

ITEM No. 1

FILE No. XXIV - 26.27

ELECTRONIC VALVE (TUBE) FACTORIES

HELMBRECHTS AND MINDEN

This report is issued with the understanding that the subject matter of it is not
protected by British Patents or Patent applications, this publication cannot
be held to give any protection against action for infringement.

COMBINED INTELLIGENCE OBJECTIVES
SUB-COMMITTEE
LONDON: H.M. STATIONERY OFFICE

ELECTRONIC VALVE FACTORIES
TeKaDe, HELMBRECHTS AND PHILIPS; MINDEN

Reported by

W/C G. L. HUNT, M.A.P.
Mr. C.A. HACHEMEISTER, U.S. Eng.
F/Lt S.J. BORGARS M.A.P.

CIOS Target Numbers 1/271 c, 1/480
Radar

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

TABLE OF CONTENTS

<u>Subject</u>	<u>Page No.</u>
I TeKaDe Electronic Factory	
1. Introduction	3
2. General Description of Plant	3
3. Types of Valve Manufactured	3
4. Items of Special Interest	4
5. Documents and Valves Evacuated through Army Channels	4
6. Other Factories, etc., Related to the TeKaDe Factory at Helmbrachts	4
II Hammerwerke, Philips Plant, Minden	
1. Introduction	5
2. General Description of Factory	5
3. Type of Valve Manufactured	6
4. Plant and Processes	6
5. Connections with other Factories in Germany	7
6. General Conclusions	7
APPENDIX I - Documents and Materials Evacu- ated from Hammerwerke, Minden	9
APPENDIX II - Copy of Report on the Hammer- werke supplied to CAFT by Jos. Gosen, Dutchman	10
APPENDIX III- Photographs showing the Situation of the Factory	13

Inspection Team

W/C. G. L. HUNT, M.A.P.
F/Lt. S. J. BORGARS, M.A.P.
Mr. C. A. HACHEMEISTER, U. S. Eng.

1. Introduction.

C.I.O.S. Target No.1/271(b), TeKaDe Electronic Valve Factory, was investigated on 16th May, 1945. The plant has been evacuated and occupies part of the C.F. Weiss Textile Mills at Helmbrechts, which is about 15 kilometres south-west of Hof. The condition of the target was good and no damage had been sustained by either the building or the plant. The local manager is Dr. Keller and his office is in Adolf Hitler Strasse.

A thorough examination of the factory was made with the assistance of one of the employees who was in possession of the keys. This employee was non-technical and was not able to give any information of a detailed nature, but the machinery and documents which were examined showed that the factory had been engaged solely on the manufacture of ordinary radio receiving valves and it was not considered necessary to interrogate any of the technical personnel.

2. General Description of Plant.

The factory was fully equipped for the manufacture of radio receiving valves. The area occupied was two floors and part of the ground floor of the building. About 300 persons were employed altogether, which would give a total output of the order of 4,000-5,000 valves per week. Pumps, bench welders, aging racks, grid winding machines, presses and test equipment were all of conventional design. In addition, machinery was available for forming pressed glass bases.

3. Types of Valve Manufactured.

The valve types which were being manufactured were:

RG1260
2T2
RL12T15

These types have all been in production in Germany for a long time. They employ the pressed glass ring seal base technique, with bakelite cap and side contact pins.

4. Items of Special Interest.

There was very little of special interest and only two things worthy of report.

The first of these is a special form of shock testing machine which consisted of a metal bar, hinged at one end and lifted at the other by means of a cam which was rotated by hand. A drop of about $\frac{1}{4}$ " was used and the movable arm fell onto a hard steel block. The valve was tested under operating conditions and a meter was used to indicate the effect of the shock upon the valve. There appeared to be one of these testing machines for each type of valve manufactured.

The second item of interest was apparatus in one of the test laboratories which indicated that measurements had been made at ultra high frequencies. A lecher wire system was in use, but the apparatus concerned was only of a rough construction and indicated that very little work had been carried on at frequencies in excess of 100 Mc/s.

