, etc.)

Considering the number of concerns in the list (20) one may say there there are too many.

1. Atelier de Montages Electriques (AME), 54 rue du Theatre, Paris XVeme. A small concern employing about twenty people and specializing in receivers and radio goniometers - Directors and Technical people: MM. YAKOWLEFF & MALLET - productive capacity, 2 million francs.

2. BRONZAVIA S.A. [illegible] St. Denis, Courbevoie (Seine). An important concern with various activities all connected with radio and optical aspects of aviation, accessories, carburetors and propulsion motors, this firm employs a

total of over 2000 persons. It manufactures airborne transmitters and receivers for the SARAM 310 aircraft. Its research establishment is separate and is called SARAM, 9 rue Fontaine a ASNIERES (Seine); the chief technician is Mr. MERLE.

During the German occupation, BRONZAVIA was supervised by two provisional administrators from the ASKANIA-WERKE of Berlin. The director of BRONZAVIA is Mr. TOURNIER.

Bronzavia's production capacity for SARAM type of material is over 200 million francs, but it would be difficult to give an estimate for other types of material.

3. CIRMA 84 Rue Perronet, NEUILLY (Seine). A very small firm employing about ten people and specializing in the manufacture of small portable transmitter-receivers operating [illegible]ths in the meter range.

Production capacity is less than 1 million francs.

4. Compagnie Pour la Fabrication des Compteurs et Materiels d'Usines a Gaz (abbreviated CdC), office and factory, 12 place des Etats Unis, Montrouge.

This company, while existing primarily as a public utility has a separate department which manufactures cathode ray tubes and iconoscopes, television units (video frequency units) and measuring instruments (calibrated signal generators etc.) This department has an important research branch which is working on some very special problems. As far as television is concerned CdC has an agreement with SFR, each company specializing in different phases of the problem.

The two companies have set up a subsidiary which is their commercial agent, the Compagnie Francaise de Television: its Director is M.Weygand.

The general director of CdC is Mr.Chomon and his assistant is M.Leduc. Among the technicians one may mention MM.BARTHELEMY, DAVID, ZAIGLINE, MANDEL.

The employees number 200, and no figure can be evaluated for the amount of business done.

5. La Construction Radioelectrique. (formerly Peyrouze & Benezech) 12 Chemin des Vignes, Pantin (Seine). A small firm specializing in low power transmitter-receiver assemblies operating on meter and decimeter wavelengths, power supply and audio frequency equipment. The director is M.Pierre Gantet. Employees number 50, and business of 5 million francs is done.

6. Compagnie Generale de T.S.F., 79 Bd Haussman, PARIS (IXeme).

This is the parent and holding company of the Groupe Girardeau, and operates some services of common benefit to the group. It operates research laboratories employing over 150 people but does no manufacturing itself.

7. Les Laboratories Radioelectriques. Office: 22 rue de O'Oasis, Puteaux (Seine), Shops: Clermont-Ferrand (Puy-de-Dome).

A concern specializing in the manufacture of fixed station transmitters for airfields of power between 500 watts and 10 kw. for short and medium wavelengths. It has recently fitted out a quartz crystal department, a measuring instruments department (precision crystal controlled frequency meter) and an electronic tube department. It is also getting set up to manufacture receivers.

The director M.NIKIS was arrested and deported to Germany in June 1944 together with several of his colleagues. His successor is M.DUCHANGE.

Personnel numbers 350.

Value of Business done: 50 million francs.

8. Le Materiel Telephonique Company (L.M.T.). Office and factory: 46 Quai de Boulogne, Boulogne-Billancourt (Seine). Laboratory: 46 Avenue de Breteuil, PARIS (VIIeme) and Lyon.

Total number of employees: over 4000.

In addition to radio equipment of all kinds, radio tubes and various other types of tubes, this company manufactures telephone equipment (its primary activity), electric cable, refrigerators, and fire fighting equipment.

It is part of International Standard Electric (whose directing individual is COL. SOSTHENES BEHN) which is tied up to the I.T.T. and A.T.T. groups.

The French concerns Cie General de Constructions Telephonique and Les Teleimprimeurs belong to these same American groups.

The director of L.M.T. is M. Roussel. Among the engineers one may note MM.RABUTEAU, SAPHORES, CLAVIER, TOURNIER.

The company's total business amounts to 300 million francs, about a third of which is radio business.

9. LOTH (Societe Industrielle Procedes Loth, abbreviated SIPL). Offices: II rue Edouard Nortier, Neuilly s/Seine (Seine). Factory of Planquivon at ATHIS de l'Orne (Orne).

Until 1938 SIPL was a research establishment and builder of prototypes. Since 1938 it has set up its factory of the Orne to mass-produce airborne radio equipment (under SARAM license, see Bronzavia). During the war of 1939-40 the personnel has increased to about 600 with a business of about 100 million francs per year.

This company has the benefit of technical assistance from Phillips. The general director is M.HAREL.

Personnel - 500 people.

Production capacity does not appear to exceed 50 million francs.

10. METOX. Office: 124 rue Reamur, PARIS (IIeme). Shops: 104 bis rue Pelleport, PARIS (XXeme)

Prior to 1940 this company imported American goods to France, but since then has begun to manufacture, specializing in commercial receivers (on medium, short and ultra short waves) and in special equipment.

Director: M.CHAUCHAT Technical Director: M.CORRIEZ

Personnel: 40 Business done: 5 million francs.

11. Societe RADIO-AIR Office 134 Bd.Hausmann, Paris. Factories: 72 Rue Chauveau, NEUILLY s/Seine (Seine), and at BRIONNE (Eure). The recording studios are at the office address.

A firm specializing in airborne equipment including radio-navigation, and in recording equipment.

General Director: M.Bonnafous

Personnel: 150

Business: 10 million francs.

During the German occupation this firm was controlled by FRIESEKE & HOPFNER of Potsdam.

12. Societe LA RADIO-INDUSTRIE (abbreviated R.I.) Office: 25 rue du De Finlay, PARIS (XVeme). Shops moved to Lyon.

is one of the oldest French radio bus
sly its financial situation has been d
rs. As cleaning this up appears to be
the Ministry of Production hopes this
business. Its current staff is negligi

ector: M.de L HONTES.

nician: M de Fr... (television speci

RBV shops, 13 Passage des Tourelles, P
re associated with R.I. for financial r
facture cathode ray tubes and iconoscop
l to the same fate as R.I. Moreover th
yet ready.

IETE LA RADIO TECHNIQUE, 21 Rue Carnot
This is the company of the GIRARDEAU
ialized in amateur equipment and recei
ly manufacturing commercial receivers
nterests of S.F.R.

IR. Office; 3 rue Lord Byron, PARIS.
urat, PARIS (XVIIeme) and 27 rue Nelat
This company has expanded greatly in
orthy of this expansion. It is part of
s is the Ateliers J.Carpentiers which
ith.

specialty is in metric length waves bu
activity into the radio field as a whol
search on transmitting tubes.

l: 800 Business: 100 milli

Director: M.RIALAN

ans: MM.DELBORD, GAMET, GLOEZ.

rector: M.VIDREQUIN.

AM (See BRONZAVIA)

iete Francaise Radio Electrique (S.F.R.
ausman, PARIS (VIIIeme). Factories: L
Seine) and Cholet (Maine-et-Loire) and

l personnel numbers over 3000. This co
all kinds of professional equipment an
es. It belongs to a group of related c
by Mr. Girardeau. Its director is Col
technicians one may note: Messrs. BETHE
GRIVET, GUTTON, WARNECKE, WILLEM.

Personnel exceeds 3000

Business is 300 million francs.

17. Societe Francaise de Telecommunications (S.F.T.) PAU

A fairly new company (1941) which specializes in quartz and its applications. This company has so far restricted itself to research and has but little production capacity.

General director: M.HONORAT. Technician: M.BEREDZKY.

Personnel: 50

Business: difficult to estimate.

18. Societe Industrielle Radio-Electrique (S.I.R.) Business office and workshops: 31 rue Censier, Paris (Veme) - also Workshops at Brionde (Haute Loire).

This company was established in order to manufacture airborne telephone equipment and to this end had put in a factory at Blenseau (Yonne) (laryngaphone and associated equipment). It also built broadcast receivers and only recently came into the professional radio equipment - measuring instruments for electronic and receiver work. It does not appear desirable for it to remain in this field and a merger with other enterprises must be considered.

Maximum personnel during the war of 1939-40 on airborne telephone equipment: 400 people

Director: M.SOME.

19. Societe INDEPENDANTE de T.S.F. (S.I.F.) Office and factory: 160 route de Montrouge, MALAKOFF (Seine).

This company manufactures all kinds of electronic equipment and transmitting and associated types of tubes.

Since 1936 it has been controlled by the Girardeau groups.

Director: M.BELLIERE. Technicians: COLAS, GAUX.

Personnel: 700

Business: 60 million francs of which 20 million are in the tube business.

20. Compagnie Francaise Thompson Houston. (T.H.) Office: 173 Bd. Haussmann, PARIS (VIIIeme). Factory for transmitting and television at Asnieres (Seine), factory for small

parts and broadcast receivers (trademark DUCRETEL) at rue de Nanteuil, Paris XVeme). The total personnel on commercial and amateur radio equipment exceeds 2000 people.

This company has besides its radio business, various activities in electrical and mechanical manufacturing. It is related to the Americal G.E. Co., and has had technical help from E.M.I. in the television field

Its General Director is M.BOREAU. Among the technicians one may mention messrs. DELVAUX, PODLIASKY, MATRICON, SOLLIMA.

Personnel in commercial radio: 500

Business up to 100 million francs.

Cirma

84, rue Perronet a' Neuilly (Seine)

5 September 1944

1. Sources of Information.

(a) Persons Interviewed

On arrival the premises were locked. With assistance from the local mayor's office entrance was gained to the plant which had ceased all operations a few days before. Sources of information included the representative from the Mayor's office, people living near the plant, a worker who called the plant by phone and M.Giboin, Co-ordinator of French Radio Production.

(b) Facilities and Equipment inspected

The manufacturing facilities were very small and makeshift in nature. Twenty five to thirty five persons were employed in the construction of low powered portable transmitter receivers. Two types were inspected. These revealed nothing new.

