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MESSRS. STEEG AND REUTER
BAD HOMBURG

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COMBINED INTELLIGENCE OBJECTIVES
SUB-COMMITTEE

LONDON — H.M. STATIONERY OFFICE

REPORT ON INSPECTION OF LABORATORIES AND FACTORY OF MESSRS. STEEG AND REUTER, BAD HOMBURG.

5 June 1945

Reported By
Wing Commander A.S. RADFORD, M.A.P.

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Messrs. Steeg and Reuter, Bad Homburg.

1. General

As a result of information obtained from Messrs. Leitz of Wetzlar the following officers forming part of C.I.O.S. mission 251 visited the firm of Steeg and Reuter on 5th June, 1945.

Col: A.W. Angus.
Col: A.J. Philpot.
Col: E.W. Taylor.
Lt/Commander C. Wright.
Wing Commander A.S. Radford.

The party was conducted around the laboratories by Dr. Reuter and his brother who had been in charge of the grinding department. Dr. Sobel who had been in charge of the electrical laboratories and quartz crystal assembly was also interrogated.

2. Background information on Messrs. Steeg and Reuter.

The firm has been engaged during the war almost exclusively on the production of piezo electric crystals for frequency control and for pressure measurement devices. Rock salt prisms and polarisation equipment for infra-red experiments have also been produced.

Three houses on Kurdorferstrasse - to the North West of the town-house the laboratories and a small factory has been built in the grounds of one, No:12, for the production and assembly of crystals for frequency control circuits.

The firm is owned as to 50% by Messrs. Leitz of Wetzlar and as to 25% each by the two brothers Reuter, both of whom are working directors.

2. (Continued)

Before the war their main activity was the production of optical apparatus mainly for demonstration purposes in technical high schools and University laboratories. Over 300 different crystals featured in their range of products as well as a wide selection of optical benches, interferometers, saccharimeters, polarisation equipment etc.

3. War time activities of firm

During the war the production of laboratory equipment has been suspended and the main activity of the firm has been the production of 6000 quartz crystals per month and 10,000 Rochelle salt crystals per month. The former have been for frequency control circuits from 50 KC/s upwards and the shortage of good quartz has led to the development of methods for the most economical use of the material available, both as regards the cutting of the maximum number of crystals from a given raw crystal, as regards the design of crystals and holders to economise in the use of raw material.

The Rochelle salt crystals have been supplied for incorporation in crystal pick ups and microphones. Ninety per cent of the output of the firm was delivered to Telefunken and other customers supplied were Lende, Loewe, Huth, Korting and Lorenz. A complete card index of the customers to whom deliveries have been made is maintained intact and might be worth a detailed study.

4. Present Condition of Laboratories etc.

The buildings have sustained no damage due to hostilities and the plant has been re-assembled after having been dispersed just before Bad Homburg was captured. Considerable stocks of quartz (about 1 ton) and Iceland spar are available.

Test equipment is practically intact, with the exception of one quartz crystal testing installation which was destroyed when the buildings were first captured.

The staff of 250 workers, comprised of mechanics, engineers,

4. (continued)

and part time women are all believed to be still available in the district. No work is going on in the crystal production unit but in the laboratories some equipments are set up for the continued study of optical problems. Dr. Reuter stated that nothing could be done until contact could be established with Messrs. Leitz from whom he expected to receive orders for optical crystals as in pre-war times.

5. Technical Aspects.

(A) Determination of Axis.

The brothers Reuter demonstrated methods of determining the electrical axis of crystals

(a) with hydrofluoric acid applied to a face which had been ground approximately in the correct plane. The etching action of the acid was more pronounced along the axes and therefore examination of the face after etching showed lines indicating the direction in which the next cut should be made.

(b) with flowers of sulphur sprinkled on a face and heated to 60°C. The interaction of the crystals and the sulphur at this temperature resulted in patterns being formed on the face from which the next direction of cut could be determined.

(c) The above methods gave results from which cuts could be made very approximately in the correct planes. Crystals would be next assembled and tested electrically and the extent to which they were off frequency would give a measure of the error in the angle of cut.

(B) Transverse Oscillators.

Dr. Sobel showed the method of construction of wafer crystals

5.(B) (continued).

to provide transverse oscillators for frequencies from 50 - 500 Kc/s. Silver films were burnt on to the faces to provide electrodes and spring contacts spot welded to the centres of these electrodes.

Samples of these crystals and of the older longitudinal types were evacuated and have been submitted to R.A.E.

(C) Supersonic Devices.

Dr. Sobel had been collaborating with Siemens and Halske, Berlin, in the design of supersonic equipment for emulsifiers and for medical equipment the application of which was not clear. In respect of emulsifiers it was stated that by the use of quartz crystal vibrating elements it had been possible to produce an emulsion of mercury in water, but Dr. Sobel stated that this achievement had been of purely academic interest and he knew of no application for it.

(D) Artificially grown crystals.

The brothers Reuter stated that they had worked artificial crystals for their optical applications but they knew of no successful production of artificial quartz crystals for frequency control purposes.

6. Conclusion and Recommendations.

This firm was a specialised concern with wide spread connections among academic and industrial concerns employing crystals for optical and electrical purposes. The key personnel, the brothers Reuter and Dr. Sobel who were interviewed, and also the engineers working directly under them have probably been in touch with all the problems for which crystal devices have been proposed.

It is therefore recommended that a detailed study of the records of the firm and of the work being undertaken in the several departments should be made as soon as opportunity offers. Consideration should also be given to the taking over of the stocks of quartz and other raw crystals and also of the test and specialised laboratory equipment which is available.

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