5. Documents and Valves evacuated through army channels.

- (1) A document describing the processes in the manufacture of pressed glass bases.
- (11) Two experimental valves type U.16, found in the director's office. These valves were triodes, similar in construction to the more recent Telefunken triodes but with the anode and grid support wires extended in the form of lines and brought out through a glass envelope at each end. The valves were rather like very much elongated acorns with an anode and grid lead on each end and with heater and cathode connections through a ring seal in the middle. No information on these valves was to be obtained at Helmbrechts.

6. Other Factories, etc., related to the TeKaDe Factory at Helmbrechts.

Main TeKaDe factory is in Nurnburg, Allersbergstrasse, and the office is also in Nurnburg in Nornenstrasse. The director is Dr. Konrad Köss.

6th June, 1945.

1. Introduction.

The Hammerwerke, Philips plant at Minden, was investigated on 16th and 17th April, 1945. The target was first reached during the evening of 16th April and, being open and unattended, was given a preliminary general survey. On the 17th April, contact was made with some of the managerial staff of the factory who accompanied the investigators on a more thorough examination of the works. Afterwards the German staff were questioned. The Germans concerned were as follows :-

Walter Roder,
Berlin W.35, Blumenthalstrasse,
Philips Valvo Works, GmbH.
Materials manager and concerned with incoming materials.

Norbert Runeki of Radioröhrenfabrik GmbH., Hamburg.
Materials manager, finished products.

Paul Vanderheyden of Radioröhrenfabrik, GmbH.,
Hamburg.
Confidential clerk.

2. General Description of Factory.

The factory is built inside a mountain on the eastern side of the River Weser at a place called Porta, approximately five miles south of Minden. The limestone rock has been excavated and floors and stairs of concrete constructed. The entrance to the factory is about 300 ft. above the level of the river and a funicular railway connects the factory entrance with the road and railway at Porta station, which is also very close to the river bank. Access to the factory by road is very difficult.

The total floor area available is 95,000 sq.ft., divided among nine floors or galleries of varying sizes. There is communication between the various floors by means of stairs and a lift. The drawing at the end of this report shows a plan of the various levels of the factory and the use to which each was put.

The leading officials and workpeople came from Hamburg (Valvo Works). About 1,200 girls were employed in the factory. These girls were Jewish and lived in camps situated outside the factory on the mountainside, where they were guarded by the SS. A few men were also forced by the Germans to leave the Philips works at Eindhoven to get the works at Minden into operation.

The machines were mostly from Eindhoven, from which evacuation commenced in September 1944. The machines which did not come from Eindhoven were evacuated from the Valvo Works at Hamburg.

The factory had been put into operation only six weeks or so before the Allied occupation of Minden and the Germans had never succeeded in getting anywhere near the full output. Operators worked 12 hours a day for 7 days a week and on this basis the total production should have reached a figure of 60,000 valves a week. However, no more than 1,000 valves a day were made.

3. Type of Valve Manufactured.

Only one type of valve had been produced, this being the RV2,4 P700, a small, directly heated, high frequency pentode which has been in very widespread use by the German armed forces since well before the war. Production of the RV12 P2000, an indirectly heated, high frequency pentode, was planned but never took place. Other valves which were due for production were the Philips DET2/200-01 and possibly the Philips C36 and B20.

4. Plant and Processes.

The plant, which was in good condition, consisted of the usual machinery found in a works making small radio receiving valves. Pumps, grid winding machines, basing machines, cathode coating plant, were all very similar to that used in ordinary British or American factories. The RV2,4 P700 and RV12 P2000 both have pressed glass bases and special machines had been installed for the necessary processes involved. Two machines were used, in the first of which glass tubing was flanged at one end, while in the second, the borated lead wires, which were held in a die and threaded over the unflanged part of the tube, were sealed under pressure. All grid wires were stretched before grid winding and special machines were installed for this process. Pressed parts, like anodes, were made in power-operated presses of rather complicated construction but having no features of special note.

