ABSTRACTS FROM THE SCIENTIFIC AND TECHNICAL PRESS.

Issued by the

Directorates of Scientific Research and Technical Development, Air Ministry.

(Prepared by R.T.P.3.)

No. 103. June, 1942.

INDEX.

Notices and abstracts from the Scientific and Technical Press are prepared primarily for the information of Scientific and Technical Staffs. Particular attention is paid to the work carried out in foreign countries, on the assumption that the more accessible British work (for example that published by the Aeronautical Research Committee) is already known to these Staffs.

Requests from scientific and technical staffs for further information or translations should be addressed to R.T.P.3., Ministry of Aircraft Production, and not to the Royal Aeronautical Society.

Only a limited number of the articles quoted from foreign journals are translated and usually only the *original* can be supplied on loan. If, however, translation is required, application should be made in writing to R.T.P.3, the requests being considered in accordance with existing facilities.

Note.—As far as possible, the country of origin quoted in the items refers to the original source.

Relation Between the Shape of Supersonic Ejectors and the Reaction developed. (A. Castagna, L'Aerotecnica, Vol. 21, No. 12, Dec., 1941, pp. 829-830.) (Digest.) (103/1 Italy.)

The thrust due to reaction of a high speed jet of fluing ejected from a moving body is the resultant of the pressure distribution over the body and depends on the velocity distribution in the surrounding medium.

For given shape and dimensions of the high speed ejector, very different types of efflux can exist depending on the state of the gas ahead of the nozzle or the conditions of the medium into which ejection takes place. In addition, if the body to which the ejector is attached is itself moving at high speed, the reciprocal action of the velocity distribution over the external surface of the body with that due to the expelled gas may require consideration. This aspect of the problem is given special consideration by the author. First the theoretical thrust exerted on an ejector by reaction is calculated for various ratios of the entry and exit pressures, friction being neglected. It is shown that the thrust is a maximum if the gas expands to the pressure of the surroundings. Although it is possible to increase the exit speed above this amount, the corresponding thrust will be reduced. Experiments described by the author confirm this theoretical conclusion. It appears that fields of flow highly detrimental to high thrust production can exist when the pressure drop utilised in expansion is excessively reduced. The author determines the required shape of the ejector to prevent this drop in propulsive efficiency and obtains the maximum possible thrust in every concrete case.

Finally, the mutual reaction between the flow inside and external to the body is investigated experimentally. For the range of speeds covered, this interaction has but a small effect on the thrust.

Thus the thrust of a body/ejector combination can be obtained very approximately by the algebraic sum of the aerodynamic resistance of the body and the reaction of the jet, each determined separately.

Theoretical Solution of Profile Drag. (J. Pretsch, Jahrbuch 1938 der deutschen, L.F.F.) (R.T.P. Translation No. T.M. 1,009.) (103/2 U.S.A.)

After a survey of the customary procedures for appraising the profile drag (in which pressure drag is neglected) and of the methods for computing the laminar and turbulent friction flow, the author proposes a method by which the pressure drag can be computed with the aid of the displacement thickness of the frictional layer. The method is restricted to the case where the effects, caused by separation of frictional layer, are small. The total profile drag can then be expressed solely by quantities derived from the velocity distribution in the friction layer immediately at the trailing edge. It is merely assumed that the mixing losses originating over the short length in the wake are negligible until the pressure reaches its end value. The proposed method is applied to seven symmetrical Karman-Trefftz profiles at zero lift and varying position of transitional region, which latter is deduced by comparison with the measured drag coefficients. From these mathematical results and the available test data, the inference is drawn that the position of the transitional region is principally dependent upon the Reynolds number $Re\delta$ referred to momentum thickness, but for the rest almost independent of the pressure gradient while being materially affected by the degree of turbulence and surface roughness; the pressure gradient becomes naturally effective in the quantity $Re\delta$ itself. This supposition is utilized to predict the traditional region and hence the profile drag coefficient of a smooth wing at moderate degree of turbulence and very large Reynolds numbers ($10^7 < Re < 10^8$) and to compute the friction and pressure drag. It appears that the relative proportion of the pressure drag to the total profile drag increases with the Reynolds number.

In conclusion the author enumerates some factors requiring further study before the profile drag can be computed theoretically with the necessary accuracy (definite location of transition point, shear stress in turbulent motion, momentum thickness of boundary layer at trailing edge).

The Boundary Layer Along a Flat Plate with Constant Suction or Emission Along the Wall. (H. Schlichting, L.F.F., Vol. 19, No. 5, 30/5/42, pp. 179-181.) (103/3 Germany.)

The author considers the modifications introduced into the ordinary two-dimensional boundary layer equation when a constant normal velocity v_0 is superposed along the boundary. A negative value of v_0 (*i.e.*, in the negative direction of the y axis) corresponds to suction, whilst a positive value covers emission. It is assumed that the potential flow is not changed by the presence of v and that the condition of no slip at the boundary ($u=0$) is maintained.

Under these conditions, the impulse thickness δ of the boundary layer is given by the equation

$$\tfrac{1}{2}d\delta^2/dx^2=\beta\,(\gamma/U_0)+(v_0/U_0)\,\delta \qquad (1)$$

https://doi.org/10.1017/S0368393100140659 Published online by Cambridge University Press

where U_0 = velocity of undisturbed flow.
β = non-dimensional parameter depending on velocity profile and which may be assumed independent of x to a first approximation.

If $v_0 = 0$, (1) reduces to the standard Blasius solution, $\delta = \sqrt{(2\beta\gamma x/v_0)}$. If $v_0 < 0$ (suction), $d\delta/dx = 0$ if $\delta = (\beta\gamma/-v_0)$, *i.e.*, the boundary layer thickness tends asymptotically to a finite constant value. On the other hand, if there is emission of air along the plate ($v_0 > 0$), δ increases continuously with x and will vary directly as x if x is large. Over this range we have

$$\delta = (v_0/v'_0)\, x.$$

It is interesting to note that in this case δ is independent of viscosity.

The constant asymptotic boundary layer thickness with suction leads to a velocity distribution which differs only very little with that existing in the normal layer. It appears that the form parameter β of equation (1) above increases from the value 0.220 at leading edge of plate to 0.500 over the region where the boundary layer has become of constant thickness.

In the case of air emission, β diminishes from 0.220 (leading edge) to zero if x is large (separation).

A more detailed study of the phenomena for smaller values of x (*i.e.*, near leading edge) is reserved for a later publication.

On the Influence of the Wind Tunnel Boundary on Resistance Measurements Especially in the Region of Compressible Flow. (C. Wieselsberger, L.F.F., Vol. 19, No. 4, 6/5/42, pp. 124-128.) (103/4 Germany.)

The presence of the body in the tunnel causes changes in the original velocity distribution (displacement effect) which may become very appreciable when the flow speed approaches sonic values, and thus falsify resistance measurements. As is well known the local velocity will increase or decrease depending on whether the tunnel is closed or open. The author shows theoretically that for the case of a sphere, the displacement effect can be eliminated if a semi-open rectangular tunnel is employed—the ratio of fixed to free boundary being 1.17 to 1 (sphere placed at centre). Similar considerations can be applied to the two dimensional case in the absence of lift, the displacement effect being eliminated by having one fixed and one free boundary, and placing the body slightly off centre, i.e. at a distance of .448 "a" from the fixed wall. ("a" = distance between fixed and free boundaries.)

In both cases, however, the solution only applies in the absence of lift, since the circulation will introduce additional velocities quite apart from those due to displacement effects. At high Mach numbers the usual procedure so far has been to carry out experiments both in the closed and open tunnel, thus obtaining limits between which the required result must lie. This, however, makes the experiments very laborious, and every effort should be made to devise a tunnel shape in which the disturbance both of circulation and displacement are as small as possible.

Velocity Field in the Neighbourhood of a Wall Possessing Discontinuous Change in Curvature. (A. Betz, L.F.F., Vol. 19, No. 4, 6/5/42, pp. 129-131.) (103/5 Germany.)

The author considers the two-dimensional case of a wall, the curvature of which changes discontinuously at a certain point, without however forming a notch in the surface (direction of tangent varies continuously). In a previous paper, Koppenfels (L.F.F., Vol. 17, 1940, p. 189) has shown that the velocity profile has a vertical tangent of inflection at this point and as a result, this author concluded a breakdown of the boundary layer. (See Abstract No. 101/6.) In the present paper this prediction is investigated more fully, special attention being paid to the behaviour of the flow in the interior of the fluid in immediate proximity to the wall.

It appears that the region over which the vertical inflection tangent exists is so small that in general no appreciable physical effect on the boundary layer is to be expected. Although the presence of the critical point as such is therefore of little importance, nevertheless the shape in the contour of the wall in front and behind the critical point will introduce velocity differences in the velocity profile, which may introduce disturbances in the boundary layer.

Conical Supersonic Flow with Axial Symmetry. (A. Busemann, L.F.F., Vol. 19, No. 4, 6/5/42, pp. 137-144.) (103/6 Germany.)

The author shows that starting with parallel flow, only two types of conical flow with axial symmetry are possible, either singly or in combination: The well known case of the cone at axial incidence and a special type of compression nozzle. Both cases are characterised by conical shock waves, the region behind the wave being free from rotation. Even in the case of perfect gases the flow as a whole is never completely isotropic. On account of its importance in ballistics, the author pays special attention to the field of flow at the vertex of a cone, complete integrations being obtained for a large range of cone angles and Mach numbers for air with $\gamma = 1.405$. The calculation of the corresponding pressure distribution is indicated and will be treated more fully in a subsequent publication. The behaviour of the flow for a Mach number in the neighbourhood of unity is investigated separately. It appears that the limiting cone angle producing conical waves decreases as $\sqrt{(M-1)}$ and is practically independent of the nature of the gas.

In conclusion it should be noted that friction (boundary layer effects) is neglected in this investigation and that experimental work covering this effect in the three-dimensional case is still very incomplete.

A Vortex Theorem Applicable to Steady Iso-Energetic Gas Flow. (W. Tollmeier, L.F.F., Vol. 19, No. 4, 6/5/42, pp. 145-147.) (103/7 Germany.)

A body moving at uniform supersonic speed through still air will be accompanied by a compression shock (so-called head-wave) situated at or near the vertex. On passing through this shock front, the velocity, pressure, density and temperature of the air undergo a discontinuous variation, leading to a change in the entropy of each individual mass particle whilst its energy content remains constant. If we neglect friction and heat conduction, it is true that the entropy content of each particle will remain the same subsequent to its passage through the shock front, the distribution throughout the gas will however no longer be isotropic since the entropy "jump" depends generally on the point of passage on the shock front. The departure from isotropic conditions naturally leads to the formation of vortices and it is the object of the author to formulate a vortex theorem for such steady iso-energetic flows in which the entropy content per unit mass S is constant along each stream line, where

$$S = \{ R/(\gamma - 1) \} \log \rho/\rho'$$

(This implies that $p/\gamma\rho = f =$ constant along the stream line.)

Under these conditions, the required vortex theorem takes the following vectoral form

$$\text{rot. } v \times v = (1/2\gamma)\,(V_m^2 - v^2) \text{ grad. } \log f \quad . \quad . \quad . \quad (1)$$

where $v =$ vectoral velocity.

$V_m =$ limiting speed of efflux into a vacuum.

The above thus represents a generalisation of the corresponding theorem in non-compressible flow for which

$$\text{rot. } v \times v = 0.$$

Applying the general theorem to two-dimensional flow, the author shows that the vortex density along a stream line varies directly as the pressure, *i.e.*,

$$\delta v/\delta x - \delta u/\delta y = P/(\gamma - 1) \{ d (\log f)/d (\psi) \} \quad . \quad . \quad . \quad (2)$$

where ψ is the stream function defined by

$$\rho u = \delta\psi/\delta y$$
$$\rho v = \delta\psi/\delta x$$

If the velocity is small, potential flow can be assumed and by introducing the corresponding values in the right hand side of (2), the vortex density can be calculated to a first approximation.

In conclusion the author briefly discusses the connection between the above iso-energetic vortex theorem and the vortex theorems of Kelvin and Bjerknes obtained by applying the rot-operator to the equation of motion direct. In this case an expression for the speed change of the vortex strength is obtained whilst the author's theorem as shown above yields information on the vortex density. Both theorems are of use in dynamic meteorology.

Supersonic Flow about Projectile Heads of Arbitrary Shape at Small Incidence. (A. Sauer, L.F.F., Vol. 19, No. 4, 6/5/42, pp. 148-152.) (103/8 Germany.)

The author investigates the case of three-dimensional supersonic flow departing only little from axial symmetry. Potential flow is assumed and the vortices emanating from the compression shock are neglected. Starting with a rigid solution of the symmetrical problem, the effect of a small incidence introduces an additional potential but the resultant potential equation is still linear with the Mach lines of the symmetrical case as characteristics. This equation is solved by a combined graphical-numerical method. It appears that to a first approximation the surface of revolution of the compression shock remains unaltered, provided the vertex of the projectile undergoes a small deformation. In the case of a conical head, this deformation simplifies to a pure rotation of the projectile corresponding to a change in the effective angle of incidence, which change amounts to an increase of about 50 per cent. in a worked out example. It should be remembered that whilst conical flow with axial symmetry still remains potential after passage through the shock front, oblique incidence introduces vortices and the flow is then no longer strictly potential. This effect is neglected in the present paper.

The Flow Resistance of a Heated Flat Plate. (W. Linke, L.F.F., Vol. 19, No. 4, 6/5/42, pp. 157-160.) (103/9 Germany.)

Wind tunnel experiments were carried out on a flat plate (517 mm. × 422 mm. × 13 mm.) the resistance being determined at Reynolds numbers between 2.6×10^5 and 12.7×10^5 (referred to length of plate, 517 mm., in direction of flow) for various electrical heat inputs. The corresponding heat transfer coefficients were also measured. In a further set of experiments at constant *Re* and thermal load, both the temperature and velocity distribution were measured in the boundary layer at three different distances from the leading edge.