2. Information obtained

(a) Organization and Affiliates

M.Mingnet, former director of the concern is an alleged collaborationist and profiteer and it is believed he fled in April or May. At this time a M.Cloutrier also a collaborationist took over control and operated the concern.

(b) German Sponsored Equipment

Production was on avery small s were about 28 complete or nearly com itter- receivers of very simple design . Operation was in the region of om a power supply of 6 volts D.C., d , and 120/240 volts A.C. The workmar . There were no signs of research nt work. Among several pieces of it was a General Radio 724 A waven 50 mc range. The shop also conta al working machines which made pa dio equipment and also what appear re- pair parts for tanks.

(c) Independant French Activity

None

Summary of Significant Findings

The technical information disc no value. A carbon copy of a let ugust 1944 and indicating continued with the enemy was discovered and t C.I.C.

Conclusions and Comments.

This firm obviously collaborat with Germany and furnished them sma of inferior, low power field comm ip- ment.

Members of Inspecting Party

Dr. E.W. Thatcher	O.S.R.
Lt. F.L. Sherman	U.S. N ing)

Compagnie pour la Fabrication des Compteurs et Material d'Usines a Gaz

Short Title: Compagnie Compteurs.

Address: 12, Place des Etats-Unis, Montrouge (Seine), Paris 7.

C.I.P.C. Target No. 1/76

30 August 1944.
31 August 1944.

1. Sources of Information.

(a) Persons Interviewed

President Directuer General)	
President Managing Director)	M.E. Chamon
Director: (Commercial Department)	M.M.Heeley
Director: (Television)	M.Le Due
Director: (Technical Department)	Mr. Hinez
Research - Television	M. Le Due
Electricity)	
Gas)	
Water)	
etc.,)	
Senior Research worker in Television	M.Barthelemy.
Secretaire General	M.Boyer

Others not Interviewed were:-

Laboratories: (Chemical Department)	M.M.Thomas
Laboratories: (Physical Department)	M.Dubose

(b) Facilities and Equipment inspected.

This company has considerable research and development in the field of television. We inspected briefly the laboratories where this work was in progress.

2. Information obtained

(a) Organization and Affiliates

This company has associated firms, but these are not concerned with radio or television apparatus.

(b) German Sponsored Activity

The Germans purchased a large number of the standard articles produced by this firm but sponsored no new activity except in the field of television. The standard products of this company include a great variety of articles for use in electrical, radio, gas and water industries, such as water, gas, and electrical meters of all types, transformers, switches etc. All members of the party

agreed that the information about units of equipment of this type which the Germans purchased would not give much detail about their German military purpose.
The television research of this company was sponsored by German Industry: in particular Telefunken. Such a fact led the inspecting party to question their research engineers very carefully about the type of research and development being done. It turned out that most of the development was for standard television receivers. The German government had an order for a large number of these commercial receivers to be used in hospitals rest homes and for industrial purposes. The company manufactures all of the electronic circuits, iconoscopes, and cathode ray tube other than the RF portions of these television sets. The Germans had the information about this television development, but none of it was particularly unusual. The German engineers visiting this factory never revealed much about their own work on radar, although engineers of Compagnie Compteurs attempted to learn about it from them. Compagnie Compteur manufactured about 10000 LB-1 two inch cathode ray tubes for the German Air Force. A sample was obtained.

In their research laboratory they were doing experiments in the two meter region using a Telefunken LS 1000, a new tube. Later we obtained the technical data and an X-ray of this coaxial type tube from S.F.R. The data on this tube is:

Tension de chauffage	12.6.v.	
Courant de chauffage	4.2A	
Capacite grille-plaque	17	u u f
grille-cathode	40	"
placque cathode	0.4	"

Pente 40 mA/V (Up equals 600 v.)
(Ip equals 0.3A)

Coefficient d'amplification: u equals 40

Puissance dissipee a la plaque: 1000 watts
Puissance dissipee a la grille: 20 watts

Tension de plaque max. 1500 v.
Tension de plaque crete. 3000 v.

Courant de plaque max. 1 amp.

Air de refroidissement:

Np equals	500	750	1000 watts
V equals	600	1100	1700 litres*min.

Telegraphic 150 mc
Up equals 1500 v.
Ip equals 1 Amp.
Ego equals 60 v.
Ig equals 150v. max
Igo equals 0.25 A.
Np equals 1000 watts
Ng equals 40 w.
Refr. 800 litres/min.

Pour une Rp de 300 - 500 ohms
(ampli a bande large)

UA equals 1100 v.
Ip equals 1.5 A.

(c) Independent French activity
The French works of this firm was not investigated except in a general way. It is believed that their television research is of high quality. Particularly interesting is the fact that they have a working 1000 line system. They also made Orthicon tubes.

3. Summary of Significant findings
The only significant find was the LS 1000 which is an air cooled 1 Kw tube using porcelain-metal seals (no glass), data on which is given below. A drawing of this tube is attached.

4. Conclusions and Comments.
Television work of this firm should be of interest to any organization concerned with French manufacture.

5. Members of Inspecting Party

Lt. J.T. Thomson	Admiralty
Lt. T.J. Nagel	U.S.N.R.
Dr. H.G. Stever	O.S.R.D. (Reporting)

Ecole Superieur d'Electricite

8 - 14, Avenue Peirre-Larcousse.
C.I.P.C. Target No. 1/98

31 August 1944

1. Sources of information

(a) Persons Interviewed

M. Bedoura ..... Sous-Directeur
M. Jouvion ..... Secretaire-General.

(b) No detailed inspection of the premises was considered necessary.

(c) No equipment inspection was considered necessary.

2. Information obtained

(a) Organization and Affiliates

This Ecole would appear to be the senior Technical College for students of electrical engineering in this area.

(b) German Sponsored Activity

The Ecole was ignored by theGermans until 1943, when it was asked to form the Section de Radio-electricite de l'Ecole Superieure d'Electricite at 48 bis Rue de Cuire, Lyons, (in unoccupied France) for radio training. This project appears to have collapsed when the Germans took over full control of southern France.

(c) French activity

Some training appears to have continued during the occupation, but on a reduced scale as a result of the difficulty of obtaining equipment.

3. Significant findings

None.

4. Conclusions and comments

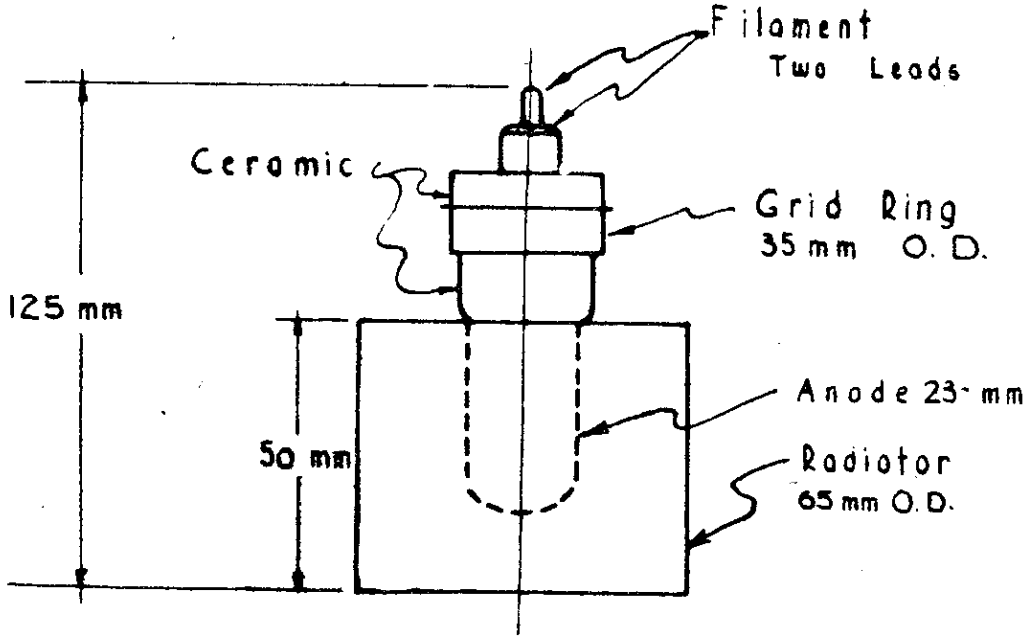
The Ecole is equipped with measuring equipment for audio and radio frequencies, and possesses an extensive library. Should these facilities be of service to the Allies, full co-operation is offered. There is however, nothing of interest to the present mission.

5. Members of Inspecting Party

Mr. L.L. Farkas — O.S.R.D.
Major W.T. Williams — War Office (Reporting)

TELEFUNKEN
L S 1000

CERAMIC-METAL SEAL TRIODE



Eiffel Tower Television Transmitter

1. Sources of Information
   (a) Persons Interviewed
   M. Guy [illegible], Director of the L.M.T. Laboratories, M. Jean Jacques Moeller, Television Engineer, L.M.T., [illegible], Director of Research and Television in Laboratories at S.a.d.i.r.

   (b) Facilities for Obtaining
   The television transmitter in the Eiffel Tower. A German Signals establishment at No. 1 Charles Floquet.

2. Information obtained
   (a) The Eiffel Tower Television Transmitter.
   This is a 30 kw peacetime product of L.M.T. It was operated by the Germans using the original French Radio Operators. The Germans had added another coaxial line input from No. 1 Charles Floquet. In this building only German Military personnel were permitted. At various times, usually about 20 minutes before the passage of Allied Bombers near by, peculiar signals were sent from this building to modulate the television transmitter.

   (b) No. 1 Charles Floquet
   Jamming equipment employing four LS 180 tubes in push-pull parallel was found at No. 1 Charles Floquet. The frequency range was about 30 to 300 mc. Also found were considerable stores of standard radio parts and components.

   (c) Papers Found
   At No. 1 Charles Floquet there were found various papers, mostly which were of no interest. Items included such things as a list of people to whom passes to the tower were issued.