On the bottom level, vacuum plant was installed and piping carried the vacuum to those parts of the factory where it was necessary. Supplies of nitrogen, oxygen, hydrogen and compressed air were also piped around the various floors.

5. Connections with other Factories in Germany.

All supplies of mica are obtained from Wilhelm Carstens, Hamburg. Part of this mica is obtained in fabricated form but most of it is fabricated at Minden. It was stated that Carstens was the major supplier of mica to all the valve factories in Germany. Siemens, Lorenz, Telefunken and Philips were all stated to obtain their mica supplies from this firm. It is possible that other insulating materials are also supplied by Carstens.

All glass used in the Hammerwerke was obtained from Glassfabriken Weiss Wasser GmbH., an associated Philips company at Weiss Wasser.

Copper-clad wire came from Osram GmbH., Berlin, and the base mouldings from Radio Mende, Berlin.

6. General Conclusions.

The factory is essentially a shadow factory of the Philips Valvo Works at Hamburg. Very little technical information was available at Minden, especially as the works had been in operation for so short a period. What information was available consisted solely of ordinary manufacturing instructions which revealed no new or outstanding techniques. The technical manager was named Siemars and he had returned to Radiorohren-fabrik, Hamburg, as had also Dr. Jobst, the works manager.

The plant is in good condition and if required, could be put into operation in a month or two. The machines used for making the pressed glass base could be adapted to make the miniature button base which is coming into wide use in the British and American Services.

The care and maintenance of the plant was discussed briefly with the Military Government representatives at Porta. Since the bulk of the machinery has been removed from the Philips works at Eindhoven, it is presumably impossible to confiscate it since it belongs to a friendly Power. It will presumably be returned ultimately to Eindhoven and the Military Government authorities will decide what steps should be taken to permit access to the factory for the purpose of maintaining the plant in good order. If left unattended, it will become rusty and useless.

The following appendices are attached :-

- I. List of documents and materials evacuated.
- II. A copy of a report made by Jos. Gosen, a Dutchman, who was moved by the Germans from Eindhoven to Minden.
- III. Photographs showing the situation of the factory.

26th April, 1945.

APPENDIX I

Documents and Materials evacuated from
Hammerwerke, Minden.

Documents.

Plans of factory layout and 70 miscellaneous drawings.

These were removed because the absence of any lighting in the factory made examination difficult. Subsequent examination showed most of them to be of no value.

Documents brought back to U.K. by party leader.

Materials.

Two Philips valves type MA 12/15.

One cathode ray tube assembly.

One Philips valve type P10.

Six Philips valves type P2000 and components.

Three Philips valves type DET.2/200-01.

One Philips valve type C36.

One Philips valve type B20.

Materials being returned to R.A.E. Farnborough from T Force Transit Camp, Venlo. Holland.

APPENDIX II

Copy of Report on the Hammerwerke
supplied to CAFT by Jos. Gosen, Dutchman.

"REPORT ON THE HAMMERER WERKE

AT HAUSBERGE

The Hammerworks were grounded after the evacuation of Eindhoven to manufacture inside the mountain radio tubes for the German army. Machines for the greater part brought from Holland (Philips) and partly from Hamburg (Valvoworks) - an associated firm of Philips.

Leading officials and workers (about 100) were brought from Hamburg. Production took place with about 1200 Jewish girls from Poland, Hungaria and Holland, who lived in camps outside the mountain and guarded by the SS. The occupation of about 4000 girls was planned.

Electric current and gas came from outside. The works possessed a small auxiliarz plant for lighting purposes. The other gases necessary to light several parts were delivered from Hamburg.

Production started on the 20th February, 1945 with one type (RV2.4 p700).

Planning output:	March	20,000
	April	30,000
	May	40,000 (Capacity)

The second type (RV12 P2000) was to start on 1st April. Production planning not known.