It appears that the resistance coefficient is only appreciably increased in the regions of low Reynolds numbers (laminar flow). For a mean excess temperature of the plate of 100° C., the increase amounts to 38 per cent. at $Re = 2.6 \times 10^5$ but diminishes to 2.6 per cent. at $Re = 12.7 \times 10^5$. Thus wing surface radiators or thermal wing nose de-icers will only affect the drag of laminar profiles. It appears that the heat transfer leads to instability of the laminar boundary layer and this is confirmed by the author's measurements of the velocity distribution in close proximity to the surface. At high *Re*, the layer is usually already turbulent and no change in the resistance coefficient is to be expected.

Pressure Distribution on Wings in Reversed Flow. (A. Naumann, Jahrbuch 1938 der deutschen, L.F.F.) (R.T.P. Translation No. T.M. 10,011.) (103/10 U.S.A.)

It is known from experience that the movable surfaces of an aircraft tethered in the open are subjected to severe moments in a tail wind. In order to obtain some data regarding the magnitude of these moments and of the load distribution in reversed flow, a series of pressure distributions were carried out which, in the interest of widest possible applicability of the results, were for the time being limited to wings without movable surfaces. Experiments of similar nature are not available as far as is known.

The series of pressure distribution measurements at three test sections on NACA airfoils 2212 and M6 within 170° to 210° angles of attack in reversed flow proved to be largely independent of the profile form. In contradiction to the pressure distribution in normal flow considerable negative pressure from the upper surface spills over on to the lower surface, and vice versa, even in the zone of sound flow. The results are presented as chordwise pressure and load distribution. The spanwise lift distribution and the total lift coefficients of the wing obtained by integration show approximate agreement with the behaviour of a diagonally disposed flat plate. By consideration of the ground effect (represented by a flat wall) the lower surface of the wing shows an increase in the low pressure.

Method of Stowing Rubber Dinghy on Aircraft. (Flugsport, Vol. 34, No. 11, 27/5/42, pp. 170-171.) (103/11 Germany.)

Two photographs illustrate the boat housed, in a folded condition, in the top of the fuselage of a twin engined aircraft behind the cockpit. The compartment (apparently 4 feet long, 2 feet wide and 3 feet deep) is fitted on top with a quick release cover plate conforming to the shape of the fuselage. Release of the cover by the wireless operator opens simultaneously the CO_2 bottle for filling the boat. The latter is packed in such a way that the process of inflation causes the boat to be automatically ejected within a few seconds of pulling the release.

Progress in Aeroplane Designs during 1941. (A. E. Raymond, J. Aeron. Sci. (Review), Vol. 1, No. 2, May, 1942, pp. 7-10.) (103/12 U.S.A.)

American design trend in 1941 can be divided into two main categories: ease of production and increase in combat efficiency. Design for production has led to the training of specialists in breakdown and assembly and who ensure intelligent co-operation between designer and fabricator, bearing in mind the special requirements of diluted labour (isometric drawings and photographs replacing traditional blue prints). Fabrication of fuselages in the form of half shells increases the number of men working at the same time, as many installations as possible being incorporated in each section before the two halves are finally joined. The more extended use of stampings, forgings and precision castings also helped to speed up production during 1941, the duramold process (plastic wood) offering further interesting possibilities.

Design for combat has taken two forms:—

Increase in range, speed and manœuvrability (relative order depending on service requirements) and increase in offensive and defensive armament. High speed aircraft is essentially a problem of designing the aircraft round the power plant (cooling and air induction).

Further progress has been made in the cowling of radial engines whilst the laminar flow wing is now ready for production.

Designing for manœuvrability is more difficult than designing for maximum speed and extensive flight tests of the prototype are generally required before the necessary manœuvrability can be obtained without sacrificing other desirable flight characteristics.

As regards armament, the year 1941 saw the extensive utilisation of armour plating in American combat machines. Such plating is distributed according to the importance of the members of the crew, but some armour may be required for purely structural protection.

In conclusion the author stresses the fact that although the turbo supercharger has been under development for nearly 20 years, it was not till 1941 that the mass produced article made its appearance on American aircraft.

The Design of Rotor Blades. (R. H. Prewitt, J. Aeron. Sci., Vol. 9, No. 7, May, 1942, pp. 255-260.) (103/13 U.S.A.)

The design of rotor blades may be divided into two parts: (*a*) determination of the physical dimensions, and (*b*) detail design involving airofoil characteristics, including moment coefficient, chordwise centre of gravity, blade weight, external smoothness, blade twist, thickness ratio, and internal structure. The two factors to be considered in determining the physical dimensions of the blades are blade loading and solidity (ratio of the blade area to disc area). The rotational tip speed varies as the square root of the blade loading; thus blade loading provides a convenient means for causing the maximum L/D to occur at a given forward speed. With the same blade loading and all other factors equal, the maximum L/D of a rotor increases with decreased solidity.

The author deals with the general aspect of the problem in the following order.

(1) Selection of tip speed ratio.
(2) Blade loading and blade area.
(3) Blade number and dimensions.
(4) Profile drag.
(5) Air load distribution.
(6) Centrifugal moments.
(7) Torsional moments.

The most general type of blade construction consists of plywood and/or cloth covered contour ribs mounted on a steel tubular spar every 3 or 4 ins. along the blade span. The cover carries the air loads to the ribs which in turn transfer the air loads to the spar tube which is the main structural member of the assembly. Lightning holes are usually cut in the web of the $\frac{1}{4}$ in. plywood ribs aft of the spar to maintain a forward location of the chordwise centre of gravity of the blade.

Wing Surface and Propeller Disc Area. (A. Proll, L.F.F., Vol. 19, No. 5, 30/5/42, p. 178.) (103/14 Germany.)

A mean value of app. 1/4.5 is often given in literature for the ratio of total propeller disc (zF_p) area to wing surface (F). It is, however, easily shown that this ratio (provided tip speed and density remain constant) must vary directly as the product of the wing loading and the factor (ϵ/K_s) where ϵ = gliding coefficient and K_s = thrust coefficient of propeller. From a review of a number of aircraft ranging from the Condor to the touring plane Mu. 13, it appears the (ϵ/K_s) is fairly constant and averages 9.5, the principle exception being the Do. 215, for which $(\epsilon/K_s) = 5.8$.

Type.	G (Kg)	F (m^2)	z	zF_p (m^2)	F/zF_p	G/F	n_E	i	n_p	$n_p\sqrt{G}$	u (m./sec.)	V(km/hr).	$\left(\frac{\epsilon}{K_s}\right)^{\frac{1}{2}}$	ϵ/K_s
Ar. 66C.	1330	29.6	1	4.9	6	44.8	1880	1	1880	68500	248	210	3.7	13.6
BV. 142	15700	130	4	38.5	3.4	120	2250	.62	1400	175500	256	400	3.15	10
Storch.	1320	26	1	5.3	5	51	1880	1	1880	68500	248	185	3.5	12.2
FW. 200	17500	118	4	35	.34	133	2350	.62	1460	206000	258	420	2.9	8.5
Ju. 52	10500	110	3	19.8	5.55	95	1930	1	1930	197000	292	290	3.15	10
Ju. 86	8200	82	2	17.1	4.8	100	2350	.62	1460	132000	252	375	2.9	8.5
Ju. 90	23000	184	4	38.4	4.8	125	2100	.62	1300	197000	237	350	2.5	6.3
Kl. 25D.	720	20	1	3.0	6.7	32.5	2320	1	2320	44500	238	160	3.05	9.3
Taifun	1350	16.4	1	4.34	3.8	82.3	1880	1	1880	69000	232	303	3.25	10.5
Mu. 13.	285	17.0	1	1.25	13.6	16.8	1700	1	2700	45500	177	133	3.0	9.0
Do. 215	8600	55	2	16.5	3.3	156.5	2550	.5	1270	118000	216	500	2.4	5.8
He. 70.	3460	36.5	1	8.04	4.5	95	1600	1	1600	94000	268	360	3.25	10.5
Do. X.	51000	490.0	12	91.0	5.4	104	1780	1	1780	404000	290	170	3.20	10.1

In the above n_E = engine r.p.m.
i = propeller reduction gear.
n_p = propeller r.p.m.
u = propeller tip speed.
V = flight speed.
z = number of propellers.

For normal high speed flight near the ground, the author obtained the following equation:—

$$zF_p/F=67.6\ (G/F)\sqrt{(\epsilon/K_s)}\sqrt{(z)}\sqrt{(1/n_pG)}$$

where $\sqrt{(\epsilon/K_s)}$ can be put equal to 3.07.

From the above, the static thrust S_0 per propeller (assuming an efficiency of 85 per cent.) follows as

$$S_0=56\ \{\ (N^2/n_p)\sqrt{(G/z)}\ \}^{\frac{1}{3}}$$

where N=h.p. per engine.

The Effect of Atmospheric Density Gradient on the Longitudinal Motion of Aircraft. (F. N. Scheubel, L.F.F., Vol. 19, No. 4, 6/5/42, pp. 132-136.) (103/15 Germany.)

Theoretical investigations in the longitudinal motion of aircraft have so far been exclusively carried out on the assumption of constant air density, the only exception being the calculation of velocity during a nose dive. It appears that the motion of the aircraft is the resultant of two oscillations of which one has high frequency and is heavily damped, whilst the other has both low frequency and damping. The former concerns mainly the angle of incidence, whilst the second reflects disturbances in velocity and shape of trajectory. With increase in flight speed, the angle of incidence oscillation increases in frequency (the damping being but little affected) whilst the trajectory oscillation decreases in frequency but increases generally in damping. Whilst the theoretical deductions are borne out by flight tests in a qualitative sense, quantitative agreement between calculation and measurement is often very bad, especially as regards damping of the trajectory oscillation. The author shows that these discrepancies can be largely overcome if the density gradient of the atmosphere in which the oscillation takes place is taken into account. In a worked out example, the author considers the case of horizontal flight both at ground level and at altitude with various temperature gradients and engine power characteristics, i.e. thrust coefficient as a function of altitude. It is shown that the density gradient increases the frequency and diminishes the damping by amounts varying between 5 per cent. and 15 per cent., its effect becoming more marked at higher altitudes and speeds. In conclusion it is pointed out that test flights under conditions of temperature inversion should be avoided.

Analytical Theory of the Campini Propulsion System. (S. Campini, L'Aerotecnica, Vol. 18, No. 1, Jan., 1938.) (R.T.P. Translation T.M. 1,010.) (103/16 Italy.)

Following the description of the new propulsion system and the definition of the propulsive efficiency, this efficiency is calculated under various conditions of flight with allowance for all internal losses.

The efficiency and consumption curves are plotted, their practical values discussed and the behaviour of the system analyzed at various altitudes and speeds. The superiority of this over the conventional engine-propeller system, starting from 400 kilometers per hour (248 m.p.h.), with respect to range and weight per horsepower output is affirmed.

The immediate possibilities of the new system in flight at high and very high altitudes in relation to the theoretical and experimental results obtained are discussed in detail.

The present report deals exclusively with the Campini jet-propulsion system. The discussion is limited, for the present, to the analytical study of the efficiency and the consumption for the case of application to aircraft and to the plotting of the practical operating curves secured theoretically by the use of suitable experimental factors.

The purpose of this study is to enable aeronautical technicians, interested in problems related to high-speed flight at low and high altitudes, to calculate directly and rapidly the results that can be obtained in practice with this system of propulsion when applied to any apparatus in accordance with the characteristics required, while using conventional heat engines and compressors.

Recent Results in Rocket Flight Technique. (E. Sanger, Flug, Sonderheft 1, December, 1934.) (R.T.P. Translation No. T.M. 1,012.) (103/17 Germany.)

The author defines effective ejection velocity as that corresponding to complete conversion of the heat of combustion of the explosive into kinetic energy. The value thus corresponds to expansion to zero pressure and exceeds the mean value of the trandetory molecular velocity before expansion. The author claims to have measured ejection velocities as high as 3,000 m./sec. and describes various applications of his "rocket motor" to aircraft propulsion. (The paper is mainly of historical interest.)

B.M.W. 801 *Aero Engine.* (Inter. Avia., No. 819, 3/6/42, pp. 11-13.) (103/18 Germany.)

This 14-cylinder twin row radial rated at 1,600 h.p. is chiefly noteworthy for the positive pressure cooling adopted which is provided by means of a fan running at 3.2 times propeller speed and mounted behind the propeller and in front of the cowl opening. By means of a special system of baffles, the compressed cooling air is guided over the individual cylinder heads and barrels and finally leaves through a controllable throttle ring after having cooled the exhaust pipes. A small part of the air is collected in the stagnation space in front of the first row of cylinders and made to pass through a ring passage forming part of the wall of the front cowling and exhausted through a controllable nose slot. This reversed flow is utilised to cool the oil radiators of ring shape inserted in this passage.

The air intake opening for the cylinders is in the form of a ring adjoining the cowling behind the engine and provision is made for adding warm air. Due to the absence of any opening outside the cylindrical engine cowl and the utilisation of exhaust heat the drag of the installation is probably of the same order as that of a liquid cooled installation of equivalent output.

The other noteworthy feature of the engine is the control group which is a development of the automatic mechanism already fitted to liquid cooled Junkers and D.B. engines. The instrument now automatically controls the boost pressure, engine speed, mixture, ignition timing and supercharger gear ratio (a two speed gear is fitted) so that the pilot can choose the operating conditions by means of a single lever. The airscrew pitch changing mechanism is operated hydraulically, the spring preloading on the control piston being selected by the control group mentioned above. In case of failure of the hydraulic system the pitch can be changed electrically, but this emergency system is not automatic.

The B.M.W. 801 *Engine.* (Flugsport, Vol. 34, No. 11, 27/5/42, pp. 159-170.) (R.T.P. Translation No. 1,519.) (103/19 Germany.)