3. Significant Findings
   In the presence of Allied Aircraft the Germans sent out some very irregular and peculiar signals on 6.52 meters. These consisted of a mixture of three types of signals put on in irregular sequence with a period of ten seconds to two minutes devoted to each. The three types of signals were:

   (a) Regular pulses, frequency 130, pulse length one microsecond.
   (b) A mixture of pulses, some of which were variable in phase.

(c) complex signals including two sine waves of different frequencies.

4. Conclusions and Comments

It is concluded that the enemy used the signal establishment at No.1 Charles Floquet for at least the following purposes:-

(a) Film televising and perhaps a small amount of direct studio pick-up.

(b) As a jamming station for our airborne equipment.

(c) For producing peculiar transmissions over the Eiffel Tower Television Station in some way connected with their air warning system.

5. Members of Inspecting Party

Major. N.D. Crane	U.S.	
Capt. E.M. Reilly	U.S.	(Reporting)
Capt. J.T. Mullin	U.S.	

Etablissement Ch.Aufiere

C.I.P.C. Target No. 1/75

1 Sept 1944

1. Sources of Information

(a) Persons Interviewed
M.Aufiere who visited the force headquarters.

(b) Facilities inspected
The Etab. Ch. Aufiere was not visited.

(c) Equipment Inspected
None.

2. Information obtained

(a) Organization and Affiliates
The Company has no known connections with other French firms.

(b) German Sponsored Activities
(1). Manufacture of an A.A. predictor of French design, in manufacture before the war, modified for use with German guns.
(2). Equipment of German design (Siemens) notably:-
(a) A small predictor
(b) A "receiving system"

(c) Independant French Activity
None revealed.

3. Significant Findings

None. This plant was not a target of primary

interest to this group.

4. Members of Inspecting Party

Dr. E.W. Thatcher	O.S.R.D. (Reporting)
Major, W.T. Williams	War Office.

Establishment Ora-Grandin

96, Rue des Entreprenevis

31 Aug 44
1 Spe 44

1. Sources of Information
(a) Persons Interviewed
M. Frerot
M. Pouthieux
(b) Facilities Inspected
None

(c) Equipment Inspected
None

2. Information Obtained
(a) Organization and Affiliates
No information on the organization was obtained.

(b) German Sponsored Activity
The firm has manufactured wireless communication equipment for the German Navy, notably the following types:-

Amplifier A.410	20 Kc/s - 1.0 Mc/s
Receiver R.600	106 Mc/s -230 Mc/s
Amplifier A.400	400 Mc/s

Some work has been carried out earlier on a "man pack" set which had not been successful: M. Pouthieux stated that he had, however, seen a very small (6"X4"X1½") set, but did not know its manufacturer.

(c) Independant French Activity
No work on Independant French Activity is reported.

3. Significant Findings
None

4. Summary and Conclusions
The plant was only engaged in construction of conventional pieces of equipment.

5. Members of Inspecting Party

Major. W. Knee	War Office (Reporting)
Capt. A. T. Kingston	War Office

Ferisol

9 Rue des Cloys

1 September 1944

1. Sources of Information

Inspection of the plant. (Samples of signal generators and vacuum tube volt meters were examined). Most of the equipment was copied from General Radio Equipment.

2. Information obtained

This firm manufactured best equipment for the Germans.

3. Significant Findings

None.

4. Members of Inspecting Party

Major. W. Knee	War Office (Reporting)
Capt. A.T. Kingston	War Office

Cie General des Construction Telephoniques

251 Rue de Vaugirard

5 Sept 1944.

1. Sources of Information

(a) Persons Interviewed

M.Gohoril	-	Head Manager
M. Drimille	-	Commercial Representative

(b) Facilities Inspected

None

(c) Equipment Inspected

Specimen of "Debegeender" Type Sp 51994/II 1.2 kW transmitter 18-100 meters.

2. Information obtained

The Company manufactured 300 Debegsenders for the Germans. These were manufactured for Lorenz and were presumed for use of German Air Force. German type tubes used:
Telefunken RS 36[illegible] and RS12P3b.

3. Significant Findings

None

4. Conclusions and Comments

This firm has connections with I.T. & T. Aside from Debegsender described above, no radio work was done for Germans, nor were they consulted or informed of enemy activity. No material of technical intelligence value obtained.

5. Members of Inspecting Party

5 Sept 1944 Dr. E.W. Thatcher O.S.R.D.(Reporting)
Lt. E.N. Rowland, R.N.V.R. Admiralty

Cie. General de T.S.F.
79 Boulevard Haussmann.
C.I.P.C. Target 1/100

31 Aug 1944

1. Sources of Information

(a) Persons Interviewed

M. Rebotier (Directuer Adjoint de la Societe Francaise Radio-Electrique) Document from M. Giboin.

2. Organization and Affiliates

This is the mother-company of the Girardeau group, controlling the following organizations:-

Three "Societes d'exploitation"
(a) La Compagnie Radio France
(b) La Compagnie Radio Orient
(c) La Compagnie Radio Maritime

Four "Societes de construction"
(d) Societe Francaise Radioelectrique
(e) Societe Independante de T.S.F.
(f) Radio Technique
(g) Radio Cinema

Of these, (d), (e) and (f) are relevant to this mission and have been the subject of separate technical reports.

3. Significant Findings
None

4. Conclusions and Comments
None, other than that the manufacturing companies of this system collaborated with the Germans on production.

5. Members of Inspecting Party

Mr.	L.L. Farkes	O.S.R.D.
Major.	W.T. Williams	War Office (Reporting)

GERMAN RADAR SCHOOL

Groupe Scolaire Ferdinand Buisson,

Ville de Charille,

Grande Rue, Serres.

2 September 1944.

1. Sources of Information
(a) Discovery
A Wurtzburg parabolic antenna was seen by one of the members of the C.I.P.C. Radar team in a large building while driving through Charille, a district on the outskirts of Paris. There had been no previous Intelligence reports on this school.

(b) Inspection
A thorough search was made of this building which had formerly been a public school. It consisted of a two storey modern brick steel reinforced structure with living accomodations, having four floors at each end.

2. Information obtained
(a) Organization and Affiliates
This building had obviously been used for training radar operation and for mechanics.

(b) Equipment Found
In this building and in the courtyard behind were many pieces of German radar equipments including Wurtzburg, Freya and ground IFF. The Germans had attempted to smash thoroughly all the apparatus which was left and had used grenades and high ex-

plosives in several places, causing the floors to collapse.

Large display racks were found which had held complete radar assemblies, showing the unit interconnections. Several rooms were fitted as lecture rooms with study aids showing valve base connections. On the roof were mounted three antennas one each of Wurtzburg, Freya and IFF, all fed from the demonstration set ups below by feeders. In the courtyard behind were assemblies for eight Freyas antennas, many IFF antennas and also tower assemblies for elevating Freya antennas. Also in a shed in this courtyard were three badly damaged motor-generators sets for Freya equipment.

3. Summary Significant Findings

As far as could be determined no new developments were to be obtained from this installation. Several pieces of enemy radar equipment were collected but only to supplement supplies of gear known to be meager. Included in this was a tube tester made specifically for testing all the tubes used in the Wurtzburg equipment. RPG 61

4. Conclusion and Comments

Contrary to former beliefs, the Germans had not only undertaken to set up a school on radar outside Germany but had done so in Paris, taking no pains to prohibit surveillance of the antennas and equipment from the public.

5. Members of Inspecting Party

Capt. E.M. Reilly	U.S. Army (Reporting)
Capt. J.T. Mullin	U.S. Army
Mr. G. McGough	O.S.R.D.
Lt. F.L. Sherman	U.S. Navy
Dr. E.W. Thatcher	O.S.R.D.

German Submarine Stores

Cormeilles-en-Parisis

North-west of Paris

31 August 1944
2 September 1944

1. Sources of Information

Inspection of Naval Submarine Stores housed in a large four story building and underground storage facilities. Examination of electronic equipment, stocks of spares for electrical apparatus and test equipment. The visits were made in company with the 30th Royal Marine Assault Unit who had already removed some equipment.

2. Information obtained

The Arsenal previously occupied by the French was taken over by the German Navy for use as material supply and distribution depot serving submarine operating bases in France, dealing in optical, electrical control torpedos, torpedo control, mechanical and navigational supplies. In general electronic equipment alone was singled out for destruction before German evacuation. Major units of submarine "DF" and "probable" recording underwater sound equipment were obtained in fair condition, by the 30th Assault Unit for shipment to Admiralty, Whitehall, London for redistribution and subsequent report. These equipments appeared to be of conventional design. Tubes found in large quantities were ordinary low frequency receiver types and some high power Thyratrons which could be used in submarine electrical control apparatus or underwater sound. Electrical test equipment found was of simple design suitable for only the simplest voltage and current measurements. Electrical cables were all of rubber or similar dielectric not suitable for use above 50mc/s. No radar or spares for radar were located.

3. Summary of Significant Findings

In spite of the large amount of equipment inspected nothing of outstanding technical importance was noted. It was of interest to note the excellent workmanship of equipment inspected and the liberal use of metals.

4. Conclusions and Comments

The Submarine stores obviously did not serve radar or communications requirements.

5. Members of Inspecting Party

31 August 1944. Lt. E.N. Rowland, Admiralty
Lt. F.L. Sherman, U.S. Navy (Reporting)

2 September 1944 Lt. F.L. Sherman, U.S. Navy

Jaeger

2 Rue Bairdin,
Levallois, Peirret.

6 Sept 1944.

1. Sources of Information

(a) Persons interviewed

M. M.Doubjou, Chief Engineer, Radio Dept.

(b) Facilities Inspected

The activities of Jaeger in the radio field have not been extensive but a combined model shop and laboratory was inspected. Utilizing the larger shop facilities of Jaeger, a concern which specializes normally in the manufacture of speedometers and other panel instruments, the radio department is enabled to produce very well finished components and assemblies. A small ceramics section of the laboratory produces all ceramics used in Jaeger equipment. It is significant that even sockets for tubes such as RCA 813 are made of ceramic in this laboratory.

(c) Equipment inspected

Jaeger has not been very active during the war. No work was done for the Germans in the radio or radar fields. The equipments inspected were essentially copies of Bendix Multi-channel transmitters and receivers. An ingenious control panel for installation with such equipment in French aircraft was designed and built before the war and was seen in the laboratory. This equipment was installed in Se 200 French aircraft and also in the Latecoere 631 flying boat.