There are 9 floors inside the mountain. The entrance is at about 300 feet (floor no. 2).

1st floor Machinehouse Installation for the distribution of gasses. Installation to get power current and a small auxiliary lighting plant.

Mechanical Workshop Exact number of the several machines not known. There were at least 15 spindles, 5 frase machines. 20 drill machines and a few machines to grind tools.

Electrical Workshop. No special machines, several transformers.

- 2nd floor About 20 machines to roll grales (?).
Further about 15 motorized and a larger
number of handpresses for manufacturing
of iron parts.
About 5 machines to cut iron and nickel
wire. Several plants to harden and
temper these parts.
- 3rd floor 5 machines with 1 pos. to press tube-
bottoms for all glass tubes. 2 machines
with 10 pos. (electrical) to press shell
bottoms. Several electrical and gas
tempering etc. for glass parts.
- 4th floor A large number of tables (iron) with
electrical welding machines for the
union of the tubes. Further pumps, etc.
and frames to burn in the tubes and
electrical controls.
- 5th floor The erection of a plant to draw "Wolfram"
and Mo wire was planned here. Further
there were several machines for the
production of other radio and trans-
mitting tubes.
- 6th floor Partly used for lodging a number of
Jewish girls and part for offices.
- 7th and 8th floors
Production of Kallodes (?) and filament
wire.
Evacuated to Hamburg are :
-

- (a) Practically all tools
- (b) All tubes
- (c) Parts and raw materials
- (d) Several machines of which there is a shortage
in Hamburg.

To produce here in Porta in the next 2 or 3 months, radio
tubes is in mz opinion impossible. Perhaps it is possible
to take the technical and mechanical workshops for other
uses. It is necessarz to organize new tools. The second
floor with the presses can be used. If Tpt. of machines
to Eindhoven is not at present possible, I advise to move
up some technical men from Eindhoven to take care of them,
so that thez can already be packed and made ready for
moving.

(Signed) Jos. Gosen.