The engine casing of this twin row radial consists of six major parts. Starting at the propeller end we have:—

(1) Gear case	(propeller reduction gear, pitch changing mechanism, magneto, cooling fan)
(2) Crank case proper	(made of steel in 3 parts, sectioned along plane of symmetry of cylinder rows)
(3) Supercharger casing	(2 speed supercharger)
(4) Induction casing	(air throttle, gun gear, oil pumps)

(5) Auxiliary mounting	(fuel and injection pumps, generator, air compressor, automatic control gear with single lever operation, starter)
(6) Oil sump	(below supercharger casing and crank case proper)

The 2-throw crankshaft is in four parts, with a central serrated screw joint on the intermediate journal (ball bearing support) and the usual clamp joints for the outer webs. The end journals work in roller bearings. The master rod has a solid big end with a lead bronze bearing, whilst the subsidiary rods are fitted with bronze brushes. Only one inlet and one exhaust valve are provided per cylinder, the valve rocker box being cast integral with the light alloy cylinder head which is shrunk on the liner in the usual way. The exhaust valve is sodium cooled and stellited. Each valve is provided with three cylindrical springs fitting one inside the other.

The air supply to the engines is taken from the stagnation point in front of the leading cylinder row and led by two passages to the intake elbows on the induction casing. These passages are fitted with grids which, on icing up, cause a reduction in pressure and an automatic opening of warm air flaps attached to the elbows.

The injection pump unit has individual plungers for each cylinder and is provided with a centrifugal and pendulum air separators.

The oil radiator (cooled by reversed flow through a nose slot in the cowl) is designed for a normal oil pressure of 8-9 atmosphere but will stand 15 atmosphere in cold starting. The VDM hydraulic-electric pitch changing mechanism is described in some detail but the article gives no detailed information on the automatic single lever power plant control mechanism which forms one of the outstanding features of this engine and which ensures that for each selected output, the necessary boost, r.p.m., mixture strength ignition timing and blower gear ratio are maintained at the optimum value. Apart from relieving the pilot, the automatic gear thus ensures that the engine is always operated both economically and safely. The nine illustrations accompanying the article give details of the valve gear, the fuel and oil supply to the engine and the cylindrical cowling.

Piston Rings and Oil Control in Two-Cycle High Output Diesel Engines. (F. G. Shoemaker and R. Allbright, S.A.E. Preprint, 17-19 June, 1942.) (103/20 U.S.A.)

There are two primary reasons for positive control of oil consumption in internal combustion engines. One factor is that of oil economy, and the other is to avoid excessive deposits on the engine parts. While the matter of oil economy has enjoyed the more popular consideration, the build-up of deposits resulting from excessive oil on the hot engine parts should be given more attention. In general, the ultimate service life of the reciprocating parts in all types of engines is determined by the build-up of these deposits. Since the rate of build-up of deposits on pistons and compression rings is influenced by the quantity of oil as well as the temperature of the parts, the piston and compression rings should be lubricated sparingly. Tables show some typical oil consumption figures for the two-cycle Diesel engine.

Solution for Diesel Piston Problems. (F. Zollner, S.A.E. Preprint, 17-19 June, 1942.) (103/21 U.S.A.)

Structurally the greatest stresses occur at the top of the piston pin bosses and it is necessary to provide an adequate supporting section between the pin bosses and the piston head to eliminate deflection and consequent fatigue failures. The design of the skirt construction must also be carefully reviewed to control skirt deflection. For thermal reasons the piston head and ring belt sections should be increased considerably beyond that necessary for structural purposes, in order to provide a reasonably cool piston head and ring belt area.

With the piston structurally and thermally sound, it is necessary to determine the safe minimum clearance at which the piston skirt will operate and best results are obtained by developing a cam gradient for the piston skirt to provide the ellipticity needed for the particular engine design for minimum safe clearance and to control this ellipticity to obtain uniform skirt bearing. In practice, the ellipticity required at the top of the skirt is determined and this ellipticity is reduced in direct relation to temperature. With the piston clearance determined, the width of the compression and oil rings should be increased to provide side clearance so that the piston in its cross head motion at any temperature does not disturb the piston ring.

Important factors in ring groove design is to provide ring grooves square with the piston axis with a smoothness of from 4 to 8 micro inches. Roughness of the ring groove will upset the best piston design for the reason that rings when heavily loaded under gas pressure cling to the rough faces of the ring groove and follow the piston in its cross head motion to such an extent that rings actually leave the cylinder wall. Root diameters of ring grooves should be finished with radii blending the root diameter to the sides of the groove at tangency. It is also important that the width of the ring lands be ample so that ring lands can support heavily loaded pistons rings without deflection. If the width of these ring lands is inadequate, the latter will deflect under operating conditions with subsequent fatigue failures. In general practice piston rings are to S.A.E. specifications with the exception that a narrow face ring of deeper than S.A.E. wall thickness is used in the top ring groove, as this type ring lowers the unit pressure of the piston ring under gas pressure and definitely reduces tendency of top ring to scuff.

B.M.W. 801 Air-Cooled Radial (Performance Data). (Inter. Avia., No. 820, 10/6/42, pp. 9-10.) (103/22 Germany.)

The boost pressures and engine speeds assigned to the various operational conditions are stated to be the following, although no figures concerning the corresponding power outputs are given: *Take-off output* at less than 8,200 ft. (2,500 m.) altitude (maximum duration, 3 mins.), abs. boost pressure 1.32 atm., engine speed 2,700 r.p.m., full pressure altitude without pressure head 3,280 ft. (1,000 m.) with sea-level supercharger; *emergency output* at more than 8,200 ft. (2,500 m.) altitude (maximum duration, 3 mins.), abs. boost pressure 1.30 atm., engine speed 2,550 r.p.m., full pressure altitude without pressure head 15,100 ft. (4,600 m.) with altitude supercharger; *climbing and active operational output* (maximum duration, 30 mins.), abs., boost pressure 1.27 atm., engine speed 2,400 r.p.m., full pressure altitude with sea-level supercharger 3,280 ft. (1,000 m.), with altitude supercharger 14,400 ft. (4,400 m.); *maximum continuous output*, abs. boost pressure 1.15 atm., engine speed 2,300 r.p.m., full pressure altitude with sea-level supercharger 5,250 ft. (1,600 m.), with altitude supercharger 15,100 ft. (4,600 m.); *maximum economical output*, boost pressure 1.10 atm., engine speed 2,100 r.p.m., full pressure altitude with sea level supercharger 5,250 ft. (1,600 m.), with altitude supercharger 14,100 ft. (4,300 m.). *The diving speed of the engine* is automatically limited to 2,700 r.p.m. by the control group. The *fuel consumption*, in Imp. gals. per hour (litres per hour) amounts to the following: 113 to 212 (515-550) for climbing up to 3,280 ft. (1,000 m.); 127.5 to 138.5 (580-630) for climbing at 13,120 ft. (4,000 m.); 83.6 to 88 (380-400) for maximum continuous output at 3,280 ft. (1,000 m.); 91.5 to 95.8 (415-435) for maximum continuous output at 13,120 ft. (4,000 m.); 59.5 to 61.6 (270-280) for maximum economical output at 3,280 ft. (1,000 m.); 63.8 to 67.2 (290-305) for maximum economical output at 13,120 ft. (4,000 m.). The *oil consumption* ranges from 6.6 lb. to 26.4 lb. (3-12 kg.) an hour.

Theoretical Consideration of Power Loss Caused by Combustion Knock. (C. W. Good, Trans. A.S.M.E., Vol. 64, No. 4, May, 1942, pp. 317-321.) (103/23 U.S.A.)

The author presents a theoretical analysis to show that the power loss accompanying combustion knock may be attributed to a mass vibration of the gases within the combustion chamber rather than to radiation. Equations are developed, based on perfect gases, to show that, on the basis of assumptions made, pressure rise with normal combustion is proportional to the quantity of charge burned and the loss in effective pressure caused by the vibration resulting from knocking combustion is demonstrated. The method has been developed for both the Otto and Diesel cycles and the relative theoretical losses in the two cases are given. It appears that the power loss due to knock may reach 6 per cent. for the Otto and 4 per cent. for the Diesel engines respectively.

Operation of Supercharged Engines in Fuel Oil Pipe-Line Pumping Service. (J. B. Harshman, Trans. A.S.M.E., Vol. 64, No. 4, May, 1942, pp. 323-329.) (103/24 U.S.A.)

This paper deals with some of the historical aspects of supercharging and experiences in the application of exhaust turbochargers ("Buchi" system) to four-cycle air-injection engines in pipe-line service are given.

Sufficient experience has been gained from the installations described to prove that increasing the horsepower of existing pipe-line pumping installations is not only practicable, but economically justifiable. For instance, a 50 per cent. increase in power can be obtained by supercharging a 500 h.p. engine for an investment of approximately $12,500, including the cost of new gears for increasing the speed of the pump. This is equivalent to $50 per installed horse-power, which is less than one half the cost per installed horse-power when purchasing additional pumping units.

The only disadvantage actually encountered in the operation has been the inability to operate these units at loads below the original rated horse-power of the engine. Although the exhaust-driven turbine is supposed to compensate automatically for load variation, it appears that an excess amount of air is forced into the engine for the quantity of fuel consumed, which results in poor combustion. After operating at reduced loads for a few days, it is necessary to remove the turbine rotor and clean out the carbon accumulations.

Pre-Exhaust Gas Pressure Measurements for Indicating Diesel Engine Performance. (B. H. Jennings and T. E. Jackson, Trans. A.S.M.E., Vol. 64, No. 4, May, 1942, pp. 331-340.) (103/25 U.S.A.)

The pressure existing just before exhaust in a Diesel engine is shown to be significant as a means of indicating load adjustments in a multi-cylinder engine. The theory and method used in obtaining these pre-exhaust pressures are explained along with the supporting data from an extensive series of tests. These tests were conducted on both two-stroke-cycle multi-cylinder engines and a four-stroke-cycle single-cylinder C.F.R. test engine. Under definite known conditions of injection, timing, and compression ratio it was found possible to evaluate both indicated and brake horse-power in terms of pre-exhaust pressure. Experimental work in progress shows that the same method is applicable to spark-ignition engines.

Design of Diesel Engine Foundations. (K. H. Larkin, Trans. A.S.M.E., Vol. 64, No. 4, May, 1942, pp. 341-350.) (103/26 U.S.A.)

All of the factors encountered in the layout, design and construction of foundations for stationary Diesel engines of the vertical type are discussed. The factor requiring the greatest attention and consideration of designers is that of reducing or isolating the vibration of the engine. This matter is treated comprehensively. The author applies accepted theories and engineering principles to the problems. As in most engineering problems, the exercise of sound judgment enters to a large extent. The paper is presented in outline form, the subject matter following the sequence generally encountered in an actual design.

Instrumentation for Developing and Testing Diesel Engines. (C. R. Maxwell and K. M. Brown, Trans. A.S.M.E., Vol. 64, No. 4, May, 1942, pp. 351-361.) (103/27 U.S.A.)

This paper gives a comprehensive idea of the range of Diesel-engine measurements essential to the design of efficient and successful types. Such measurements include accurate power determination, fuel consumption, lubricating-oil consumption, record of crankcase blow-by, exhaust-smoke measurement, all of which are items of performance. In addition, such informative items as pressure attained, rate of pressure rise, combustion analysis, flame duration, exhaust-gas analysis, functions of fuel-injection system, temperature measurements, vibration data, are all very important. Descriptive details are given of the instruments and methods employed in one of the leading Diesel-engine testing laboratories of the U.S.A. for the determination of these factors.

Hydraulic Characteristics of Fuel Injection Nozzles. (O. F. Zahn, Trans. A.S.M.E., Vol. 64, No. 4, May, 1942, pp. 373-377.) (103/28 U.S.A.)

This paper makes use of both new and previously published material in studying the hydraulic actions and limitations of fuel-injection nozzles. The primary hydraulic function of such a nozzle is to inject all portions of the fuel at velocities above a certain minimum necessary for atomization. The most serious factor tending to prevent this is the wide range of speeds found in present small Diesel engines. It is found that the closed nozzle meets the requirements of speed flexibility better than the simple open type, and that the variable-area-orifice closed nozzle is a further improvement over the plain-hole closed nozzle. The effects on the rate of injection and minimum regular quantity of injection are noted.

The Control of Torsional Vibrations in Radial Engines by Means of Tuned Pendulums. (V. Moore, J. Aeron. Sci., Vol. 9, No. 7, May, 1941, pp. 229-244.) (103/29 U.S.A.)

The author reduces a standard nine cylinder radial power plant including geared propeller and gear-driven supercharger to the equivalent two-mass system and obtains expressions for the angular deflection of crank and propeller over a series of operating speeds, friction being neglected and the amplitude of the disturbing torque assumed independent of r.p.m. For the particular sample chosen, resonance is obtained at 1,360 r.p.m., the 4.5th order of the disturbance (due to the firing frequency) agreeing with the natural frequency of the reduced system (node near propeller, crank and propeller swinging in opposite directions). As is well known, an ordinary dynamic vibration absorber (inertia mass under spring control and oscillating at a fixed frequency) will only force a node at the point of attachment, if the latter is subjected to a fixed frequency disturbance to which the absorber can be tuned. In an internal combustion engine, however, the disturbing torque frequency varies with engine speed and if the 4.5th order disturbance is to be eliminated at all speeds (and not only at resonance) the frequency of the absorber must also vary directly as the engine speed. This happens to be the case if the absorber is in the form of a pendulum, the point of attachment of which rotates at crankshaft speed. In this case the centrifugal field controlling the frequency varies also as the speed of rotation and 4.5th order tuning can thus be maintained at all r.p.m.

The author investigates the behaviour of such a pendulum on the assumption that the point of attachment is at the crankpin and there is no friction in the damper. Whilst the damper, if accurately tuned, will of course remove 4.5th order disturbances, it will introduce resonance with 3rd and 9th order disturbances should they be present. Moreover, large errors in tuning will have considerable effect on the vibratory response of the system. Provided however the tuning is in the range of 4.45 to 4.55, the damping effect is satisfactory. The pendulum damper is usually made by giving the equivalent of a bifilar suspension to the balance weight on the crank web and in order to obtain this accuracy of tuning, manufacturing tolerance in the position and dimensions of the pins and bushes must not exceed .002 in.