2. Information obtained

(a) Organization and Affiliates

The Jaeger radio department is a part of the Jaeger plant located at 2 Rue Bairdin, Levallois, Pierret. There are two other plants in Paris.

(b) German Sponsored Activities

None

(c) Independant French Activities

None were revealed.

3. Summary of Significant Findings

Nothing of significance to the mission of the C.I.P.C. teams was found.

Laboratoire Central des Industries Electriques

14, Rue de Steel.

C.I.P.C. Target No. 1/97

30 Aug 1944
5 Sep 1944

1. Sources of Information

(a) Persons Interviewed

M.Sartre ..... Directeur
M. de la Gorce ..... Sous-Directeur
M.Jouault ..... Directeur-Honoraire
M.Bellenot ..... Ingenieur de Rayon-X et Secretaire-General.

(b) Facilities inspected

No inspection of plant or equipment was carried out.

2. Information obtained

(a) Organization and Affiliates

The Laboratory acts as a national organization for the testing of commercial equipment: its works seem comparable with the U.S. Bureau of Standards or the British N.P.L. Its X-ray laboratory is situated in L'Ecole Superieur d'Electricite.

(b) German Sponsored Activities

They claim to have done no direct work for the Germans, having acted in their normal consulting capacity on a few occasions only. This has involved the following:- the check of the operation of a siren on 25 c/s; the determination of the output of an alternator; and the release of the results of some of their own work on coronas.

(c) French Activities

The Laboratoire appears to have fulfilled its normal functions to only a restricted extent, since they have carried out no testing of German equipments during the occupation. They have made for another organization believed to be the (Societe Independent de T.S.F.) some X-ray photographs of some German metal valves. These have been examined by experts on the second visit and appear to be normal transmitting valves, they have however, been re-photographed for later examination.

3. Significant Findings

None, with the possible exception of the valve photographs mentioned above.

4. Conclusions and comments

The facilities available at the Laboratoire are more or less those that would be expected at such

an organization, and they may be of value to Allied production at a later date.

5. Members of Inspecting Parties

30 Aug 1944	Mr. L.L. Farkas	O.S.R.D.
	Major W.T.Williams	War Office (Reporting)
5 Sept 1944	Dr. E.W. Thatcher	O.S.R.D.
	Lt. E.N. Rowland	Admiralty

Laboratoire Radio-Electrique

22, Rue del Oasis, Puteaux.

5 Sept 1944

1. Sources of Information

(a) Persons Interviewed

M. Boucher
M. Berline

(b) Facilities Inspected

The main facilities of this organization being the three factories at Clermont-Ferran, no detailed inspection of these premises was carried out.

2. Information obtained

(a) Organization and Affiliates

The Laboratoire acts, in effect, as the headquarters office of the Laboratoire Radio-Electrique Clermont-Ferran, with premises at

43, Rue des Jacobins
3, Rue Barbier-Daubree
70, Rue Lamartine.

These are not, of course, at present accessible. The Laboratory is affiliated with Baird Television.

(b) German Sponsored Activity

(i) Production of transmitting valves (c.15 metres) to Telefunken designs.

(ii) Built 1-kW (16-120 m) transmitters; delivery was effected approx. 6 months ago; 5 to the Luftwaffe, 10 to the Wehrmacht.

(iii) Received (understood not delivered) order for 9 telegraph transmitters (½-kW, 15-60m).

The organization has developed, and apparently produced in small numbers a certain amount of very high-grade measuring equipment (frequency standards, apparatus for the measurement of temperature coefficient, etc.). M.Berline also states that when formerly employed with SFR he was working on a 16 cm split-anode magnetron delivering 3kW peak power under pulsed conditions. The corresponding local oscillator of the receiver was a Barkhausen oscillator with tuned grid (Pierret tube)

3. Significant Findings

Nil, except in so far as M.Berline's statement has been corroborated by SFR.

4. Conclusions and comments

Of considerable interest from the aspect of production of measuring equipment, but of no interest to this mission.

(M.Berline's early work is not relevant to this present work for the Laboratoire.)

5. Members of Inspecting Party

Capt. J. Mallin	U.S. Army
Major W.T. Williams.	War Office (Reporting)

Cie des Lampes

Office - 29 Rue de Lisbonne

Factories - 14 Rue de la Garenne, Courbevoie

57, Rue Pasteur, Puteaux.

C.I.O.S. Target No. 1/99

1. Sources of Information

(a) Persons Interviewed

The office was visited first by Dr. Thatcher and Major Williams. The office and factories were visited [illegible] by Dr. Thatcher, Major Williams and Lt. Thomson.

Personnel [illegible]

Directeur Laboratoire	[illegible] Wurtz
Sous-Directeur	[illegible] Perreau
Ingenieur en Chef	M.Bracaensin
Ingenieur Adjoint	M Menet
Directeur Commercial	[illegible] Bergen

(b) Facilities inspected
The factories were inspected, including the attached description of work done for the Germans.

(c) Equipment inspected
The firm's representative said that no equipment was made there.

Information obtained
(a) Organization and Affiliates
The factories made valves and lamps and C.R.T. There was no close connection with any other French firms.

(b) German Sponsored Activity

Principaux tubes d'emission commandees ou livres sur commandes allemandes

5.Y.35 - Pentode emission 50 W - Commande de 5.300 dont eviron ..... 3.500 livres
5.Y.15 - Pentode emission 15 W - Commande de 3.000 coldee
5.X.75 - Pentode emission 100 W - Commande de 1,000 cont ..... 800 livres
R.S.337 - Pentode emission allemande de 100 W Commande de 3,400 dont 155 livres.
S.D.6 - Pentode emission specifiquement allemande - Tres urgentes - Priorite de fabrication - Commande de 3.000 - Livraison ..... 2 Enchantil
L.S.50 - Pentode emission ? 50 W - Commande de 15,000 livre 0
R.G.62-01 Redresser - Commande de 20,000 - Livraison .0
Tubes divers courant - 2.X.M.400-2.X.M. 600-3W.350.C 4.T.100 - e.W.600 - 3 W.7500.E-3.W 20 KE. 3.W.75.K.E. - 3.W.100. K.E.

Reception
R.E.N904 (ou A 4,410)
en commande: 655.00 dont 541.000 livres.

R.V. 12 P 2.000-Pentode Reception-Commande de 100.000 Livraison 0
H.L. 2/4. P.3 - Pentode Reception-Commande de 30.000 Livraison 0
E.C.H.3 - E.E.F.2 - E.F.9 - C.Y.2 - C.B.L.6 - E.B.L.1

(c) Independant French Activity
Research is being carried on. It was stated that the Germans did not show any particular interest

in this. Valves for wave-lengths shorter than 1 metre are being investigated.

3. Significant Findings

Only one tube of any importance was found. This was the SD 6 of which a mounted sample with rating-sheet was obtained. The SD 6 is a high voltage diode in a large "doorknob" like envelope. It is really one of the Gema UHF triodes (such as is used in the Kriegsmarine 80Cms radar set) with the grid left out. The sample and data obtained were turned over to Dr. Griffith at D.S.R. It was stated that only two samples of this were delivered to the Germans.

4. Conclusions and Comments

Like many other French valve firms, the developmental side is concerned with tungsten seals in hard glass for very short wave lengths. Triodes and diodes of the modified "door-knob" type are being investigated. One experimental sample with many tungsten wire connections through a moulded glass base was obviously intended for an operation in a concentric line. The technique is clumsy. If there were any new techniques they were not disclosed. The main factory was destroyed by Allied bombing in September and December 1943 and operations have been resumed on a reduced scale.

5. Members of Inspecting party

Major W.T. Williams	War Office	(Reporting)
Dr. E.W. Thatcher	D.S.R.D.	
Lt. J. Thompson	Admiralty	

[illegible]

(Societe Industrielle Procedes Loth - Abbreviated S.I.P.S.)

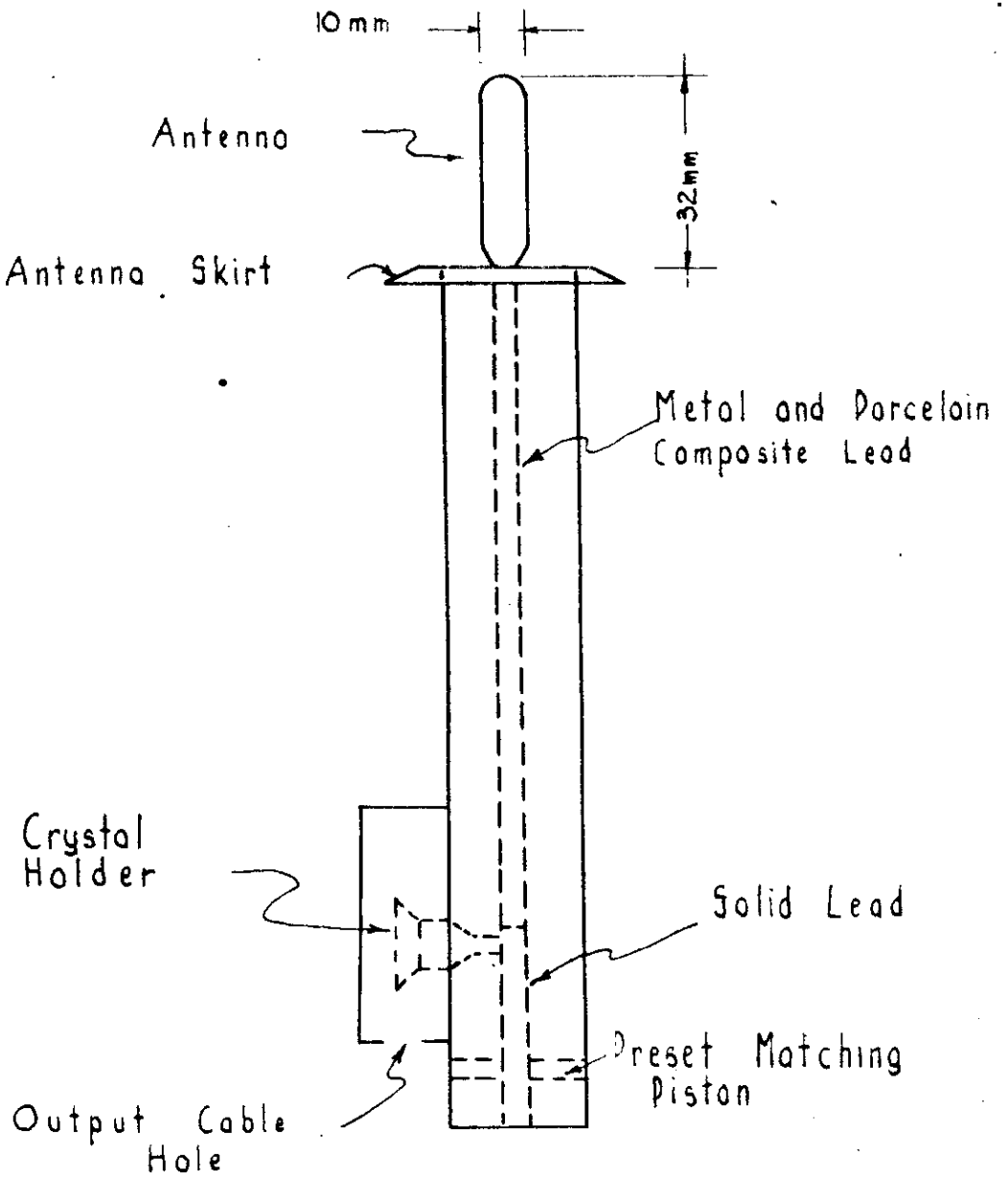
[illegible] Rue Edouard Mortier
[illegible], S. Seine