Barkhausen

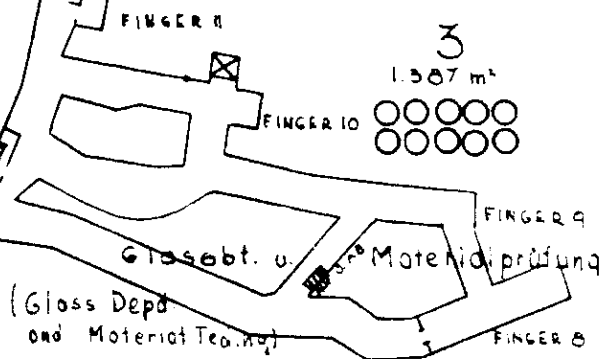
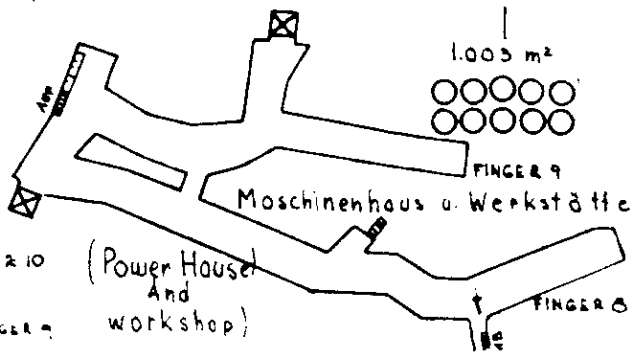
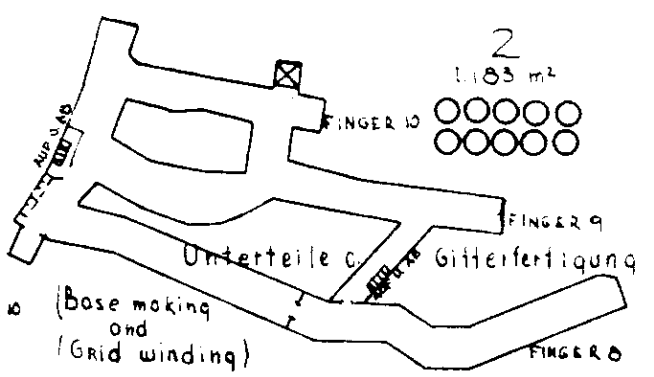
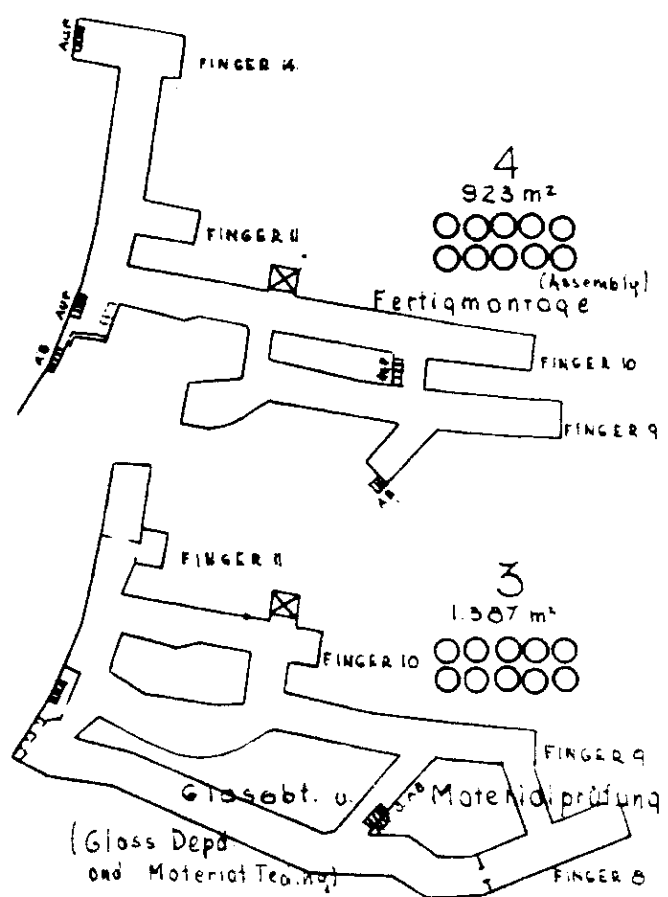
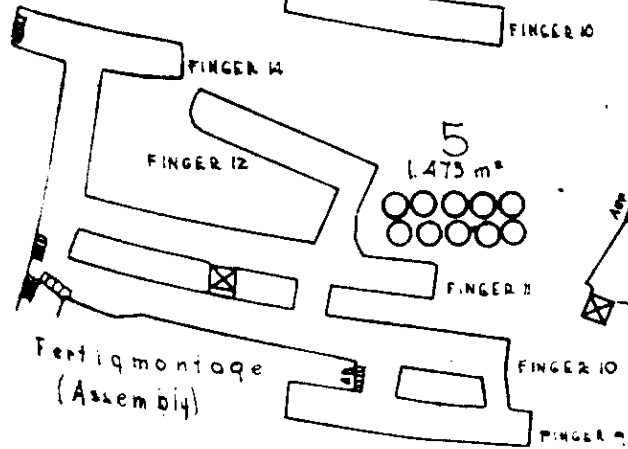
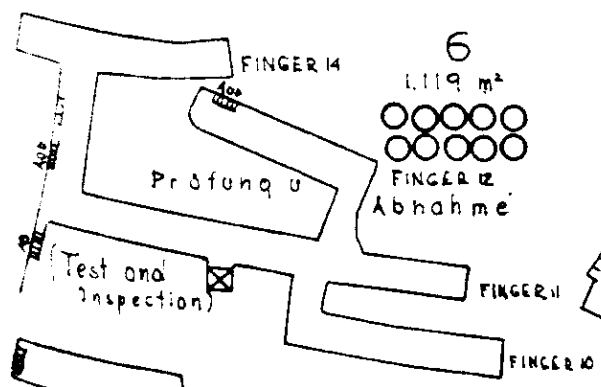
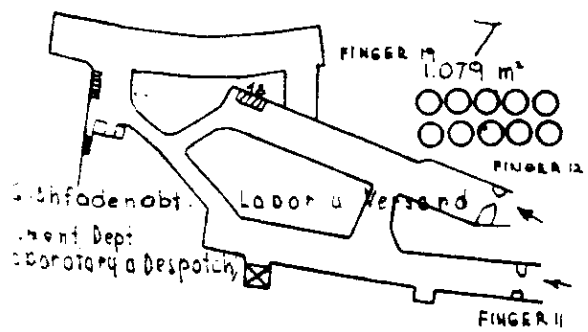
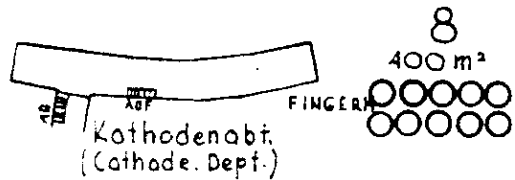
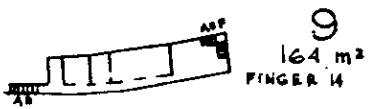
8 apr. 45