In addition, since it is not practicable to fit the damper on the crankpin, the flexibility of the web must be considered when determining the required tuning. The author shows how to allow for this and also considers the case of two dampers (one fitted to each web). This will reduce the shaft amplitude at resonance to one half the former value.

The Effect of Speed on Boost Pressure in the Case of Engines Fitted with Centrifugal Superchargers Operating at Constant Gear Ratio. (A. Kortum, L.F.F., Vol. 19, No. 5, 30/5/42, pp. 161-166.) (103/30 Germany.)

The author considers more especially the case of speed changes at constant throttle opening brought about by changes in the pitch setting of the airscrew. The calculation is carried out for superchargers of different characteristics, the throttle being either on the suction or pressure side. If the pitch is diminished at constant throttle, the engine will speed up till a new balance between torque delivered and torque absorbed is brought about. When flying at the rated altitude or above (full throttle), both boost and engine torque will increase under these conditions leading to a considerable increase in power output. At lower altitudes, however (throttled operation), the increase in boost pressure is partly neutralised by increase in the throttling effect. Depending on the degree of the latter an increase in engine r.p.m. may thus be accompanied by a drop in boost and this may occur even over the normal working range of r.p.m. if the throttle is on the suction (intake) side. In the case of the pressure throttle, however, this phenomenon will only arise at very low speeds (idling range). In both cases the diminution in boost can easily be corrected by a slight opening of the throttle.

The engine charge and torque vary with speed in a similar manner to the boost pressure. The two factors are however not directly proportional, since at higher speeds the air experiences a greater rise in temperature on passing the supercharger. Thus the same degree of boost furnishes a higher torque at low than at high r.p.m.

The difference in the behaviour of pressure and suction throttles receives special attention by the author. It appears that the suction volume of the supercharger is practically independent of the amount of throttle opening, if the latter is placed on the intake side. As a result, the supercharger generally operates in the region of favourable efficiency. With the pressure throttle, on the other hand, the volume of air passing through the supercharger depends on the degree of throttle opening (expansion at throttle). The point of operation on the supercharger characteristic thus changes in this case and if the full range of operation of the supercharger is to be utilised, the efficiency of the latter at full throttle is poor, although the quantity of charge handled is large. A suction controlled supercharger operating in the optimum range of the characteristic (small suction volume) will thus be only able to feed a smaller engine than the same supercharger when controlled on the pressure side. Any attempt to operate the suction controlled supercharger at the same flow output as under pressure throttle conditions will cause a corresponding drop in compression efficiency.

Turbines for Power Generation from Industrial Process Gases (Flue Gases, Natural Gas, etc.). (J. Goldsbury and J. R. Henderson, Trans. A.S.M.E., Vol. 64, No. 4, May, 1942, pp. 287-298.) (103/31 U.S.A.)

This paper presents a discussion of the field of application for turbines operated by industrial-process gases and natural gases and examples of the mechanical details of actual turbines which have been built for such applications are given. A simple method for calculating the energy available in a pure or a compound gas for specific operating conditions is described, and the properties of various gases for use in such calculations are listed. After a study of the available data on gas properties, the authors have selected for the working curves those which were considered to be most authentic.

Certain processes may be improved or operated more economically by the installations of turbines to derive power from the expansion of gases whose energy might otherwise be wasted or inefficiently used.

In some cases, the reduction in temperature resulting from expansion through a turbine may be more important than the power obtained.

By expanding gases through turbines rather than wastefully through valves and small pipe lines, power can often by derived which will replace power derived from the burning of fuel, and thus help to conserve fuel resources.

Light Aircraft Engines and Their Fuel Problems. (C. J. Doman, J.S.A.E., Vol. 50, No. 5, May, 1942, pp. 188-195.) (103/32 U.S.A.)

The recent revision of petrol specifications is presenting a serious problem for designers of light aircraft engines, where the customers are demanding increased power at no increase in cost or weight. The author points out the effects of using fuels of higher octane number containing greater proportions of lead, and describes attempts to alter the engine design to permit the use of higher leaded fuels without seriously increasing the weight or cost of the engines.

The use of dual carburation on a six-cylinder opposed type of engine is the simplest method of approach for the time being. The designer of the light plane must however appreciate the necessity of better cooling and attention to details in the installation, in order to obtain the maximum efficiency from the engine.

Changes Occurring in Oils and Engines from Use. (F. A. Guess and others, J.S.A.E., Vol. 50, No. 5, May, 1942, pp. 196-208.) (103/33 U.S.A.)

Results of oxygen-absorption tests and modified Underwood tests of five oils are given and show the general behaviour characteristics that might be expected of the oils in service. Dynamometer stand tests of the same oils in two each of three makes of large production passenger-car engines are described and the oils are rated in order of descending merit, as measured by progressive oil change and final engine condition.

Changes occurring in both oil and engine condition during extensive road tests of these oils are then shown and compared with chemical laboratory and engine-stand test results.

Some Observations on the Mechanical Testings and Flow Properties of Industrial Plastics. (E. G. Couzens, W. G. Wearmouth, J. Chem. and Ind., Vol. 61, No. 5, May, 1942, pp. 69-74.) (103/34 Great Britain.)

Little has been published regarding the most suitable conditioning treatment to the test samples employed in the mechanical testing of plastics, and in particular of thermoplastics. Similarly, for ordinary tensile tests there is little information about the effect of the rate of stretching on the usual physical constants, i.e., ultimate tensile strength, Young's modulus, and elongation. The work here described indicates the effect of various conditioning treatments, and a suitable treatment for standard work is suggested.

Findley's work on the rate of stretching of cellulose acetate test pieces is discussed, and it is shown that similar results are obtained with many other thermoplastics. The effect of creep on the test results is important and some experiments on thin strips of copolymer are described which show that below a critical stress the rate of creep is negligible. This critical value may have some practical significance, since it probably approximates to the safe load to which the plastic can be continuously subjected without the development of creep. The heating effect arising when certain rigid plastics are stressed to fracture point is also described.

Moisture in thermoplastic powders has a profound effect on their flow properties and the need for a standard conditioning treatment is demonstrated and stressed. Similarly, the effect of particle size is noted, and also the effect of increased stress conditions. The various methods of determining flow properties are reviewed, and their defects are listed by means of examples. Finally, the Scott Blair-Coppen equation is mentioned and its application to certain thermoplastic moulding compositions is discussed, values for polystyrene and cellulose acetate compositions being given.

Heat-Resisting Steels. (Engineer, Vol. 173, No. 4,509, pp. 499-501 ; G. Riedrich, Stahl and Eisen, Vol. 61, 1941, p. 852.) (103/35 Germany.)

Heat resisting steels are widely used at the present time in furnace and boiler construction, and in the chemical and metallurgical industries. They are used in the cast, forged and rolled condition in place of ordinary steels on account of their improved resistance to scaling and greater strength at high temperatures, involving longer life, saving in weight and more efficient utilisation of heat. They often replace ceramic materials on account of their greater strength, better thermal conductivity and the ease and lack of delay with which replacements can be effected if necessary.

In a review of the present position of the forged and rolled heat-resisting steels which has recently been published in Germany, the author confines himself to rolled and forged steels which are to be used at temperatures above 550° C. and further excludes consideration of valve steel and alloys for electrical heating elements. He first draws up a list of properties of which some are always required in heat-resisting steels, and others are of particular interest in connection with special applications of these materials.

New Methods for Mechanical Testing of Plastics. L. H. Callendar, British Plastics, Vol. 13, No. 155, April, 1942, pp. 445-458.) (103/36 Great Britain.)

Impact testing to cross-section has been for a long time a need of engineers in many industries, to enable them to test materials in the state in which they are used, instead of relying on doubtful comparative values from specially made-up test pieces. A practical method is here described for impact tests to cross-section on electrical plastics.

In the past the difficulty in the way of testing to cross-section has been mainly due to the general use of the excess swing pendulum method with Izod support. The errors of this method, namely, the "shearing and tearing" error and the "broken half" error, are shown by a number of examples to be very large for plastic materials and quite sufficient to invalidate it for comparative brittleness testing of this class of materials.

Comparative brittleness testing to cross-section is shown by numerous results to be bound up with the following:—

(1) The use of the same radius of notch, namely, ½ mm., and the same depth of notch, namely, one-third of the thickness of the test-piece for all tests on pieces of any cross-section.

(2) Charpy anvils adjusted to a distance apart equal to six times the thickness of the particular test-piece under test.

(3) A minimum velocity of impact of 8 ft. (244 cms.) per second.

(4) The first definite crack or break must be taken as the end-point of the test.

(5) The use of the guillotine or vertical drop-weight type of machine is also advantageous for this purpose; photographs of a recommended design of machine are given.

Among other matters touched on is the importance of plastic yield temperature and controlled humidity in relation to impact testing.

In the Appendices photographs are given of a new simple machine for plastic yield temperature, and also the interesting theoretical question of the uncertain range is gone into at some length.

A New Insulation Material. (British Plastics, Vol. 13, No. 155, April, 1942, p. 468.) (103/37 Great Britain.)

"*Preformed*" *Plastics.*—The Westinghouse Research Laboratories are experimenting with a new "preformed" plastic material expected to combine the strength of laminated plastics with the ductility of the moulded type. The moulded type by itself is said to lack the strength needed for some applications, while laminated plastics have not lent themselves to the formation of complex shapes. The new plastic is produced by forming a mixture of wet pulp and resin in the shape of the finished produot, which is then baked under pressure in an oven to harden the resin. This material was first to be used for making parts for household appliances in order to dispense with sheet steel and thick walls of insulating materials. The product is also to be used for Army supplies. A new two-part helmet, lighter than the present helmet, is being worked on. The inner part, made of the preformed plastics, can be worn during ordinary field operations, while a steel outer shell can be added in actual battle.

Design of Steel Castings. (H. Ocking, Stahl and Eisen, Vol. 43, No. 26, 28/6/23, pp. 841-843.) (103/38 Germany.)

The main difficulty in casting steel is the avoidance of blowholes due to trapped air. For this reason, horizontal surfaces in the mould must be avoided as far as possible and replaced by sloping or conical surfaces. The author demonstrates this on a series of pulleys and wheels which have been redesigned to allow the trapped air to escape before solidification. Some of these castings are of considerable diameter (18 feet) and provided with only very simple vertical ribbing. It is claimed that conical surfaces adapt themselves more readily to shrinkage during cooling than horizontal surfaces. This is of great importance, since steel castings undergo about three times the linear shrinkage of ordinary cast iron (2 per cent. against .7 per cent.). As a result, the conical casting is largely free of internal stresses. The maching of such surfaces can be carried out automatically in a simple manner and since blow holes are mainly confined to the central riser, excess material to be removed by maching can be restricted to the utmost.

Corrosion of Unstressed Steel Specimens and Various Alloys by High Temperature Steam. (H. L. Solberg and others, Trans. A.S.M.E., Vol. 64, No. 4, May, 1942, pp. 303-316.) (103/39 U.S.A.)

The resistance of alloy steels to high-temperature steam is greatly influenced by the amount of chromium present. Alloy steels containing 7 per cent. or more of chromium are very resistant to corrosion produced by steam at temperatures up to at least 1,400° F. The 18-8 stainless steels showed practically no corrosion when subjected to steam at temperatures up to 1,400° F.

The corrosion rate is very rapid during the first 500 hrs. of testing, and then gradually diminishes as the time of exposure to the steam continues.

Steam temperatures greatly influence the corrosion of steels. Except for steels containing 7 per cent. or more of chromium, the corrosion rate increases very rapidly at temperatures in excess of 1,100° F.

The steels tested may be grouped into three general classes according to the type of scale formed. The first group consists of low-carbon steel, carbon-molybdenum and the low-chromium steels which are covered with a thick, porous, tightly adhering scale. The scale which forms on the steels of the second group, that is, the 4-6 Cr. steels and the 2 Cr.-Moly-Al.-Si. steel, is very brittle and easily flakes off under fluctuating temperatures. The third group consists of steels having a chromium content of 7 per cent. or more upon which a very thin, non-porous, tightly adhering scale is formed.

Scale formed on the inner surface of a tube does not flake off as readily as the scale which has formed on the outer surface of a tube.

Progress in Methods of Edge-Gluing Lumber and Veneers. (H. K. von Maltitz and O. Bolling, Trans. A.S.M.E., Vol. 64. No. 4, May, 1942, pp. 387-392.) (103/40 U.S.A.)

Boards for lumber cores of plywood, for solid-dimension stock, such as chair seats, solid tops, etc., are still almost universally edge-glued together with conventional cold-setting glues, i.e., animal, vegetable and casein. Veneers are still widely taped together and, when edge-glued without tape, are generally glued with prespread animal glue. This paper describes new methods and machines for edge-gluing lumber and veneer with waterproof and water-resistant heat-setting adhesives, particularly urea-form-aldehyde resin, and points out the advantages gained through adoption of these new methods.

Variation in Shrinking and Swelling of Wood. (A. J. Stamm and W. K. Lougborough, Trans. A.S.M.E., Vol. 64, No. 4, May, 1942, pp. 379-386.) (103/41 U.S.A.)

The shrinking and swelling of wood substance has been shown to depend upon the chemical composition, being chiefly affected by water-soluble extractives which may reduce the shrinkage by 20 per cent. or more. The shrinking and swelling, as transmitted to the external dimensions, has been shown to depend also upon (*a*) the orientation of the structural units; (*b*) the nature and extent of the gross capillary structure; and (*c*) the stresses set up in the wood by moisture gradients or external means. The directional shrinking and swelling is shown to be primarily due to structural orientation. There is a tendency for the fibre-cavity size to remain constant when the wood shrinks and swells. This makes the shrinkage tend to be equal to the specific gravity of the wood (dry weight-green volume basis) times the fibre-saturation point of the wood on a volume of water per unit weight of wood basis. Deviations from this relationship are caused by stresses and by water-soluble extractives.