[illegible] Sept 1944.

1. Sources of Information

(a) Persons Interviewed
M. Mosbier, Asst. [illegible], Director General

(b) Inspection of Facilities and Equipment
None



BROADBAND CM - WAVE ANTENNA FOUND AT KRIEGSMARINE EXTENSION 124 Bd. Maurice Barres PARIS 2 SEPT. 44

2. Information obtained

(a) Nature of Establishment

Loth is a small manufacturing establishment having branches as follows:-

Paris Branch - 120 Employees
Flers Branch - 600 Employees
Brive Branch - 200 Employees.

(b) German Sponsored Activities

None directly. The firm was however a sub contractor to other companies making equipment for the Germans. Major orders included,

For Phillips - Holland - Radio telephone transmitters, 20-100 meter.
For Soram - Paris - 160 watt airport communications equipment 40-1500 meters.
For Sadir - Paris - Receivers, 4-7 meters.
Total activity as a sub contractor was about 100 million francs of communications and equipment for French and Dutch Firms holding prime contracts.

(c) Independant French Activities

The firm claimed that they were developing 1½ meter transceivers in secret without German participation.

3. Significant Findings

No new technical developments were encountered. Most of the work was of standard pre-occupation design.

4. Conclusions and Comments

It was noted that the person interrogated seemed reluctant to give information. This may have been because of a lack of understanding of the mission or because of translation difficulties.

5. Members of Inspecting Party

Dr. E.W. Thatcher	O.S.R.D.	
Lt. F.D. Sherman	U.S. Navy	(Reporting)

Le Material Telephonique

C.I.P.C. Target No. 1/95

Laboratories 46, Avenue de Breteuil

Factory 46, Quai de Boulogne, Boulogne-Billiancourt

1 September 1944
4 September 1944

1. Sources of Information

(a) Persons Interviewed

After meeting Col. Behn who placed all L.M.T. facilities at the disposal of C.I.P.C. the technical information was mainly given by M.Rabutneau, Chief Engineer and M.Clavier, in charge of U.H.F. work. M.Muller who deals with transmitters was present but no one questioned him. M.Clavier's assistants Altousky and Goudet were also present.

(b) Facilities Inspected

The laboratories used by M.Clavier's group were inspected with the exception of the valve laboratory. However valves made by the experimental group were examined.

(c) Equipment inspected

Centimetre wave equipment was examined.

2. Information obtained

(a) Organization and Affiliates

The L.M.T. organization and affiliations are well-known. The firm is associated with Bell Labs in U.S.A. Standard Telephone and Cables in U.K. and Lorentz in Germany.

(b) German Sponsored Activities

Contracts were accepted from the Germans for

(a) 1 kw medium wave transmitters
(b) 60 kw transportable transmitters on 9-10 metres.
(c) search receivers on 5-15 cm.

Of these no samples of (b) or (c) had been delivered. The contract for (c) was placed early in 1942. A sample of the British valve CV 67 was shown to L.M.T. by the Germans in November 1942. L.M.T. attempted to copy this. Their copies were shown to C.I.P.C.

Independant French Activities

Independant development has been energetically pursued by the Hyper-wave group of L.M.T. under the direction of M.Clavier, assisted by Mr. Coudet, valve engineer and Mr. Altousky, circuit engineer. On the valve side positive grid tubes and velocity modulated tubes have been developed, the latter containing samples of reflection tubes and two resonator klystrons. Diodes suitable for 10 cm operation have also been developed, but crystal detectors have remained experimental only. On the circuit side a Q-meter for cm waves has been developed with which measurements were made on German cables and wave guides. The latter are made by the German firm Vacha.

mary of Significant Findings

The significant findings are difficult to list. First the existence of 10 cm apparatus which had been shown to the Germans is significant in itself. The particular valve made by L.M.T. were

On 10 cm wavelength Aperture coupled Klystron 30 watts output C.W. air-cooled.

On 10 cm wavelength Aperture coupled Klystron 100 watts output C.W. water-cooled. The efficiency is about 9%.

Power is measured by a bolometer, without correction for glass losses.

On 5 cm wavelengths a water-cooled Klystron gave 25 watts output C.C. These valves are similar to British CS2, but are only electronically tunable over about 1%-2%. Frequency modulation has been attempted.

On 10cm wavelength and about that wavelength, reflection oscillators, copies electronically of the Cv 67 but with experimental tuning systems. One of these was similar to the Great Baddow long range tuning oscillator which uses a tunable rectangular war guide resonator.

The 10 cm diode is a remarkable achievement. Made with a three-wire punch in hard glass and tungsten, the two outer wires are connected to opposite ends of the straight filament. The middle lead connects with the short cylindrical anode, the spacing being very small indeed, less than 10 thousandths of an inch. Clavier's assistant claims that this diode is about 10d B up in signal noise on the German crystal, a sample of which was obtained.

On the general subject of crystal noise (the Germans use crystals at 50cm) Clavier had some interesting German results. Taking noise factor as akT,

for 50cm a equals 10-25
for 20cm a about 100
for 10cm a greater than 200 and less than 2000,

the best figure mentioned being 200. Johnson noise is a equals 4 on same scale, so a equals 200 is 50/1 or 17 d B above theoretical. This does not include noise of 1st I.F. German crystal is artificial silicon. This is in large scale production. M.Clavier also mentioned that the Germans use triodes down to 25 cm.

M.Clavier gave the following names of important German cm wave experts.

Telefunken - Rothe and Meinke
Pintsch - Weissfloch
University of Graz - Borgnis
Lorentz - Herriger and Doering (U.H.F.)
Air Ministry - Kretzmann.

He also mentioned that the Germans had taken out many French and Belgian patents during the war. Records have been kept by L.M.T. and can be obtained from M.Rabuteaux.

The search receiver made in L.M.T. Laboratories had the following specification.

It covers 10-15 cm, using two Local Oscillators. The first covers 10-12.4 cm and the second 12-15 cm. Both are position grid tubes, stabilized by means of tunable resonators, and working off stabilized power packs. The output voltage is developed between the ends of the grid. The band width is 1 Mc, but the Germans asked for 8 Mc. The receiver can discriminate between two stations ½ Mc apart. It is double super-heterodyn, the first I.F. being 1 SMC and the second 9 Mc. The first converter is the L.M.T. diode.

M.Clavier measured the attenuation constant of a German flexible cylindrical wave guide, cut-off 12 cm. The measurements were made at about 10cm. Theoretical figure was 17 d B/Kilometre, the measured value 250 d B/Kilometre. The measurements were made using the H.wave and the Clavier Q-meter.

The party obtained from L.M.T. a copy of an article from "Hochfrequenztehnif and Elebtroakustik" of June 1943 describing the "Pintech tube Type HB 14, eines Resotanks". This article will be turned over to Lt. Com. Mayer, U.S.N.R. Readiness Division, London, England who has encountered this tube in a German decimeter communication set found near Cherbourg. L.M.T. also showed parts of a 20 cm Heil tube which used a double sheet electron beam passing thru the center of a half wave length concentric line resonator.

Conclusions and Comments.

It must be concluded that the Germans are well advanced in cm wave technique, but it seems probable that the possibility of using it operationally has only come up recently. In the case of L.M.T. the best work has been done on measurements, and the most interesting valve is the diode. There is no evidence of new technique.

5. Members of Inspecting Party

1 September 1944.	Dr. G. Stever	O.S.R.D.
	Dr. K.R. Spangenberg	O.S.R.D
	Capt. E. Reilley	U.S.Army
	Lt. T.J. Nagel	U.S. Navy
	Lt. E.N. Rowland	Admiralty
	Lt. V. Thomson	Admiralty(Reporting)
4 September 1944.	Dr. G. Stever	O.S.R.D.
	Dr. K.R. Spangenberg	O.S.R.D.
	F/Lt. Fishwick	Admiralty
	Mr. G. McCouch	O.S.R.D.
	Lt. T.J. Nagel	U.S. Navy
	Lt. J. Thomson	Admiralty

Metox

18 Rue de Pellefort
104 bus Rue de Pellefort
124 Rue Reamur

1 September 1944.

1. Sources of Information
   (a) Persons Interviewed
   M.Cauchot, Director.
   M.Coriez, Tech Director.

2. Information obtained
   (a) German Sponsored Activities
   Production for Germans: for Luftwaffe made 50 types %203, 2-3m receivers made 1100 type R600, 106-230 mc/s receivers at rate of 60 per mo for Navy. Samples of these sets, which embody no new techniques, have been received by A.T.I. teams and sent to the R.A.E. Farnborough.