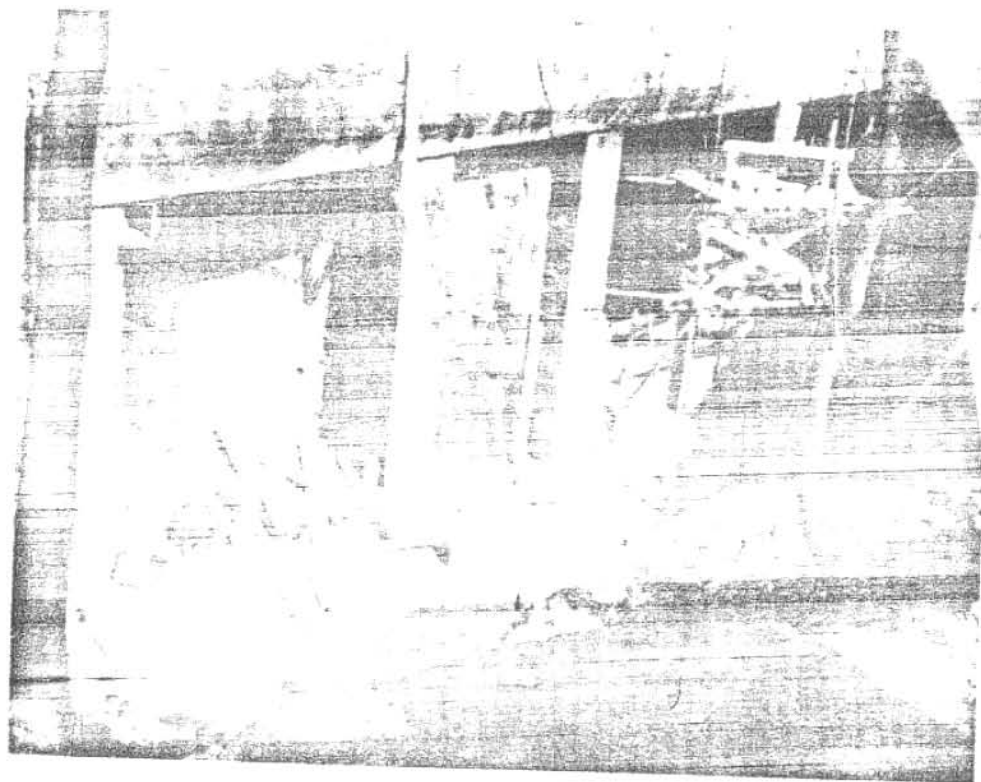
N.B. By Investigator

Mr. Gosen was interviewed at the offices of the Mil.Gov. before his departure for Holland. His address in Hollarnd will be.