When the compressive strength of the wood perpendicular to the grain is low relative to the tensile strength, the wood tends to collapse under drying stresses, and hence shrinks excessively. When the tensile strength of the wood perpendicular to the grain is low relative to the compressive strength, the wood tends to shrink less than normal under the drying stresses. In the authors' opinion, collapse is more generally due to compressive stresses than to a liquid tension.

Stress Analysis of Rings for Monocoque Fuselage. (N. H. Hoff, J. Aeron. Sci., Vol. 9, No. 7, May, 1942, pp. 245-251.) (103/42 U.S.A.)

Suggestions are made for reducing the work and for increasing the accuracy of the calculation of the unknown quantities in closed rings of arbitrary shape for monocoque fuselage. The advantages of assuming three or four imaginary pin-joints instead of an imaginary cut through the ring are shown. Graphic methods are introduced for the determination of the moment distribution in the "simple" system caused by the shear flow transmitted by the sheet covering. Worked out examples show the application of the principles to numerical problems.

Non-Destructive Testing of Metals and Alloys. (Donaldson, Met. Treat., Spring 1942, pp. 2-8.) (103/43 Great Britain.)

Tests of a non-destructive character, as carried out on parts which are to be used in service are classified and described. Acoustic tests with particular reference to the stethoscopic method, methods making use of supersonic and ultrasonic waves, optical tests including spectrographic and spark tests and ferrographic, tangent coil and X-ray and gamma-ray methods are considered. Proof testing of chains, live load testing of bridges and hydraulic testing of pipes, hollow forgings and castings are reviewed under the heading of static and hydrostatic tests. Recent advances in hardness testing are also reviewed.

(Abstract supplied by Research Dept., Met. Vick.)

Effect of Rate of Loading on the Mechanical Properties of Some Materials. (R. H. Evans, J. Inst. Civil Engs., Vol. 17, No. 7, June, 1942, pp. 296-306.) (103/44 Great Britain.)

A knowledge of the mechanical properties of materials when subjected to high rates of loading is of considerable importance in several branches of engineering. Many investigators have examined the properties of metals at either comparatively low testing-speeds or very high speeds, the former in screw-powered testing-machines and the latter in impact testing-machines. No tests have been made on metals over a continuous range of loading speeds, whilst in the case of crushing tests on concrete cubes the only tests known to the author have been made by D. A. Abrams, and by P. G. Jones and F. E. Richart, in which the shortest time of loading was only one second. The rate of loading in compressive and tensile tests on concrete is specified both in British Standard Specification No. 12 (1940) for Ordinary Portland and Rapid Hardening Portland Cements, and in the "Handbook on the Code of Practice for Reinforced Concrete." In the former the specified rate of loading is 5,000 lbs. per square inch per minute for the cube crushing tests, and 100 lbs. per square inch of section per 12 seconds for the briquette tests, whilst in the latter the specified rate is 2,000 lb. per square inch per minute for the crushing tests. The author's investigation was undertaken to study the effect of the rate of loading upon (*a*) the crushing strength of rich and lean mixes of concrete, and (*b*) the yield-point, ultimate or tensile strength, percentage elongation, and reduction of area of mild steel, duralumin, and brass (Muntz Metal), and the tensile strength of cast iron.

(*a*) *Concrete*: There is no increase in crushing strength for load speeds as fast as 1-20th sec. At faster speeds, increases up to 25 per cent. were noted, especially for lean mixes.

(*b*) Ductile materials differ in the manner in which the yield point and tensile strength vary with rate of strain. In the case of mild steels, both characteristics undergo a marked increase with rate of strain. For dural, the yield point increases but little, whilst the tensile strength is practically independent of strain rate. The strength of cast iron begins to increase appreciably when the time of loading is less than 1-20th second. Finally, in the case of brass, the rate of strain has practically no effect either on yield or ultimate.

Crack Sensitivity in Welded Cr Mo Steels. (Ball, Iron and Steel, 10/4/42, pp. 233-238.) (103/45 Great Britain.)

The reasons for cracking in welds of chromium-molybdenum steels of thin section are discussed with reference to the work of Muller and Zeyen. Tables are given showing the effect of method of manufacture on crack sensitivity. The composition is stated to affect the sensitivity and tables showing the effect of various elements are included. This is substantiated by reference to the work of Muller, Bardenheuer and Bottenberg. The chemical form of sulphur in relation to carbon is important as indicated by Zeyen. The cause of cracking is said to have been sometimes explained on a basis of internal stresses set up by gases.

The effect of oxygen and hydrogen on the crack sensitivity is also given in tabular form and a further consideration of the effect of temperature variations on mechanical properties is detailed.

(Abstract supplied by Research Dept., Met. Vick.)

Temper Hardness Sensitivity of Some Alloy Case Hardening Steels and Their Liability to Cracking when Immersed in Molten Lead Bronze. (H. Cornelius and F. Bollenrath, L.F.F., Vol. 19, No. 5, 30/5/42, pp. 167-173.) (103/46 Germany.)

The object of the authors' investigations was to meet the demand for a steel with an ultimate tensile above 110 Kg./mm.^{2} (>70 tons psi.) (together with good extension, contraction and notch sensitivity) when quenched from 1,100°-1,200° C. without subsequent heat treatment. At the same time the steel should only show a slight tendency to crack when in contact with molten lead bronze.

Eleven steels were investigated, number one of the series corresponding to the Cr.-Mo. case hardening steel of DIN 1663 (1.04 per cent. Cr., .24 per cent. Mo.) which as expected met the desired requirements except that the relatively high Mo. content was objectionable from the point of view of procurement. The other experimental steels were therefore free of this constituent (and in part also of Cr.), these elements being replaced by the addition of V, Ti, Al, as well as by an increase in the Mn and Si content. The authors give details of their method of experimentation and the article is illustrated by a large number of structural micro photographs.

Two replacement steels of the following composition were found to be fully equal to the standard DIN sample.

C.	Si.	Mn.	Cr.	V.	Ti.
0.19	0.42	0.97	0.50	0.19	0.13
0.22	0.64	1.08	—	0.60	0.13

Structure and Fatigue Strength of Al-Cu-Mg Wrought Alloys (DIN 1,713) with Relatively Large Mn and Mg Content. (W. Bungardt, L.F.F., Vol. 19, No. 5, 30/5/42, pp. 174-177.) (103/47 Germany.)

In German aircraft construction, considerable use is made of Al-Cu-Mg wrought alloys (DIN specification 1713) with relatively large Mn. and Mg. content. The per cent. composition of these alloys is as follows:—

Cu.	Mg.	Mn.	Fe.	Si.	Al.
4-4.5	1-1.3	1-1.3	0.5	0.7	Rest

In the great majority of cases, pressed or rolled material of this alloy has a satisfactory uniform structure, the excess Mn.-Fe. aluminide crystals being only of small dimensions and arranged linearly. Under certain melting and solidification conditions which have not yet been completely elucidated, it may happen however that the aluminide crystals in the original casting increase over a hundred-fold in size and on account of their brittle nature introduce zones of weakness during the subsequent cold working.

The author has carried out tests on wrought alloys subjected to this defect and whilst the ultimate tensile, yield point, extension and notch sensitivity are not appreciably affected, the bending fatigue strength of a smooth cylinder is reduced by about 15 per cent. below the standard value. In the case of a notched cylinder the effect is however very small. The large crystals evidently function as internal notches, the effects of which are however still small compared with the weakening effect of an external notch.

On the Development of Play in Bolted Joints Under Fatigue. (B. Dirksen, L.F.F., Vol. 19, No. 4, 6/5/42, pp. 153-156.) (103/48 Germany.)

Bolted connections are used on aircraft to a considerable extent, either for large fittings requiring dismantling (e.g. wing/fuselage) or in order to introduce a

https://doi.org/10.1017/S0368393100140659 Published online by Cambridge University Press

certain amount of flexibility at the joint (undercarriage and controls). Considerations of weight and space necessitate that the ultimate safe load be fully utilised, whilst production difficulties rule out a split construction such as is often adopted in engine connecting rods. As a result, bolted connections on aircraft develop play and the resultant back lash may impair the safety of the craft, unless there is frequent inspection and replacement. Since proper inspection is often difficult, the flight periods necessitating replacement are not consistent. Moreover, the requirements of mass production necessitate a reduction in permissible play of the original part so as to ensure interchangability. It is the object of the author to determine a connection between stress range, load cycles and increase in play for the normal eye bolt, so that the part can be replaced when it has reached the statistical endurance limit. Any maintenance during this period could thus be avoided. A detailed experimental investigation of this problem will evidently be very laborious, since the behaviour of even this simple type of connection will depend on at least eight parameters given below:—

Geometric parameters.

1. Form of lug.
2. Bolt section area.
3. Dimension and fit of bolt.
4. Nature of surface.

Material.

5. Material of lug.
6. Material of bolt.

Type of load.

7. Non-reversing (fluctuating).
8. Tension-compression (alternating).

If we consider only two variables at a time and are satisfied with only seven points on the Wohler curve, this requires about 2,000 test pieces, for each of which the play has to be measured several times during the fatigue tests. It is obvious that the labour involved could be considerably reduced if the experiments could be arranged to give some indication of the development of play. For this purpose the author adopts the following ingenious method. The end surface of the eye-bolt is polished and a photographic record of the deflection of the end tangent plane of the bolt is made, whilst the lug/bolt combination is subjected to the load cycle on a pulsator. Under these conditions the bolt acts as a simple beam of constant span loaded at the centre by the lug. Since the force on the bolt is the resultant of the reactions at the hole in the lug, the stresses in the eye-hole are recorded directly at their place of origin without the introduction of any intermediate links capable of exerting a damping or stress reducing effect. Since the natural frequency of the bolt is very high, the optical response diagram is not distorted by the load cycle frequency, and is a true record of the eye-hole loading and thus of the tendency to develop play, even if the applied load is only fluctuating and there is no actual change over in the seating. Such a change over is at once indicated on the record by the high frequency oscillations superposed on the main sinusoidal record. Comparative tests in which the actual wear of the eye-hole was measured as a function of load cycles under various conditions of loading show a basic connection between development of play and the optical record of bolt or hole wall stresses. The experiments are being continued with the hope of formulating a more exact relationship.

The Problems Inherent in the Protection of Flying Personnel Against Temperature Extremes Encountered in Flight. (O. O. Benson and E. A. Pinson, J. Aeron. Sci., Vol. 9, No. 7, May, 1942, pp. 252-254.) (103/49 U.S.A.)

The final solution to the problem of maintaining body heat balance under the varied and extreme conditions encountered in flight is probably dependent to a

https://doi.org/10.1017/S0368393100140659 Published online by Cambridge University Press

great extent on future developments in aircraft design. If pressure cabin aircraft are developed, the solution may lie in the heating of the cabin air together with some effective means of defrosting window areas in the cabin. As for the present, the best solution would seem to incorporate the best features of the electrically heated suit with the use of insulative clothing of maximum bulkiness commensurate with normal personal comfort and efficiency. Insulative clothing of moderate weight such as the standard intermediate winter flying clothing, can be tolerated on all body areas except the hands which are needed for tactile operations. To keep the extremities warm and the body as a whole in heat balance, external heat could be applied with proper distribution beneath the insulative clothing. Heavy mittens could be carried as accessories or emergency equipment for protection in case of failure of the heating system or abandonment of the aircraft. This would provide adequate emergency protection, independent of the craft, for all except the most severely cold conditions such as those encountered at very high altitudes and in the far north.

The Ability to See Low Contrasts at Night. (M. Luckiesh and F. K. Moss, J. Aeron. Sci., Vol. 9, No. 7, May, 1942, pp. 261-263.) (103/50 U.S.A.)

The use of test objects of maximal contrast (black on white) in so-called screening tests for selecting military and other personnel involves the tacit assumption that individual differences in contrast sensitivity are unimportant, differences in the resolving power or the visual acuity of the eye, as determined with objects of maximal contrast, being of primary importance. However, this is not entirely true and the hazards of these assumptions do not have to be risked, since the ocular examinations can readily be made with low-contrast test objects, such as light grey objects on a white background. There are many sound reasons for using a chart comprising a progressive series of low-contrast test objects. Such a chart is capable of revealing individual variations not only in absolute sensitivity to brightness but also to variations in contrast sensitivity or sensitivity to brightness difference. The latter visual characteristic is primarily important in observation at night and, obviously, it is not reliably measured with test objects of maximal contrast, such as black test objects seen against a white background or completely silhouetted against a luminous background.

The selection of a brightness of 0.01 foot-lambert as the low brightness or scotopic level for the tests recommended by the authors was based upon both theoretical and empirical considerations. At this brightness level, seeing depends almost entirely upon rod vision. Hence, this level is theoretically appropriate for a screening test designed to detect individual differences in ability to see under low levels of illumination. A brightness level of 0.01 foot-lambert is also comparable in order of magnitude with the brightnesses of roads and highways under moonlight. Thus the data obtained under 0.01 foot-lambert are readily interpretable in many practical situations without introducing the uncertainty of extreme extrapolation.

Medical Problems of High Altitude Flight. (F. V. Tavel, Inter. Avia., No. 821, 18/6/42, pp. 1-7.) (103/51 Switzerland.)

The increase in flying operations at altitudes above 23,000 feet has created the urgent need of improving present day oxygen breathing apparatus. Such apparatus must have the following characteristics:—

1. Reliability at all altitudes and at very low temperatures.
2. Easy operation, even if the pilot has lost a considerable portion of his capacity of judgment owing to altitude effects.
3. Oxygen requirements under strenuous work conditions must be met.
4. Available oxygen must be employed efficiently so as to reduce weight carried.
5. The installation must be explosion and bullet proof.

The complete breathing apparatus consists of three parts: the oxygen supply, the regulator and the respirator.