   (b) Independent French Activity
   No evidence of any research for Germans.

3. Significant Findings
   None

4. Conclusions and Comments
   None

5. Members of Inspecting Party

Major W. Knee	War Office (Reporting)
Capt. A.T. Kingston.	War Office

Mendon Observatory

6 September 1944

1. Sources of Information.

From discussions between Dr. S.A. Goudsmit of Alsos and Mr. Lyot, the Director of Mendon Observatory, it was learned that a German radio station located in the Observatory grounds was believed to be used for ionosphere investigations. Mr. Lyot stated that the Germans were interested in sun spot activity and magnetic storms, and believed that they produced correlations between these and ionosphere disturbances for use in predictions of ionsphere characteristics.

2. Information obtained

The Mendon Observatory site was visited and the German radio building was found on the grounds in a considerably damaged state. The only piece of equipment found which could be associated with ionosphere investigation was the metal screen and collar for a cathode ray tube of about 14" diameter. However, the French guard who accompanied the party described an antenna system which was constructed in 1932 but replaced in 1944 by the present antenna which could conceivably be used for ionosphere investigation.

The present antenna was considerably damaged but from the pole tower and matching unit, it appears that it was the broad band type of Benito transmitter doublet antenna with three elements pointing about 20° from the vertical upward and three similar antennas pointing downwards. This antenna was fed by the same type of armored coaxial cable as the broad band Benito transmitter antenna, the cable terminating in remains of four-channel equipment similar to Benito. Reticence in identifying the equipment as operational Benito is caused by the failure to find any equipment in the vicinity which resembled the Benito receiving gear. Interrogation of the natives also failed to produce such information.

A second pole tower some ten meters shorter than the first was reported to have an antenna similar to the above but smaller. This tower stood about 20 meters from the first. However, no evidence of attachment of any antenna could be found on the second pole tower, and no cable could be found on it or leading

to it. This second tower was one of the four poles of the earlier antenna system, the other three of which had been felled.

3. Significant Findings

None from the standpoint of new developments or techniques. The antenna marching unit, cathode ray tube screen and collar, and various considerably damaged pieces from the ground equipment are being forwarded to R.A.E. Farnborough, Attn: Mr. Supper.

4. Conclusions and Comments.

The Radio equipment found at Mendon Observatory may be used for ionosphere investigations at the high limiting frequencies but it is believed that the receiving station would have to be some thousand miles away from the transmitter as no reflection of waves of acute incidence would occur at the frequencies employed. However the equipment could be used for another type of investigation but the absence of receiving or display gear leaves this speculation somewhat obscure.

5. Members of the Inspecting Party

Dr. K.R. Spangenberg.
Capt. T. Drysdale (Reporting)

O T A L U

110 Bd. Richard Lenoir

31 Aug 1944.

1. Sources of Information

Visit to plant. Discussion with M.Henri Poulain.

2. Information obtained

The firm specializes in aluminum work. Demonstrations were given of a method of welding aluminum with a portable acetylene blowpipe. There was obtained the description of an electrical welding method using two 6 volt car batteries.
Full details on the above items are being transmitted to the War Office and to the U.S. Signal Corps, Base Section.

3. Significant Findings

None

4. Members of Inspecting Party

Major W. Knee	War Office
Capt. A.T. Kingston	War Office

RADIO TECHNIQUE

51, Rue de Carnot, Suresnes, Paris

31 August 1944.
6 September 1944.

1. Sources of Information.

(a) Persons Interviewed

M.Damelet	Director General
M.Aubemel	Director of Radio Development
M.Nozieres	Director of Valve Development

(b) Facilities Inspected

Only a cursory inspection of the laboratory facilities was made. The plant has a good factory and seems well equipped for production. Not much of the plant was shown.

2. Information obtained.

(a) Organization and Affiliates

Radio Technique is one of four manufacturing concerns controlled by the Cie. Geneal de Telephone Sans Fils and employs about 4000 people.

Radio Technique has manufacturing contracts with Telefunken and Philips and a financial relation with the latter; half of its shares being held by Philips. Eclairage at Radio Cie.

(b) German Sponsored Activities

Valve development was carried under German supervision. They had also manufactured standard German valves.

Production as follows:

A receiver designated EB12. They received in late 1941 an order for 25,000 of which they had completed 16,000 by June 1944. A second similar order was later cancelled.

Produced part of a receiver designated as the Koln Gerat (Fu52b-2). Five out of the six component units were made here. It had 2 high frequency mixer, Oscillator and 3 I.F. stages. The I.F. was one mc and a crystal B.F.O. was included. The assembly took place at the Sachsen Werke-Dresden and the orders totalled 7000. Production had begun at 350 per month of each block and 6500 had been delivered.

Recently Radio Technique received an order to produce the following Telefunken developed Radar Components, parts of a FuSe64:

Seeschlange - This had a frequency warbler and the valves were LGI's. It contained I.F. strips.

Weisel - I.F. amplifiers of about 25 mc.

Serieu - Pulse Amplifiers and strobe producer

Seeigel - Pulse generator. The circuits seem to have provision for antijamming. This unit was also to be manufactured in Vienna at the rate of 500 per month by Hornj, Ericson-Schiek, and Angelen.

(c) Independant French Activity

Manufactured a communications receiver somewhat comparable to the best American makes. Frequency range was 3 to 600 meters. At wavelengths greater than 10 meters the sensitivity is better than 0.1 microvolt and below 10 meters better than 2 microvolts. The receiver was perhaps for sale to Germany.

3. Significant Findings

There were no significant findings from the standpoint of new developments or techniques. The extensive German production and the tie with Philips and Telefunker is perhaps sufficient.

The Company had recently tooled up to make Fug 162Y receivers at the rate of 800 per month until 12,000 had been made. L.M.T. had received a similar order for 6000 and a further 8000 were to be produced at Hilversum.

The following list of German Technical personnel may be of interest:

Phillips - Mr. Larsen.

Telefunken - Mr. Vogt (a technician) of Department DB2/FR.
Mr. Voth (a technician)
Mr. Fentzke (a technician)
Dr. Schultz - Head of T.F.N. in France.
Mr. Hasse' - representative at Cologne
Mr. Guinner - Berlin Director

Lorenz - Mr. Rissener - main director
Mr. Weiczorek - a Czech engineer who did much work for Lorenz.

4. Conclusions and comments

The company was apparently a heavy producer for the Germans and is probably in possession of much more information than was revealed.

5. Members of Inspecting Party

Lt. J. Thompson	Admiralty
Lt. Nagel	U.S. Navy
Mr. G. McCouch	O.S.R.D.
F/Lt. Fishwick	R.A.F. (Reporting)

Sadir - Carpentier

101 Bd Murat,
Paris - 16 e.

29 August 1944
30 August 1944

1. Sources of Information

(a) Persons Interviewed

M. G.Roy, Sales Manager
M. Y.Delbord, Manager in charge of Research and television laboratories.
M.T.Mahe, Assistant Sales Manager.

(b) Facilities inspected

The administrative and sales office of Sadir are located in Paris at 101 Bld Murat and at this same location are included the research laboratories and prototypes department, drawing room and work shops. This address was visited on several occasions by members of the C.I.P.C. Radar and Guided Missiles teams. Manufacturing is done principally at 27, Rue Nelaton, Puteaux.

It was found that the Paris plant of Sadir is well equipped in a very modern building, partly shared with the Edgar Brandt organization. The facilities appear to have been well laid out in order to further efficient production of prototypes and carrying on of research.

A department which has been designing and constructing quality signal generators and test equipment was found to be well equipped for the purpose, as attested by the appearance of and tolerance claimed for the products. The ceramics and tube laboratories appear to be among the best equipped for research in electronics yet found by C.I.P.C. personnel.

:) Equipment inspected

While the premises visited are essentially devoted to research there were some single samples and prototypes of Sadir products available for inspection. These are listed below.

1. 5 kw transmitter. This was a transmitter ordered by the Germans to be built without oscillator and early driver stages, only the last driver and final being included in the equipment. A small number were completed. It was revealed that while the peak current in the final stage might attain 16 amperes the transmitter was not suitable for pulse work, due to the time constants of circuit elements.

2. 120 Watt 30-34.8 mc transmitter. This is a rather compact transmitter made for the Luftwaffe. It was observed that it contains tubes of the series employed in aircraft and ground radar, that is, the RV-12P 2000 and LS-50 types to the exclusion of all others. This transmitter bears the designation "Deitstrahlsender 120 W AS 3".

3. R-87 series Receivers. This series of receivers which have been made to cover the range of frequencies from 1⅛ to 3, 2½ to 4½, 4½ to 8, and 8 to 13 meters all follow the same general design specifications, but differ only in their high frequency stages and oscillators. Various services of the German forces have used it, the Luftwaffe being the principal user although the Kriegsmarine also employed the receivers. The latter service was the only one interested in the 8 to 13 meter set but lost interest in this project. Sadir has actually made the sets work down to 60 cm but the Germans never used any of such receivers although they wanted them. They were told that they were unsatisfactory.

4. EB1 3F Receivers. SADIR has recently assembled this receiver, a well known Airborne beam approach set having automatic tuning facilities for thirty four stations. An order for 5000 to be made in one year was placed by the Germans. In the Spring of this year work ceased because supplies of vital components were not being received from Germany. Supply was never resumed and the greater part of the order remains undelivered.

5. Pulse Signal Generator. Germans requested SADIR to produce a pulse generator having a PRF variable from 10 cycles to 10 kc and an adjustable pulse length, continuously variable from 0.5 to 5 microseconds. A fixed value of 50 microseconds was also required. An adjustable voltage output of 1 to 100 volts at 2000 ohms was specified. SADIR purposely produced this generator after long delays but with characteristics such that it would not fill the requirements. Whereas an order for a considerable quantity had been previously placed by the Germans, this was at length cancelled after delivery of the first instrument.

6. 100w FM & AM transmitter. 50 of these units were delivered in 1943. They employ single dial frequency control and a Collins Antenna Coupler and cover the range from 4.8 to 12 meters. While very compact they have a few "difficulties" inherently attendent with such compact design.