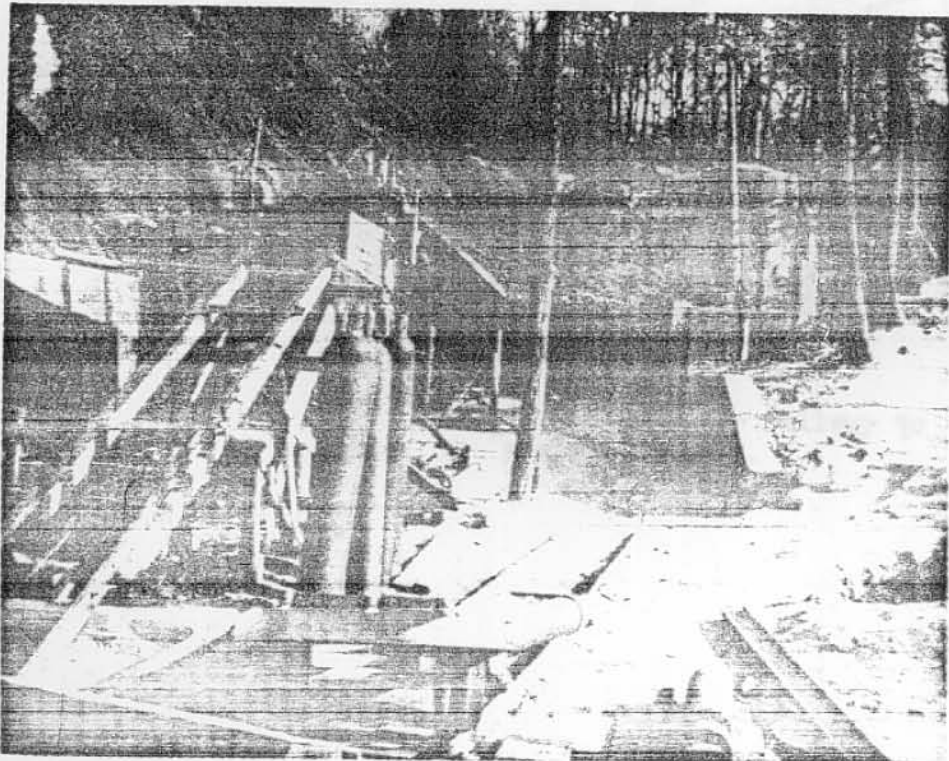
School Street 76
Eindhoven Holland.