The supply is usually from a high pressure storage bottle containing 30 litres of gas. Such bottles are very vulnerable to gun fire and their weight usually restricts the amount of oxygen carried to below medical requirements under conditions of air fighting. Alternatives are the provision of liquid oxygen or the generation of the gas from peroxides in the aircraft itself. Both these alternatives are still in the experimental stage. The difficulty with liquid oxygen supply is the provision of reliable regulating devices; the installation, however, weighs less than half that of the high pressure system (1 lb. against 2.4 lbs. for a supply of 120 litres/hour). The chemical oxygen system on the other hand in its present form weighs about 50 per cent. more than the pressure system for equivalent output. The duty of the regulator is to enrich the oxygen content of the air supplied by the respirator. Automatic regulation is essential, especially during air combat. The simplest type depends upon air pressure only, but this is wasteful during expiration and does not adapt itself to sudden increased demands during combat. Germany employs exclusively so-called "lung automatics," the oxygen supply following the breathing requirements. This has the disadvantage of requiring a perfect fit of the mask and is also subject to icing trouble at low temperatures, due to the water content of the expired air. Recent attempts have been made in the direction of so modifying the mask that the pressure controlled supply with continuous flow can be retained whilst the drawbacks of this simple system are overcome. An example of this is furnished by the American BLB respirator. As regards pressure effects, the breathing of $O_2 - CO_2$ mixtures has certain beneficial effects, but for flight above 30,000 feet a sealed cabin appears essential. The danger of CO poisoning from exhaust leaks in the cockpit is considerably increased at altitude, and for this reason the breathing system should be of the closed type and the employment of mouthpiece and nose masks is not recommended.

LIST OF SELECTED TRANSLATIONS.

No. 46.

NOTE.—Applications for the loan of copies of translations mentioned below should be addressed to the Secretary (R.T.P.3), Ministry of Aircraft Production, and not to the Royal Aeronautical Society. Copies will be loaned as far as availability of stocks permits. Suggestions concerning new translations will be considered in relation to general interest and facilities available.

Lists of selected translations have appeared in this publication since September, 1938.

ENGINES AND ACCESSORIES.

TRANSLATION NUMBER AND AUTHOR.		TITLE AND REFERENCE.
1470	Englisch, C. ...	*Cylinder Liners of Automobile Internal Combustion Engines.* (A.T.Z., Vol. 44, No. 12, June 25th, 1941, pp. 305-312.)
1471	Kimmel, A.... ...	*Effect of Subsidiary Connecting Rod Assembly on the Force Acting Perpendicular to the Crankshaft Axis.* (L.F.F., Vol. 18, No. 12, Dec., 1941, pp. 403-416.)
1472	Capetti, A.	*Considerations on the Compression Stage in Internal Combustion Turbines.* (L'Aerotecnica, Vol. 18, No. 5, May, 1938, pp. 566-581.)
1476	Nüll, v. d. W. ...	*Practical Examples of Aero Engine Superchargers.* (Z.V.D.I., Vol. 85, No. 47-48, 29/11/41, pp. 905-913.)
1483	Gambarucci, E. ...	*An Elementary Theory of Thermal Jet Propulsion.* (L'Aerotecnica, Vol. 21, No. 12, Dec., 1941, pp. 774-797.)
1488	Reniger, V.... ...	*The Future of Aircraft Propulsion. The Steam and Gas Turbines.* (La Science et la Vie, Vol. 58, No. 279, Nov., 1940, pp. 152-161.)

MATERIALS.

1474	Hizoku, E. ... ... Akira, I.	*A Study of the New Method of Preventing the Corrosion of Electrons of Various Kinds—Report II.* (Nippon Kinzoku Gakkai-Si, Vol. 4, No. 4, April, 1940, pp. 91-103.)
1479	Kempf, H.	*Rapid Chemical Analysis of Pig Iron.* (Stahl und Eisen, Vol. 62, No. 7, 12/2/42, pp. 136-140.)
1480	Kitahara, G. ...	*On the Season Cracking of Aluminium—Base Mg.-Al.—Alloys.* (Nippon Kinzoku Gakkai-Si, Vol. 4, No. 10, Oct., 1940, pp. 343-347.)
1485	Erk, S. ... ... Holzmuller, W. ...	*Hardness Testing of Plastic Moulding Compounds.* (Kunstoffe, Vol. 28, No. 5, May, 1938, pp. 109-113.)

Translation Number and Author.	Title and Reference.
1486 Buchman ...	... *Strength and Permissible Loading of Polyvinyl Chloride Plastics.* (Z.V.D.I., Vol. 84, No. 25, 22/6/1940, pp. 425-432.)

AIRCRAFT AND ACCESSORIES.

1475 Ruhlemann, E.	... *Cable Weights of Electrical Installations on Aircraft.* (Flughafen, Vol. 9, No. 4, April, 1941, pp. 3-5.)
1481 Eula, A. ...	... *Experiments on a Family of Multi-Bladed Airscrews.* (Atti di Guidonia, No. 49-50, April, 1941.)

FUELS.

1473 Squeo, T. ... Elvio ...	... *The Electrolytic Method for Quantitative Determination of Lead Tetraethyl.* (Atti di Guidonia, No. 41, 1941, pp. 5-12.)

AERODYNAMICS.

1482 Seitter, H. ...	... *Wind Loads on Buildings.* (Der Bauingenieur, Vol. 22, No. 33-34, 20/8/41, pp. 323-326.)

WARFARE.

1487 Rodriguez, R. C. ...	*Horizontal and Dive Bombing.* (Ingeniera Naval, Vol. 9, No. 78, Dec., 1941, pp. 393-397.)

PHOTOGRAMMETRY.

1489 Jorio, M. di...	... *Determination of Positions and Altitude of an Aircraft in Space by Means of Photogrammetic Methods.* (Atti di Guidonia, Vol. 19, No. 43, Feb., 1941, pp. 21-36.)

LIST OF SELECTED TRANSLATIONS.

No. 47.

NOTE.—Applications for the loan of copies of translations mentioned below should be addressed to the Secretary (R.T.P.3), Ministry of Aircraft Production, and not to the Royal Aeronautical Society. Copies will be loaned as far as availability of stocks permits. Suggestions concerning new translations will be considered in relation to general interest and facilities available.

Lists of selected translations have appeared in this publication since September, 1938.

(1) THEORY AND PRACTICE OF WARFARE.

(a) JAPANESE AIRCRAFT INDUSTRY.

TRANSLATION NUMBER AND AUTHOR.	TITLE AND REFERENCE.
1499 Vogt, R.	*Japan—Thoughts and Memories (Reminiscences of a German Aircraft Engineer in Japan 1923-1935).* (Luftwissen, Vol. 9, No. 3, March, 1942, pp. 71-74.)

(b) A.A. ARTILLERY TRAINING.

1528 ——	*The Verograph—A New Training Device for A.A. Control.* (Flugwehr-und-Technik, Vol. 3, No. 9, Sept., 1941, pp. 212-215.)

(2) AERODYNAMIC AND HYDRODYNAMIC.

1490 Eckert, E.	*Similarity Considerations Applied to Aerodynamic Flow Machines.* (L.F.F., Vol. 18, No. 11, 20/11/41, pp. 387-395.)
1517 Pritsch, J.	*On the Stability of Laminar Flow in a Straight Pipe of Circular Cross Section.* (Z.A.M.M., Vol. 21, No. 4, Aug., 1941, pp. 204-217.)

(3) PLASTICS.

1498 Kuch, W.	*Mechanical Properties of Transparent Plastics at +20°C.* (L.F.F., Vol. 19, No. 3, 26/4/42, pp. 111-120.)
1503 Frolich, K.	*Hardness Determination of Plastics by the Rolling Ball Method.* (Kunstoffe, Vol. 30, No. 4, April, 1940, pp. 103-106.)

(4) ELASTICITY.

(a) STRESS.

1493 Trevarovsky, I. G...	*An Investigation of the Stresses in Rotating Discs with a Number of Apertures.* (Sov. Kotloturbo, No. 11, November, 1940, pp. 402-411.)

Translation Number and Author.		Title and Reference.
1500	Schmidt, R.... Klein, H. ...	*The Hamilton Carbon Resistance Method of Stress Determination and its Application to Airscrew Vibration Measurements.* (Luftwissen, Vol. 9, No. 3, March, 1942, pp. 75-81.)

(b) Vibration.

1512	Meyer, J. ...	*Displacement of the Natural Frequencies of an Elastically Mounted Aircraft Engine Brought about by the Gyroscopic Effect of the Airscrew.* (Jahrbuch 1938 deutschen L.F.F., pp. 179-182.)

(c) Fatigue.

1496	Cornelius, H. Bollenrath, F. ...	*Torsional Fatigue Strength of High Tensile Steel Shafts.* (Z.V.D.I., Vol. 86, No. 7-8, 21/2/1942, pp. 105-108.)

(5) Engines and Accessories.

1505	Poppinga, R. ...	*The Present Position of German Research on Wear, with Special Reference to Cylinders and Piston Rings.* (A.T.Z., Vol. 44, No. 10, 25/5/41, pp. 247-260.)
1518	Lettan, E. ...	*Resonant Vibrations in Pipe Lines.* (Kraftfahrtforschung, No. 39, 1939.)
1519	——	*B.M.W. 801 Aero Engine (Twin Radial, Fuel Injection).* (Flugsport, Vol. 34, No. 11, 27/5/42, pp. 159-170.)

(6) Fuels.

1509	Ceccarini, V. ...	*Experiments with Ketones and the Possibility of Their Utilisation as a Constituent of 100 Octane Fuel.* (Atti di Guidonia, No. 55-56, Aug., 1941.)

(7) Heat Transmission.

1497	Rachko, W. A. ...	*The Influence of Surface Roughness on the Coefficient of Heat Transmission for a Boiling Liquid.* (Sov. Kotloturbo, No. 11, 1940, pp. 411-414.)
1507	Rachko, W. A. ...	*The Heat Exchange of Boiling Water with the External Surface of a Tube.* (Sov. Kotloturbo, No. 9, Sept., 1940, pp. 323-326.)

(8) Production.

(a) Hard Metal Tools.

1513	——	*Widia Handbook. Tungsten Carbide Cobalt Hard Metal Faced Tools.*

(b) Design of Mg. Alloy Components.

1514	Schonberg ...	*The Design of Magnesium Alloy Components.* (A.T.Z., Vol. 44, No. 12, 25/6/41, pp. 295-305.)

Translation Number and Author.	Title and Reference.
	(9) Aerial Photography in Winter.
1511 Timofeyer, P. G. ...	*Aerial Photography in Winter.* (Air Fleet News, Vol. 23, No. 2, Feb., 1941, pp. 154-158.)
	(10) Wireless Navigation.
1506 Gorshkov, M. F. ...	*Preparation of Maps for Navigation by Wireless.* (Air Fleet News, U.S.S.R., Vol. 23, No. 1, Jan., 1941, pp. 46-48.)

TITLES AND REFERENCES OF ARTICLES AND PAPERS SELECTED FROM PUBLICATIONS REVIEWED IN R.T.P.3.

Requests for further information or translations should be addressed to R.T.P.3, Ministry of Aircraft Production.

THEORY AND PRACTICE OF WARFARE.