7. FM Broadcast Training. A broadcast transmitter of conventional design was inspected. None but the prototype have been built and it was finished at the start of the war.

8. Modified R-87 receivers for FM. The Germans were greatly interested in obtaining some high frequency receivers for FM operation. Modification units were produced for the R-87 receiver and while unfinished, a party of Germans arrived one day with grenades and machine guns to take the material in its incomplete stages and finish the job elsewhere. They removed a total of 26 modified receivers.

9. Some interesting tubes were inspected, products of SADIR's own laboratory. Glass to metal seals seemed to be highly developed and considerably worthy of fuller investigation at a later date.

Information obtained.

(a) Organization and Affiliates

Sadir was founded in 1932 and after development joined with the Ateliers J. Carpentier Company, a measuring instrument manufacturer to become "Societe Anonyme des Industries Radioelectriques et des Ateliers J. Carpentier" retaining the desirably brief title of "Sadir" as a trade name for the radio organization in general. The Carpentier branch still makes measuring instruments.

Sadir has, in the past, made radio equipment for transmitting, receiving, direction finding and navigation, for Air Force, Navy, Communications, Public Services and Broadcasting. It has done considerable work in television as well. There are about 800 employees in the offices and two plants, at 101 Bld Murat in Paris and 27 Rue Nelaton in Puteaux. The Carpentier branch has two plants. One is situated at 46 Rue Arago in Puteaux and the other at Nantes (Loire Inferieure). These plants make measuring and control instruments, submarine listening and periscope equipment, telegraphic equipment and telemeasuring devices. Offices of the Carpentier managing staff are located at 3 Rue Lord Byron, Paris.

The Board of Directors of the Societe is composed as follows:

M. E.Rialan.....President and General Manager
M. C.Galvaing.....Administrative Manager
M. M.Vidrequin....General Manager of Sadir Department
M. G.Roy.....Sales Manager
M. P.Garnet.....Technical Manager
M. Y.Delbord.....Manager in charge of Research and television laboratories.
M. R.Culot.....Murat works manager
M. R.Jourdan.....Puteaux wrks manager

The Societe is an affiliate of the Edgar Brandt holding company.

(b) German Sponsored Activities

A detailed description of the various projects engaged in during German occupation is listed above under "Equipment Inspected." In addition Sadir was asked to produce 200 airborne television transmitters in 1941. The design was to be the same as the airborne British EMI set flown before the war in England. Complete plans are held by Sadir but no work was done on the project. A request for design and construction of a 200 Watt FM transmitter was submitted by the Germans. This was to cover the band 35.5-48.5 mc. 25 kc deviation was desired. This was a fairly recent request and no work was completed.

(c) Independent French Activities

SADIR was apparently not watched as closely as some other organizations by the Germans. A Capt. Kemper

of no particular technical ability, who held the title of "Controller" spent about half his time at the plant on Bld Murat. As a result SADIR was able to carry on considerable research. Details of accomplishments of the laboratories have not been probed since the mission of C.I.P.C. has to date concerned itself particularly with seeking information concerning German activities and any utilization of new French ideas by the Germans. This company was able to carry on enough secret work to lend assistance to the F.F.I. by building and operating underground transmitting equipment for use before the liberation.

Summary of Significant Findings.

A tube having a molybdenum-glass seal of interesting properties was seen. This tube had several molybdenum leads about 3/16" in diameter sealed through the glass. A very small and nicely finished bead had been formed, considering the relatively enormous dimensions of the leads and small size of the tube, roughly 2½" diameter of doorknob shape.
Nothing else of particularly noteworthy significance was seen at SADIR.
Among German personnel who have been associated with SADIR are the following:

Name	Office (German)	Capacity-Specialty
Hournung (Dr)	515 & 525	High Frequency
Goldmann (2 Bros.)	Lorenz Co	Antennas
Kist	Lorenz Co	Antennas
Grossman	Lorenz Co	Antennas
Wenzel, von	Stabs (LC4 Air Ministry)	F.M.transmitter
Henfelder	GL 4	Supervision
Capt Kemper	GL 4	Plant Supervision (Controller)
Loewe	D4 POL D4 ZOI D4 ZOT	Gestapo

Conclusions and Comments

The association with SADIR has been most productive in establishing proper contacts with people of importance in the radio industry. The personnel of the Board of Directors and heads of various laboratories have been most eager to assist the members of the C.I.P.C. teams investigating radar, radio and guided missiles. This has led to the contact with M.Giboin head of the radio branch of the Ministry of Supply in France.

Any opportunity to assist SADIR in the future in getting into production might further the bond of friendship and mutual welfare of both the Signal Corps and the SADIR organization. It would seem possible, for example, to place with such firms who are equipped as this one is, contacts for production of high precision radio test equipment. SADIR appears to be as well informed as any other organization visited, with respect to the relative state of the art. There are no outstanding findings as a result of visits to SADIR.

5. Members of the Inspecting Parties.

Dr. H.G. Stever	O.S.R.D.	
Lt. T.J. Nagel	U.S. Navy	
Lt. E.N. Rowland	Admiralty	
Capt. J.T. Mullin	U.S. Army	(Reporting)
Capt. E.M. Reilley	U.S. Army	
Lt. J. Thomson	Admiralty	
Major W.T. Williams	War Office	
Lt. F.L. Sherman	U.S. Navy	
Mr. G. McCouch	O.S.R.D.	
Fl/Lt. W. Fishwick	Royal Air Force	

Societe d'Applications Radio-Electriques a L'Aeronautique et la Marine (S.A.R.A.M.)

9 - 11 Rue H.G. Fontaine, Asnieres (Seine)

5 September 1944.

1. Sources of Information.
(a) Persons interviewed
M.Merles.....Directeur

(b) Facilities inspected
A brief tour of the factory was carried out under the direction of M.Merles.

(c) Equipment inspected
Equipment in the testing rooms and laboratories was inspected briefly.

2. Information obtained
(a) Organization and Affiliates
This Societe is a member of the Bronzavia group, with headquarters at 207, Boulevard St. Denis a Courbevoie. It is connected in turn with a subsidiary concern, "SAPHYR", producing, in particular, iron-dust elements of various types.

(b) German Sponsored Activity
The firm produced before the war transmitter-receivers for aircraft. The Germans have required the continuation of these designs, but have used them in ships and cars. They have manufactured no new German designs.

(c) Independent French Activity.
The firm has developed a fewitems of measuring equipment for their own use.

3. Significant findings
None

4. Conclusions and comments
A promising concern from the production aspect, but there is no evidence of knowledge of information of interest to this mission.

5. Members of Inspecting Party.

Capt. J. Mullin U.S.Army
Maj. W.T.Williams War Office (Reporting)

Societe Francaise Radio-Electrique

Head Office - 79, Boulevard Haussman

Factory and Laboratories - 55 Rue Greffuhle
Leralloie-Perret, Paris VIIIe.

C.I.P.C. Target No. 1/19a

31 August 1944
5 September 1944
6 September 1944

1. Sources of Information
(a) Persons Interviewed
At the head office, the Director, M.Rebotier and the Chief Engineer, Mr.Benoit were contacted at the Research Labs, M.Poute, Director of Research and Dr. Grivet, research worker, were contacted.

(b) Equipment and Facilities inspected.
At the factory some of the laboratory was inspected. Also a few standard German tubes and threeGerman radio sets manufactured by S.F.R. were inspected.

Information obtained

(a) Organization and Affiliates

Societe Francaise Radioelectrique, along with Radio Technique, Societe Independent de T.S.F. and Radio Cinema make up the research, development, and manufacturing companies controlled by the holding company., Compagnie Generale de Telegraphie Sans Fils. Their products are exploited by the three companies, La Compagnie Radio France, La Compagnie Radio Orient, and La Compagnie Radio Maritime.

These companies have exchanged agreements with R.C.A, Marconi, and Telefunken. Their research and development was supposedly controlled by Telefunken during the occupation, although they claim that there was none of the peacetime exchange of information between Telefunken and S.F.R.

(b) German Sponsored Activities.

The information we received from S.F.R. as well as from the other organizations of Compagnie Generale de T.S.F. was remarkably devoid of interest from the research point of view. We obtained from the headquarters a document which lists the characteristics of the sets which they manufactured for the Germans. This document is to be turned over to C.I.P.C. We saw examples of AS P 59, Dora D-2, Theodor, all of which are described in the accompanying document. Samples of the various equipments can be obtained if desired. Mr.Poute showed us samples of a few very ordinary German valves and gave us the characteristics of the following German Air Force valves: LS 50, LG 3, RL 2T2, LV1, LS 130, LS 30, RV 2P 800, LG-1, RG12 D 300.

S.F.R. was asked to make 10000 LS 50s per month. They didn't. S.F.R. was asked to make 07S1 cathode ray tubes. Germans have good ceramic work done at Heesche Company in Helmsdorf. Samples of an apparatus containing relays and miniature components were produced along with working drawings and circuit diagrams. The units were found to be part of a ground receiver of wide frequency coverage. The working drawings and circuits showed the units as being parts of receiver Fu E 52-6-2 (Koln). From the circuit diagram it was seen that the relay performed a simply function of switching from a set of fixed resistors to variable values in an oscillator circuit.

(c) Independent French Activities.
The company showed no inclination to show any of their research and development for purely non-German purposes, and we didn't press the point.

3. Summary of Significant Findings.
No significant research developments were uncovered. It is very surprising that all of the engineers of this company did not uncover something of interest in German research, especially if one considers the close tie with Telefunken, which does most of Germany's short wave works. We did obtain the following names of personnel in Telefunken and the German Air Ministry:

TELEFUNKEN-BERLIN

Dr. General	Dr. Mye
Dr. Technique	Dr. Zickermann
Directeur	Dr. Weth
Directeur Commercial	Dr. Granitza
Techniciens de fabrication	Wolff, Wiegand, Duesing A.Kuntze

MINISTERE de l'AIR ALLEMAND

BERLIN	Docteur Hentschell
	Docteur Krause
	Docteur Kretzmann
PARIS	Ingenieur Uhlemann
	Ingenieur Lenecka
	Ingenieur Rosenbaum

Almost certainly if this company were willing to reveal their own researches or tubes we would learn of some German research work which they had picked up from Telefunken engineers.

