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APPENDIX I

KOCHEL, NR. GARMISCH.

1. The section of Peenemunde dealing with Supersonics was evacuated to Kochel in 1944, and full operation had not been achieved at the new site by the end of the war. The equipment is now being dismantled for removal to U.S.A. This target is being thoroughly covered by Mr. P.R. Owen of the M.A.P. G.M. team. The party inspected the facilities and interrogated Dr. Hermann (Director) and Dr. Wagener, one of the aerodynamics staff.

2. The supersonic wind tunnel equipment consisted of two intermittent tunnels operating by suction into an evacuated sphere, (working section 40 cms. square maximum speed M = 4.4) and one continuous tunnel (working section 18 cms. square and maximum speed M = 3.5). These tunnels had been used for fundamental work on heat transfer, supersonic flow past cones, elaboration of experimental technique (interferometer, Schlieren apparatus, low pressure gauges, etc.), and for tests on specific weapons such as V2 designs, with and without wings, and Wasserfall (a guided supersonic Flak rocket).

3. Dr. Hermann said that a larger suction tunnel with a working section 1 metre square was projected. It was also proposed to build a tunnel for testing model athodyds. Compressed air in a chamber of 100 cu. metres capacity at 35 atmospheres pressure would be arranged to flow into a vacuum chamber. The working section was to be 10 cms. by 15 cms. maximum speed M = 3, and the tunnel was to be designed to have atmospheric pressure in the working section, so that fuel could be burnt in the athodyd. A model of 2 cms. diameter and 15 cms. long was envisaged. The time of a run would be 10 - 15 seconds, and one run could be made every 15 minutes. Dr. Hermann said that it was proposed to build such a tunnel at Gottingen or Volkenrode, with a larger one at Kochel later.

4. Dr. Hermann said that work on A1 and A2 (the forerunners of A4) was started at Peenemunde in 1934. The early work dealt mainly with combustion problems; aerodynamic investigation began in 1937. During 1937-39 there was extensive discussion between the Ordnance and Luftwaffe interests on the relative merits of V2 and the orthodox bomber. Large scale production of V2 was not started until later in the war, when aircraft production was cut by bombing, and Dr. Hermann believed that there was little conflict in production between the V2

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and aircraft. He said that control of V2 was conceived in 3 main stages:-

(a) By measurement of angle only, not position, of the trajectory at fuel cut-off.

(b) By measurement of velocity, angle and height at point of cut-off by an "acceleration integrator" device.

(c) By radio control of the complete trajectory.

He considered that (c), which was never used during the war, should give a range accuracy of one in a thousand.

APPENDIX II

OTTERBRUNN, NR. MUNICH.

1. The wind tunnels, only one of which was complete, were inspected and Professor Peters, the Director of the Establishment, was interrogated. He had worked at MIT for 10 years, returning to Germany for a "summer vacation" in July, 1939.

2. Professor Peters said that Dr. Baumke intended to have three main aerodynamic research centres, viz. D.V.L. Berlin, L.F.A. Volkenrode, and a third in South Germany. He asked Professor Weiselsberger (returned from Japan) to design the equipment but his plans were considered too modest, and Peters was brought in to take charge.

3. The only completed tunnel at Otterbrunn was a high speed return circuit tunnel, working section 3 metres diameter, designed to operate up to the choking velocity (i.e. nearly to M = 1 when empty). Professor Peters said that a speed of M = 0.85 had been reached with 75% of the power. The whole tunnel could be evacuated and tests made at low pressure (range 1/10 to 1 atmospheres), so that the Reynolds number could be varied while keeping the Mach number constant. One end of the tunnel could be moved back so as to give an open tunnel at atmospheric pressure. This was used for tests of running engines where the exhaust gases had to be removed. In the "open" condition, 60% of the air was returned, and this gave sufficient heating to prevent condensation. The power was supplied by two motors, each capable of giving 6,000 kilowatts for 10 minutes.

4. Two supersonic tunnels were in course of erection. One was a continuous return circuit tunnel, similar to that of Ackeret at Zurich. The working section was 40 cms. square, and the maximum speed M=3; the power was 3,000 kilowatts. Professor Peters said that the continuous air circulation eliminated most of the drying problems. The other was an intermittent supersonic tunnel operated by suction into an evacuated sphere, similar to that at Kochel. The working section was 25 cms. square.

5. Professor Peters referred to a tunnel at Imsk Utstahl, Nr. Salsberg, designed for speeds up to M = 1. The working section was 8 metres and power about 10,000 h.p. The tunnel was 30% assembled at

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the site, and a further 50% of the parts were made. It was intended to test the components of jet units in altitude conditions in this tunnel.

APPENDIX III

Interrogation of Professor Rossmann & Dr. Hackemann of the Weapon Division, L.F.A. Volkenrode.

1. Professor Rossmann is Director of the Weapon Division, which is organised* in 3 sections:-

(a) Mechanical and electrical problems and interior ballistics, (Leader Dr. Hackemann).

(b) Exterior ballistics (Leader Dr. Schussler)

(c) Fire control (ground to air only) and bomb sights (Leader Dr. Schugt).

The main equipment of this Division consists of two "shooting tunnels"; the cross wind tunnel and the low pressure tunnel.

2. The cross wind tunnel is 30 m. long; the cross wind (up to 150 ms. per second) extends along the whole length of the tunnel and is produced by suction into an evacuated chamber situated alongside the tunnel. The depth of the cross wind is only 60 cms. and projectiles up to 2 cms. calibre can be fired. The position and orientation of the projectile is measured at a number of stations along the tunnel by means of spark photography, 3 sparks being produced at each station. A tuning fork controls the spark timing and the system is "triggered" by a double tin foil contact device. Professor Rossmann said that the tunnel was finished in November 1944, and so not much had yet been done in it. The main work was concerned with the stability of low velocity (150 ms. per second) projectiles with spring stabilised fins, designed for firing vertically from fighters against bombers at close range (50-100 ms.). Photo-electric recording was planned, but had not yet been installed.

3. The low pressure tunnel for investigating the ballistics of projectiles under altitude conditions is 400 ms. long. The photographic technique is similar to the other tunnel but the cameras are placed inside the tunnel, thus necessitating a large diameter.

/Projectiles

* For fuller details see "Armament work at LFA at Volkenrode near Braunschweig" Gen. Armt. Div. RAE Note (Ref. Arm.S.1507/LGC/123 dated 24.7.45).

Projectiles up to 88 mms. (Tiger tank ammunition) had been fired. Methods of inducing large angles of yaw by means of assymmetrical sabots had been devised, but little research work had been possible owing to urgent war demands.

4. Professor Rossmann referred to Professor Schardin, who carried out the ballistic measurements on the firing range of the Luft Kreigs Academy at Gatow, near Berlin. Jump cards were used for measuring the projectile yaw and an assymmetrical extension to the gun barrel had been devised to induce larger angles of yaw.

5. Professor Rossmann said that L.F.A. did not develop any weapons themselves; they were concerned with interior and exterior ballistics, the development of methods of measurement and experimental techniques. Peizo electric gauges were extensively used.