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
1	2677	Germany ...	*The Messerschmitt* 208 (*New Version of Me.* 108) (*Photograph*). (Flight, Vol. 41, No. 1,745, 4/6/42, p. 554.)
2	2678	G.B. ...	*Avro Manchester* (*Details and Performance*). (Flight, Vol. 41, No. 1,745, 4/6/42, pp. 555-557.)
3	2680	G.B. ...	*Air/Sea Rescue.* (Flight, Vol. 41, No. 1,745, 4/6/42, pp. a-b.)
4	*2685	Germany ...	*Recent Results in Rocket Flight Technique.* (E. Sanger, Flug Sonderheft 1, December, 1934.) (R.T.P. Translation No. T.M. 1,012.)
5	2686	U.S.A. ...	*Catalina Amphibian* (*Photograph*). (Aeroplane, Vol. 62, No. 1,619, 5/6/42, p. 634.)
6	2687	G.B. ...	*Aircraft Armament in Two Wars.* (Aeroplane, Vol. 62, No. 1,619, 5/6/42, pp. 642-643.)
7	2689	U.S.A. ...	*The North American N.A.* 73 (*P*-51) *and the Mustang I* (*Recognition Details*). (Aeroplane, Vol. 62, No. 1,619, 5/6/42, p. 649.)
8	2690	Italy ...	*The Macchi C* 202 *and the Saetta II.* (Aeroplane, Vol. 62, No. 1,619, 5/6/42, p. 649.)
9	2691	Japan ...	*Aeroplanes of the Japanese Army and Navy Air Forces—IV.* (Aeroplane, Vol. 62, No. 1,619, 5/6/42, p. 652.)
10	2692	G.B. ...	*The Weapons of Air Warfare—I.* (P. W. Brooks, Aeroplane, Vol. 62, No. 1,619, 5/6/42, pp. 641-643.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
11	2719	G.B.	*Engineers in the Army.* (Engineer, Vol. 173, No. 4,509, 12/6/42, pp. 494-495.)
12	2726	G.B.	*The R.A.F.'s Offensive in May.* (Engineer, Vol. 173, No. 4,509, 12/6/42, p. 502.)
13	2728	G.B.	*The Avro "Manchester" Heavy Bomber (and Photograph).* (Engineering, Vol. 153, No. 3,987, 12/6/42, pp. 465 and 470.)
14	2734	Switzerland ...	*British Criticisms on the Conduct of the War.* (Inter. Avia., No. 818, 26/5/42, pp. 1-7.)
15	2735	Sweden ...	*Svenska B 17 (S 17) (Dive Bomber and Reconnaissance with Snow Skids) (Photograph).* (Inter. Avia., No. 818, 26/5/42, p. I.)
16	2736	Germany ...	*Focke-Wulf Single-Seater Fighter F.W. 190 (B.M.W. 801 Engine of 1,600 h.p.).* (Inter. Avia., No. 818, 26/5/42, p. I.)
17	2737	Japan ...	*Silhouettes of Japanese Aircraft (Mitsubishi T. 96, T. 98) (900 h.p. "Kinshei" and 750 h.p. Mitsubishi Radials).* (Inter. Avia., No. 818, 26/5/42, p. I.)
18	2738	Japan ...	*Japan's First Line Aircraft (from British Sources).* (Inter. Avia., No. 818, 26/5/42, pp. 9-12.)
19	2739	Germany ...	*German Torpedo Bombers.* (Inter. Avia., No. 818, 26/5/42, p. 13.)
20	2742	U.S.A. ...	*New Designations of U.S. Army Aircraft.* (Inter. Avia., No. 818, 26/5/42, pp. 17-18.)
21	2743	U.S.A. ...	*Curtiss "Warhawk."* (Inter. Avia., No. 818, 26/5/42, p. 18.)
22	2744	U.S.A ...	*Consolidated B. 24 "Liberator" for Anti-Submarine Work.* (Inter. Avia., No. 818, 26/5/42, p. 18.)
23	2755	G.B.	*Allies and Axis Torpedo Aircraft (Main Data of 18 Types).* (Flight, Vol. 41, No. 1,746, 11/6/42, pp. 585-586.)
24	2758	G.B.	*The Value of Torpedo Aircraft.* (Flight, Vol. 41, No. 1,746, 11/6/42, pp. 583-585.)
25	2760	Japan ...	*Japanese Type Names.* (Aeroplane, Vol. 62, No. 1,620, 12/6/42, p. 657.)
26	2761	Germany ...	*New German Motor Cannon (Installed in Aircraft having Argus Motors).* (Aeroplane, Vol. 62, No. 1,620, 12/6/42, p. 658.)
27	2762	Germany ...	*Focke-Wulf F.W. 190 (1,600 h.p. B.M.W. 801 Motor) (Photograph).* (Aeroplane, Vol. 62, No. 1,620, 12/6/42, p. 659.)
28	2763	Italy	*The Macchi C. 202 Single-Seat Fighter (Photograph).* (Aeroplane, Vol. 62, No. 1,620, 12/6/42, p. 662.)
29	2764	Italy	*Italian Air Strength.* (Aeroplane, Vol. 62, No. 1,620, 12/6/42, pp. 668-669.)
30	2765	U.S.A. ...	*Douglas Boston III (Photograph).* (Aeroplane, Vol. 62, No. 1,620, 12/6/42, p. 672.)
31	2766	G.B.	*Details of the Avro Manchester I (with Photograph).* (Aeroplane, Vol. 62, No. 1,620, 12/6/42, pp. 674-675.)
32	2767	Japan ...	*Aeroplanes of the Japanese Army and Navy Air Forces—V.* (Aeroplane, Vol. 62, No. 1,620, 12/6/42, p. 680.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
33	2802	Switzerland ...	*British Criticisms of the Conduct of the War (II) (with Special Reference to White Paper on Organisation of Joint Staff).* (Inter. Avia., No. 819, 3/6/42, pp. 1-8.)
34	2804	Germany ...	*Me. 210 Fighter.* (Inter. Avia., No. 819, 3/6/42, p. 14.)
35	2805	Germany ...	*B.V. 141 Asymmetric Reconnaissance Plane.* (Inter. Avia., No. 819, 3/6/42, p. 14.)
36	2806	Germany ...	*Hs 129 Attack Bomber.* (Inter. Avia., No. 819, 3/6/42, p. 14.)
37	2811	Japan ...	*Mitsubishi OO Navy Fighter (Photograph).* (Inter. Avia., No. 819, 3/6/42, p. I.)
38	2812	U.S.A. ...	*U.S.A. Air Lines Under Military Control.* (Inter. Avia., No. 819, 3/6/42, p. 23.)
39	2814	U.S.A. ...	*Vought-Sikorsky "Kingfisher" OS-2-U (Photograph).* (U.S. Air Services, Vol. 27, No. 4, April, 1942, p. 13.)
40	2815	U.S.A. ...	*Emergency Oxygen Supply while Parachuting.* (A. V. Heller, U.S. Air Services, Vol. 27, No. 4, April, 1942, p. 20.)
41	2816	U.S.A. ...	*The Martin "Mariner" Long Range Patrol Bomber (P.B.M.-3) (Photograph).* (U.S. Air Services, Vol. 27, No. 4, April, 1942, p. 26.)
42	2817	U.S.A. ...	*Four-Engined Douglas C-54 Transport Plane (Photograph).* (U.S. Air Services, Vol. 27, No. 4, April, 1942, p. 30.)
43	2818	U.S.A. ...	*Curtiss Condor III (or C-46) Twin-Engined Transport.* (U.S. Air Services, Vol. 27, No. 4, April, 1942, p. 34.)
44	2819	U.S.A. ...	*A Practical Method of Pilot Selection.* (M. N. Walsh, U.S. Air Services, Vol. 27, No. 4, April, 1942, pp. 14-16, 40.)
45	2824	G.B.	*Long-Range Bombing.* (Engineer, Vol. 173, No. 4,510, 19/6/42, p. 516.)
46	2825	G.B.	*Engineers in the Army.* (Engineer, Vol. 173, No. 4,510, 19/6/42, pp. 516-517.)
47	2845	G.B.	*War Production of the Allies.* (Engineering, Vol. 153, No. 3,988, 19/6/42, p. 492.)
48	2898	Germany ...	*Unsymmetrical Aircraft B.V. 141.* (Flugsport, Vol. 34, No. 11, 27/5/42, pp. 157-159.)
49	*2900	Germany ...	*Method of Storing Rubber Dinghy on Aircraft.* (Flugsport, Vol. 34, No. 11, 27/5/42, pp. 170-171.)
50	2922	U.S.A. ...	*Lockheed Vega Ventura (Photograph).* (Aeroplane, Vol. 62, No. 1,622, 26/6/42, p. 713.)
51	2923	U.S.A. ...	*North American B. 25 C. (Mitchell) (Photograph).* (Aeroplane, Vol. 62, No. 1,622, 26/6/42, p. 719.)
52	2925	G.B.	*Weapons of Warfare, IV (Historical).* (Aeroplane, Vol. 62, No. 1,622, 26/6/42, p. 723.)
53	2926	Japan ...	*Japanese Army and Navy Aeroplanes—VII.* (Aeroplane, Vol. 62, No. 1,622, 26/6/42, p. 730.)
54	2927	Germany ...	*Dornier Do. 217 E1.* Aeroplane, Vol. 62, No. 1,622, 26/6/42, pp. 734-736.)
55	*2934	U.S.A. ...	*Progress in Aeroplane Designing during 1941.* (A. E. Raymond, J. Aeron. Sci. (Review), Vol. 1, No. 2, May, 1942, pp. 7-10.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
56	2935	Germany ...	*Dornier 217 E.* (Flight, Vol. 41, No. 1,748, 25/6/42, pp. 635-639.)
57	2936	U.S.A. ...	*Bell Airacobra.* (Flight, Vol. 41, No. 1,748, 25/6/42, p. a.)
58	2937	U.S.A. ...	*Grumman Martlet I.* (Flight, Vol. 41, No. 1,748, 25/6/42, p. b.)
59	2939	Italy	*Caproni 313 S Bomber (Photograph).* (Flight, Vol. 41, No. 1,748, 25/6/42, p. 644.)
60	2940	G.B.	*De Havilland Glider.* (Flight, Vol. 41, No. 1,748, 25/6/42, pp. 650-651.)
61	2943	Germany ...	*De-icing Equipment on Do. 217 E (Hot Air).* (Engineer, Vol. 174, No. 4,512, 3/7/42, pp. 6-8.)
62	2951	G.B.	*Refuelling Spitfire at Malta (Photograph).* (Flight, Vol. 42, No. 1,749, 2/7/42, p. 5.)
63	2952	G.B.	*Glider Training.* (F. A. de V. Robertson, Flight, Vol. 42, No. 1,749, 2/7/42, pp. 7-9.)
64	2953	Germany ...	*Evolution of the German Fighter.* (Flight, Vol. 42, No. 1,749, 2/7/42, pp. 11-12.)
65	2954	Germany ...	*Heinkel He. 111 K.* (Flight, Vol. 42, No. 1,749, 2/7/42, p. a.)
66	2955	Germany ...	*Ju. 88.* (Flight, Vol. 42, No. 1,749, 2/7/42, p. b.)
67	2956	Germany ...	*Me. 210 (Flying Altitudes for Recognition Details).* (Flight, Vol. 42, No. 1,749, 2/7/42, p. 15.)
68	2957	Germany ...	*Do. 217 E. Tail Diving Brake.* (Flight, Vol. 42, No. 1,749, 2/7/42, p. 17.)
69	2962	U.S.S.R. ...	*Russian Rocket Bombs.* (Inter. Avia., No. 820, 10/6/42, pp. 10-11.)
70	2963	U.S.A. ...	*North American B. 25 C. (Mitchell III) Twin-Engine Bomber.* (Inter. Avia., No. 820, 10/6/42, p. 5.)
71	2964	U.S.A. ...	*Lockheed Vega 37 (Ventura) Twin-Engined Bomber.* (Inter. Avia., No. 820, 10/6/42, p. 5.)
72	2965	Italy	*Re. 2,000 and 2,001 Fighters.* (Inter. Avia., No. 820, 10/6/42, p. 10.)
73	2966	U.S.A. ...	*Timm P.T. 220 C Trainer.* (Inter. Avia., No. 820, 10/6/42, p. 6.)
74	2967	Germany ...	*Distribution of German Air Fleets.* (Inter. Avia., No. 820, 10/6/42, pp. 11-12.)
75	2968	U.S.A. ...	*U.S.A. Aircraft Designations (Curtiss Commando and Condor).* (Inter. Avia., No. 820, 10/6/42, p. 6.)
76	2969	Canada ...	*Canadian Fairchild Trainer "Cornell."* (Inter. Avia., No. 820, 10/6/42, p. 7.)
77	2970	U.S.A. ...	*American Fighters in Russia.* (Inter. Avia., No. 820, 10/6/42, pp. 6-7.)
78	2971	Germany ...	*Blohm and Voss B.V. 222 Six-Engined Flying Boat Bomber.* (Inter. Avia., No. 820, 10/6/42, p. 9.)
79	2973	U.S.A. / G.B.	*Bomb Load Data for Various Types.* (Inter. Avia., No. 820, 10/6/42, pp. 8 and 15.)
80	2975	U.S.S.R. ...	*Four-Motor Russian Bomber (Photograph).* (Aeroplane, Vol. 62, No. 1,621, 19/6/42, p. 688.)
81	2976	U.S.A. ...	*The Consolidated Catalina Flying Boat (Drawing).* (Aeroplane, Vol. 62, No. 1,621, 19/6/42, p. 696.)
82	2977	U.S.A. ...	*The Boeing B-17 E (The Fortress II).* (Aeroplane, Vol. 62, No. 1,621, 19/6/42, pp. 689, 704-705.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
83	2978	G.B. ...	*The Short S. 29 (The Stirling I).* (Aeroplane, Vol. 62, No. 1,621, 19/6/42, pp. 704-705.)
84	2979	Japan ...	*Aeroplanes of the Japanese Army and Navy Air Forces—VI.* (Aeroplane, Vol. 62, No. 1,621, 19/6/42, p. 708.)
85	2980	U.S.A. ...	*Curtiss C. 46 " Commando " (Photograph).* (Aeroplane, Vol. 62, No. 1,621, 19/6/42, p. 706.)
86	2981	U.S.A. ...	*Bell Airacobra with Extra Fuel Tank (Photograph).* (Aeroplane, Vol. 62, No. 1,621, 19/6/42, p. 689.)
87	2982	G.B. ...	*Weapons of Air Warfare—III (Historical).* (P. W. Brooks, Aeroplane, Vol. 62, No. 1,621, 19/6/42, pp. 698-699.)
88	2983	U.S.A. ...	*Kittyhawk and Whirlwind Fighters (with Photographs).* (Flight, Vol. 41, No. 1,747, 18/6/42, pp. a-b.)
89	2984	Germany ...	*The Twin Rear Turrets Fitted to the Junkers 88 (Photograph).* (Flight, Vol. 41, No. 1,747, 18/6/42, p. 615.)
90	2985	Germany ...	*Focke-Wulf F.W. 190 (Photograph).* (Flight, Vol. 41, No. 1,747, 18/6/42, p. 615.)
91	2986	G.B./Germany	*The Spitfire in Germany (German Comments).* (Flight, Vol. 41, No. 1,747, 18/6/42, p. 615.)
92	2987	U.S.A. ...	*Brewster Bermuda-Buccaneer (Dive Bomber).* (Flight, Vol. 41, No. 1,747, 18/6/42, p. 622.)
93	2988	G.B. ...	*Air Transport Auxiliary (Home Ferry).* (G. W. Williams, Flight, Vol. 41, No. 1,747, 18/6/42, pp. 617-621.)
94	2989	U.S.S.R. ...	*Four-Engined Soviet Bomber (Photograph).* (Flight, Vol. 41, No. 1,747, 18/6/42, pp. 604-607.)
95	2992	U.S.S.R. ...	*Russian P.E.—2 Light Bomber (Photograph).* (Aeroplane, Vol. 63, No. 1,623, 3/7/42, p. 5.)
96	2993	U.S.A. ...	*Catalina Amphibian (Consolidated 28-5 A.) (Photograph).* (Aeroplane, Vol. 63, No. 1,623, 3/7/42, p. 6.)
97	2994	G.B. ...	*Four-Cannon Spitfire (Photograph).* (Aeroplane, Vol. 63, No. 1,623, 3/7/42, p .6.)
98	2995	G.B. ...	*De Havilland " Flamingo " Military Transport (Photograph).* (Aeroplane, Vol. 63, No. 1,623, 3/7/42, pp. 7 and 18.)
99	2996	Italy ...	*Macchi C. 202 Fighter (Photograph).* (Aeroplane, Vol. 63, No. 1,623, 3/7/42, p. 8.)
100	2997	Italy ...	*Cant Z. 511 Transport (Photograph).* (Aeroplane, Vol. 63, No. 1,623, 3/7/42, p. 8.)
101	2998	G.B. ...	*General Aircraft Hotspur Gliders (Photograph).* (Aeroplane, Vol. 63, No. 1,623, 3/7/42, p. 9.)
102	2999	G.B. ...	*Weapons of Air Warfare—V (Historical).* (P. Brooks, Aeroplane, Vol. 63, No. 1,623, 3/7/42, pp. 11-12.)
103	3001	Japan ...	*Aeroplanes of Japanese Army and Navy—VIII.* (Aeroplane, Vol. 63, No. 1,623, 3/7/42, p. 21.)
104	3002	G.B. ...	*School for Glider Pilots.* (Aeroplane, Vol. 63, No. 1,623, 3/7/42, pp. 22, 23.)
105	3003	Italy ...	*Reggiane Re. 2,000 (Falcho I).* (Aeroplane, Vol. 63, No. 1,623, 3/7/42, pp. 24-25.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
106	3004	U.S.A.	...	*Republic P-43 (Lancer).* (Aeroplane, Vol. 63, No. 1,623, 3/7/42, pp. 24-25.)
107	3005	Japan	...	*Japanese Aircraft (Photographs and Silhouettes).* (Aviation, Vol. 41, No. 3, March, 1942, pp. 60-61.)
108	3016	U.S.A.	...	*Main Landing Gear and Wheel of the Consolidated B-24.* (Aviation, Vol. 41, No. 3, March, 1942, p. 90.)
109	3017	U.S.A.	...	*Structural Details of the Vought-Sikorski V.S.-44-A.* (Aviation, Vol. 41, No. 3, March, 1942, p. 90, 93.
110	3018	U.S.A.	...	*The Martin 167-W Main Landing Gear.* (Aviation, Vol. 41, No. 3, March, 1942, p. 93.)
111	3024	G.B. ...	...	*Repair and Maintenance Organisation of the R.A.F. (Special Problems with American Types).* J. I. Waddington, Aviation, Vol. 41, No. 3, March, 1942, pp. 122-129.)
112	3027	U.S.A.	...	*Light Planes for Army Observation.* (W. Strohmeier, Aviation, Vol. 41, No. 3, March, 1942, pp. 130-141, 184, and 187-188.)
113	3029	U.S.A.	...	*CO_2 Fire Extinguishing Systems on Aircraft.* (J. M. Noble, Aviation, Vol. 41, No. 3, March, 1942, pp. 148-149.)
114	3032	G.B. ...	...	*A.R.P. and the Engineering Industry.* (Nature, Vol. 149, No. 3,789, 13/6/42, pp. 673-674.)
115	3036	G.B. ...	...	*Resistance of Aircraft Structures to Projectile Impact.* (Light Metals, Vol. 4, No. 53, June, 1942, pp. 216-217.)
116	3092	U.S.A.	...	*New R.A.F. Types, XXI—The North American NA-73 (P. 51) Mustang Single-Seater Fighter.* (Airc. Eng., Vol. 14, No. 159, pp. 130-131, May, 1942.)
117	3095	G.B. ...	...	*The Short Stirling Heavy Bomber (Constructional Drawings).* (Airc. Eng., Vol. 14, No. 159, pp. 141-148, May, 1942.)
118	3096	Germany	...	*German Report on the Effect of Bullets on Aircraft Structure.* (Airc. Eng., Vol. 14, No. 159, pp. 136-137, May, 1942.)
119	3105	Germany	...	*British and American Military Aircraft.* (Luftwissen, Vol. 9, No. 4, pp. 118-119, April, 1942.)
120	3111	Germany	...	*Blohm and Voss BV 141 Asymmetrical Aircraft.* (Inter. Avia., No. 821, pp. 10-11, 18/6/42.)
121	3112	Japan	...	*New "OO" Fighter.* (Inter. Avia., No. 821, p. 11, 18/6/42.)
122	3113	Japan	...	*Japanese Aircraft Engine Industry.* (Inter. Avia., No. 821, p. 12, 18/6/42.)
123	3114	U.S.S.R.	...	*PE-2 Twin-Engined Light Bomber.* (Inter. Avia., No. 821, p. 12, 18/6/42.)
124	3115	U.S.A.	...	*Bell P-39 Fighter and P-57 Fighter.* (Inter. Avia., No. 821, pp. 12-13, 18/6/42.)
125	3116	U.S.A.	...	*Grumman TBF-1 "Avenger" Torpedo Plane.* (Inter. Avia., No. 821, p. 13, 18/6/42.)
126	3117	U.S.A.	...	*Curtiss P-40 F "Warhawk."* (Inter. Avia., No. 821, p. 13, 18/6/42.)
127	3118	G.B. ...	...	*Avro "Manchester."* (Inter. Avia., No. 821, pp. 14-15, 18/6/42.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
128	3120	Switzerland ...	*Types of Warplanes Employed in Libya.* (Inter. Avia., No. 821, p. 17, 18/6/42.)
129	3121	Germany ...	*The Dissociation of Explosives as Affected by the Equilibrium Constants of Water Gas, C, CO_2 and CO.* (V. Renner, Z.G.S.S., Vol. 37, No. 5, May, 1942, pp. 81-83.)
130	3122	Germany ...	*The Constitution of Mercury Fulminate.* (L. Bergfeld, Z.G.S.S., Vol. 37, No. 5, May, 1942, pp. 84-86.)
131	3123	Germany ...	*Technical Warfare.* (K. Justrow, Z.G.S.S., Vol. 37, No. 5, May, 1942, pp. 87-90.)
132	3126	Italy	*Italian Warplanes (Bombers and Fighters), Specifications.* (Am. Av., Vol. 6, No. 1, pp. 4-9, 1/6/42.)
133	3132	Germany ...	*Modern German Warplanes (Me.* 109 *F, F.W.* 190, *Do.* 217, *B.V.* 141). (Luftwissen, Vol. 9, No. 5, May, 1942, pp. 136-137.)
134	3133	Germany ...	*Blohm and Voss B.V.* 141, *Unsymmetrical Aircraft.* (R. Vogt, Luftwissen, Vol. 9, No. 5, May, 1942, pp. 138-141.)
135	3134	Germany ...	*Problems of Naval Aircraft.* (H. Ebner, Luftwissen, Vol. 9, No. 5, May, 1942, pp. 142-154.)
136	3137	G.B.	*Avro "Lancaster."* (Flight, Vol. 42, No. 1,750, 9/7/42, pp. 32, 33.
137	3138	G.B.	*De Havilland Flamingo Transport (Photographs).* (Flight, Vol. 42, No. 1,750, 9/7/42, p. 38.)
138	3139	U.S.A. ...	*North American Mitchell B.* 25 *C.* (Flight, Vol. 42, No. 1,750, 9/7/42, p. 40.)
139	3140	U.S.A. ...	*Boston III (Havoc II) Fighter.* (Flight, Vol. 42, No. 1,750, 9/7/42, p. a.)
140	3141	U.S.A. ...	*Hudson V. Bombers.* (Flight, Vol. 42, No. 1,750, 9/7/42, p. b.)
141	3144	G.B.	*Avro "Lancaster" (Photographs).* (Aeroplane, Vol. 41, No. 1,624, 10/7/42, pp. 30-31, 37.)
142	3145	U.S.A. ...	*Grumman Avenger (Photographs).* (Aeroplane, Vol. 41, No. 1,624, 10/7/42, p. 34.)
143	3146	G.B.	*Weapons of Air Warfare—VI (Modern).* (P. Brooke, Aeroplane, Vol. 63, No. 1,624, 10/7/42, pp. 45-45.)
144	3147	Japan ...	*Japanese Army and Navy Aircraft.* (Aeroplane, Vol 63, No. 1,624, 10/7/42, p. 54.)
145	3168	Germany ...	*German Gliders (Gotha Go.* 242 *and D.F.S.* 230). (Airc. Prod., Vol. 4, No. 43, p. 374, May, 1942.)
146	3179	U.S.A. ...	*Plastic-Bonded Trainer Aircraft CT-*6 *A (Geodetic).* (Airc. Prod., Vol. 4, No. 44, p. 412, June, 1942.)
147	3180	U.S.A. ...	*Condor III Troop Carrier.* (Airc. Prod., Vol. 4, No. 44, p. 400, June, 1942.)
148	3186	U.S.A. ...	*Air Power in the Pacific Conflict.* (J. A. Ward, Aero Digest, Vol. 40, No. 5, pp. 54-58, May, 1942.)
149	3193	Germany ...	*Junkers Ju.* 88 *A6 Bomber.* (Aero Digest, Vol. 40, No. 5, pp. 255, 265-266, May, 1942.)
150	3231	Germany ...	*The Development of Modern Weapons as illustrated by the German Infantry Machine Gun MG.* 34. (D. Wunsiedler, W.T.M., Vol. 46, No. 4, pp. 78-83, April, 1942.)
151	3232	U.S.S.R. ...	*Land Fortifications in Soviet Russia.* (D. Grosse, W.T.M., Vol. 46, No. 4, pp. 83-89, April, 1942.)