4. Conclusions and Comments
This company was very obviously in very close collaboration with Telefunken. It is strongly suspected that they knew a great deal about German developments but they revealed almost nothing. The company should be thoroughly investigated by some Intelligence Agency.

5. Members of Inspecting Party

1st Visit to the Head Office on 31 August 1944 by

Mr. L.L. Farkas	O.S.R.D.
Major W.T. Williams	R.E.M.E.

2nd Visit to the Factory and Laboratiore on 5 September 1944 by

Dr. S.A. Goudsmit	ALSOS Mission
Dr. K.R. Spangenberg	O.S.R.D.
Lt. J. Thomson	Admiralty
Lt. T.J. Nagel	U.S. Navy
Dr. H.G. Stever	O.S.R.D. (Reporting)

3rd Visit to the Head Office on 6 September 1944 by

Capt. J.T. Mullin	U.S. Army
Capt. E.M. Reilly	U.S. Army

Societe Independent de T.S.F.

170 Rue de Montagne - Malakoff.

5 September 1944.

1. Sources of Information

(a) Persons Interviewed

M.Belmere ..... Director General
M.Carrick ..... Draftsman who acted as interpreter.

(b) Facilities inspected

None

(c) Equipment inspected

None

2. Information obtained

(a) German Sponsored Activity

Under German occupation the following types of equipment were built to German models and specifications.

(a) Airplane transmitter 50-70 watt (773 delivered)
(b) Airplane receiver 2000 ordered (180 delivered)
Both (a) and (b) were stated to cover two bands 50-100 meters and 500 to 1000 meters.
(c) "Traffic" receiver 15-80 meters
(d) Power amplifiers 6-10 kW 25-100 meters (10 delivered)

(b) Independent French Activity

Before the war the firm was engaged in fitting trucks with radio transmitter and receivers and radio direction finders for the French forces. The firm also manufactures tubes on a small scale. All are conventional (pre 1939) types.

3. Significant Findings
None

4. Conclusions and Comments
The director claimed complete ignorance of German developments and activity in the radio field. Nothing new or unusual had come to their attention in their contacts with the enemy. No technical information of value was obtained.

5. Members of Inspecting Party

Dr. E.W. Thatcher .....O.S.R.D. (Reporting)
Lt. E.N. Rowland .....Admiralty

Societe Industrielle Radioelectrique

31 Rue Censier, Paris 5.

5 September 1944.

1. Sources of information
(a) Persons interviewed
M.Sene.....Manager
M.Bardy.....Technical Manager
M.Marlon.....Commercial Manager
M.Jouan.....Production Manager

(b) Facilities inspected
Factory at above address. Mainly an assembly plant.

(c) Equipment inspected
Electronic Voltmeters, C.R. Oscilloscopes and other conventional laboratory equipment. Also panoramic receivers covering 0.25 to 4 mc and 4 mc to 30 mc. Laryngophones.

2. Information obtained
(a) Organization and Affiliates
Firm has other factories located at Bleneau (ave de la Gare) and at Brioude (13 Ave Victor Hugo) and an office at 22 Bvd. de la Bastille (Paris 12).

(b) German Sponsored Activity.
The Germans asked for laboratory equipment and especially the panoramic receiver, but the firm had avoided supplying it. They had sent only one panoramic receiver to Berlin and had not been paid for it.

(c) Independent French Activity
The firm had developed the larynogophone for inter-

nal communication in aeroplanes for the French Air Ministry before the war.

3. Significant Findings.
None

4. Conclusions and Comments.
The firm has no knowledge of German activities and has not done any important research on its own. It has, however, a useful capacity for producing signal generators and similar laboratory measuring apparatus.

5. Members of Inspecting Party

Dr. E. W. Thatcher	O.S.R.D. (Reporting)
Lt. E. N. Rowland	Admiralty

Societe Parisienne Pour L'Industrie

85 Blvd Hausemann - Paris

2 September 1944

1. Sources of Information
(a) Persons Interviewed
M. Deglaire and associates

(b) Facilities and Equipment examined
None

2. Information obtained
(a) German Sponsored Activity
The Societe was consulted by the Germans in connection with installation of Giant Wurzburg station. No contracts were held. The Team recovered reproduction of construction drawings dated 15 April 1943 submitted to firm by Germans. It was generally believed that constructions Metalliques de Strasbourg were the main contractors for Wurzburg installation.

(b) Independent French Activity
Company engaged in installation of heavy electrical equipment, transformers, substations power lines, electric railway lines, cables for telephone and telegraph also gas, gasoline and water pipe lines.

3. Significant Findings.
None relative to C.I.P.C. Interests.

4. Conclusions and Comments
The team feels that this firm was very willing to help but cannot provide any further information of significance in the radar field.

Lt. E.N. Rowland	Admiralty
Lt. F.L. Sherman	U.S. Navy
Lt. E. Riley	U.S. Army
Dr. E.W. Thatcher	O.S.R.D. (Reporting)

Societe Radio Air

Paris Business Office - 134 Blvd Hausmann

Factory - 72 rue Chanveau, Neuilly S/Seine. Tel MAE 59-84

5 September 1944.

1. Sources of Information

(a) Persons interviewed

M.Cosnard, Director of Production and M.Vignaud, Technical Director wereinterviewed. They were most co-operative and it is assumed that they gave the team all the information requested. The factory and small laboratory employ about 150 persons. Aircraft communications and navigational equipment of conventional French and German design were inspected.

2. Information obtained.

(a) Organization and affiliates

Strictly a manufacturing company.

(b) German Sponsored Activity

During German occupation the company was operated by the Firm of Frieske and Hopfner of Grossbeerenstr 105-121 Potsdam - Babelsberg. Their main production was on aircraft transmitter 4.5-7.5 meters and receiver 4-8 meters their type RE 537. This equipment was previously used by the French Air Force. Five to six thousand of these equipments were delivered to the Germans on a French "Reparations" contract. The company has been called upon by the Germans to service and modify these equipments for 5.5 to 8.5 meters. The company has been producing for the last eighteen months a blind landing equipment of conventional German design type VR-11. A quantity of 500-600 have been delivered.

(c) Independent French Activity.

None was revealed.

3. Summary of Significant Findings.

During the occupation, Radio-Air was operated by the Germans as a minor source of aircraft communications and navigational equipment. No development or research work was carried on nor do they have the facilities for such work. Material produced was of conventional or obsolete design.

4. Conclusions and Comments

No technical information of value was obtained.

5. Members of Inspecting Party

Dr. E.W. Thatcher	O.S.R.D.
Lt. F.L. Sherman	U.S. Navy (Reporting)

Cie, Francaise Thompson-Houston

10, Rue Nanteuil.

C.I.P.C. Target 1/96

31 August 1944

1. Sources of information.

(a) Persons interviewed

M.Marmin.....Sous-Directeur
M.Cope.....Ingenieur

(b) Facilities Inspected

A brief inspection of the factory was carried out under the guidance of the representatives interviewed.

(c) Equipment inspected

A number of items of equipment, produced for the Germans were examined.

2. Information obtained.

(a) Organization and Affiliates.

This is one of a number of factories of this organization in the Paris area: time did not permit other branches to be visited, but there was no reason to suppose that these would be of greater interest than this.

(b) German Sponsored Equipment.

A variety of items of telephone and public-address system units were in production to German orders.

(c) Independent French Activity
None

3. Significant Findings.
Nothing of obvious interest was seen. The firm claims, and the present condition of their benches supports this, that they have been making only telephone and public-address systems, and units (amplifiers etc.) for these. They state that they have carried out no radio work of any description. A large number of nearly complete chassis are available, without valves: valves are added after the sets have left the factory, which holds only a set of Telefunken valves for testing.

4. Conclusions and comments.
Though of considerable promise from a production aspect, this factory appears to possess no features of interest to the present mission.

5. Members of Inspecting Party

Mr. L.L. Farkas	O.S.R.D.
Major W.T. Williams	War Office (Reporting)

Compagnie de Westinghouse

Head Office: 23 Rue d'Athenes, Paris 9.

C.I.P.C. Target No. 1/93

30 August 1944

1. Sources of Information
(a) Persons interviewed
M.R.Jourdain - President Directeur General
M.G.Valleteau de Moulliac - Secretaire General

(b) Facilities inspected
None

(c) Equipment inspected
None

2. Information obtained.
This firm is similar to the British Westinghouse Signal and Brake Co., and has three factories.
(1) at Freinville making railway brakes, aircraft landing gear, railway signals, rectifiers of Cu O and selenium - 1500 persons.

(2) at Pons, making railway brakes and railway carriage heating apparatus - 170 persons.
(3) at Montlucon making railway apparatus - 60 persons.

It has continued this work during the occupation. Its only research work has been on the technique of making selenium rectifiers. This was not disclosed to the Germans but M.Jourdain stated the Germans knew all about selenium rectifiers.

Personnel

President Directeur General	Robert Jourdain
Secretaire General	Guy Valleteau de Moulliac
Directeur General Adjoint	Paul Prache
Directeur	Maurice Bulle
Ingenieurs:-Chefs de Service:	
Ingenieur Conseil	Jules Dormoy
Ingenieur Service Brevets	Engel Antoine
Chef de Service Freins	Guillemin Tarayre
Ingenieur Service Freins	Raoul Borde
Chef du Service Signalisation	Andre Roulier
Chef du Service Redresseurs	Marcel Dessant

USINE DE FREINVILLE

Directeur des ateliers	Oudinet
Chef de Service technique	Pourille

USINE DE PONS

Directeur	Pradier

USINE DE MONTLUCON

Directeur	Sylvestre

4. Conclusions & Comments.

This firm has no knowledge of new developments in the radio field. It might be useful if it was contacted by British Westinghouse on the subject of selenium rectifiers.

5. Members of Inspecting Party

Mr. Farkas	O.S.R.D.
Dr. H.G. Stever	O.S.R.D.
Lt. T.J. Nagel	U.S.Navy
Lt. E.N. Rowland	Admiralty (Reporting)