PLAN DER
HAMMERWERKE

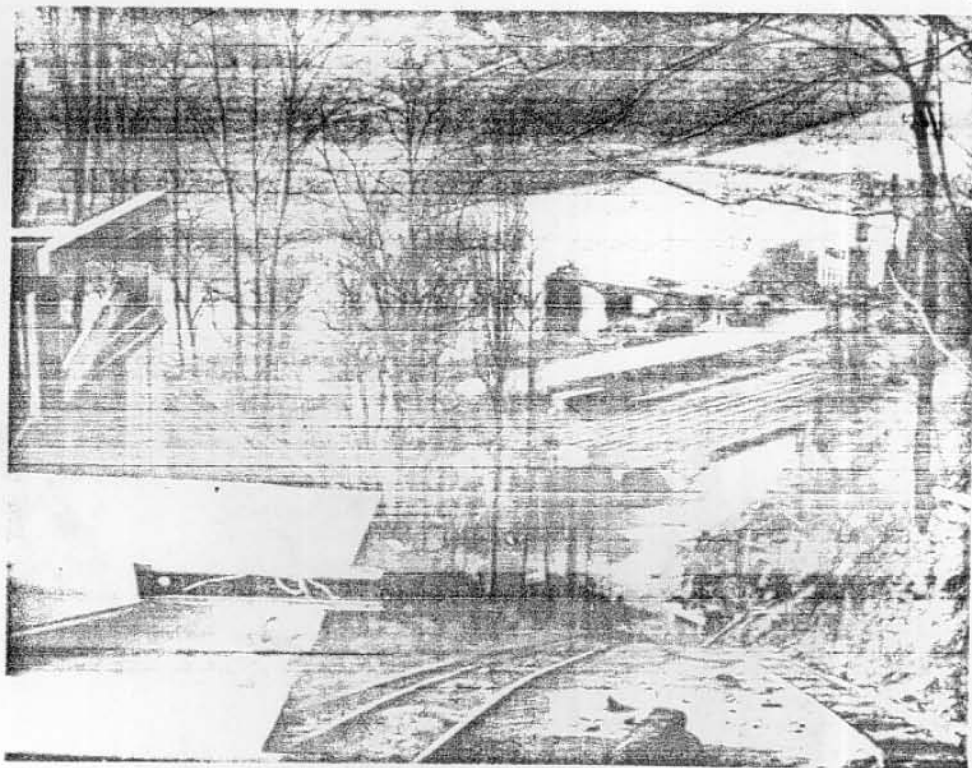




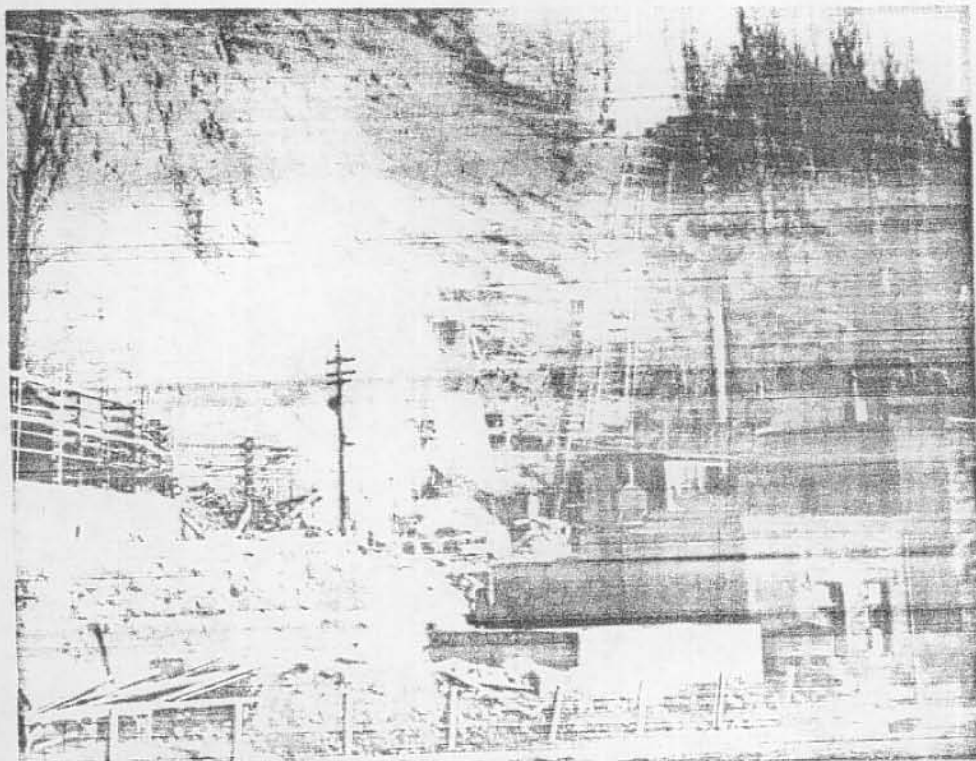
1. Entrance to factory.



2. Top of funicular railway and approach
to entrance.



3. Looking down funicular railway to
Ems-Weser Canal.



4. Funicular railway as seen from canal bank.