Aerodynamics and Hydrodynamics.

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
152	*2682	U.S.A.	...	*Theoretical Solution of Profile Drag.* (J. Pretsch, Jahrbuch 1938 der deutschen, L.F.F.) (R.T.P. Translation No. T.M. 1,009.)
153	*2683	U.S.A.	...	*Analytical Theory of the Campini Propulsion System.* (S. Campini, L'Aerotecnica, Vol. 18, No. 1, Jan., 1938.) (R.T.P. Translation T.M. 1,010.)
154	*2684	U.S.A.	...	*Pressure Distribution on Wings in Reversed Flow.* (A. Naumann, Jahrbuch 1938 der Deutschen, L.F.F.) (R.T.P. Translation No. T.M. 1,011.)
155	2770	G.B. ...	...	*Cavitation Erosion of Non-Ferrous Metals and Alloys—Part II.* (J. W. Donaldson, Metal Industry, Vol. 60, No. 24, 12/6/42, pp. 401-403.)
156	2836	G.B. ...	...	*New Model Basins for U.S. Navy (V).* (Engineer, Vol. 173, No. 4,510, 19/6/42, pp. 506-508.)
157	3124	G.B. ...	...	*The Drifting Force of a Ship Among Waves.* (T. H. Havelock, Phil. Mag., Vol. 33, No. 221, pp. 467-475, June, 1942.)
158	3215	Germany	...	*The Potential Flow of Viscous Fluids.* (G. Hamel, Z.A.M.M., Vol. 21, No. 3, pp. 136-139, June, 1941.)
159	3216	Germany	...	*Limiting Curves of Adiabatic Potential Flow (Supersonic).* (W. Tollmien, Z.A.M.M., Vol. 21, No. 3, pp. 140-152, June, 1941.)
160	3217	Germany	...	*Discontinuities in a Moving Continuum.* (W. Kucharski, Z.A.M.M., Vol. 21, No. 3, pp. 152-162, June, 1941.)
161	3221	Germany	...	*On a New Theory of Free Turbulence.* (H. Reichardt, Z.A.M.M., Vol. 21, No. 5, pp. 257-264, Oct., 1941.)
162	3222	Germany	...	*The propagation of Turbulence in a Stream of Heated Air (I).* (W. Schmidt, Z.A.M.M., Vol. 21, No. 5, Oct., 1941, pp. 265-278.)
163	3223	Germany	...	*Influence of Ground Configuration on Flows above the Rotating Earth.* (H. Gortler, Z.A.M.M., Vol. 21, No. 5, pp. 279-303, Oct., 1941.)
164	3225	Germany	...	*The Fundamental Equations of the Ship's Sails.* (H. v. Schulmann, Z.A.M.M., Vol. 21, No. 5, pp. 308-310, Oct., 1941.)
165	3226	Germany	...	*Geometrical Relationships between Two Dimensional Fields of Potential Compressible Flow.* (R. Sauer, Z.A.M.M., Vol. 21, No. 5, pp. 312-315, Oct., 1941.)
166	3227	Germany	..	*Calculation of the Friction and Load Capacity of a Michell Pad of Finite Width on a Flat Sliding Surface (Pad Curvature Considered).* (W. Frossel, Z.A.M.M., Vol. 21, No. 6, pp. 321-340, Dec., 1941.)
167	3228	Germany	...	*The Theory of Adiabetic Compressible Potential Flow (II).* (H. Beerbohm, Z.A.M.M., Vol. 21, No. 6, pp. 341-350, Dec., 1941.)
168	3229	Germany	...	*The Propagation of Turbulence in a Stream of Heated Air (II).* (W. Schmidt, Z.A.M.M., Vol. 21, No. 6, pp. 351-363, Dec., 1941.)

AIRCRAFT, AIRSCREWS AND ACCESSORIES.

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
169	2676	U.S.A. ...	*Air Transport Developments during* 1941. (W. Littlewood, J. Aeron. Sci. (Review Sect.), Vol. 9, No. 6, April, 1942, pp. 9-13.)
170	2681	G.B.	*Thirty Years of Flying (Wilbur Wright Memorial Lecture for* 1942). (Lord Brabazon, Flight, Vol. 41, No. 1,745, 4/6/42, pp. 565-569.)
171	2740	Germany ...	*The Bloch* 800 *(S.O.* 90) *Twin-Engined Mail Aeroplane and the Bloch* 161 *(Four-Engined Commercial Transport Aeroplane).* (Inter. Avia., No. 818, 26/5/42, p. 16.)
172	2741	France ...	*French Gyroplane S.E.* 700. (Inter. Avia., No. 818, 26/5/42, p. 16.)
173	2759	G.B.	*Flying Boat Project.* (J. A. Sizes, Flight, Vol. 41, No. 1,746, 11/6/42, pp. 594-597.)
174	2808	U.S.A. ...	*Light Aeroplane Construction in the U.S.A.* (Inter. Avia., No. 819, 3/6/42, p. 16.)
175	2809	U.S.A. ...	*Air Line Maintenance in the U.S.A.* (Inter. Avia., No. 819, 3/6/42, p. 16.)
176	2810	U.S.A. ...	*Vought Sikorsky V.S.* 44 *Commercial Flying Boat (Photograph).* (Inter. Avia., No. 819, 3/6/42, p. 1.)
177	2903	G.B.	*Aircraft Electrical Wiring, Part II.* (Aircraft Production, Vol. 4, No. 40, February, 1942, pp. 187-189.)
178	2904	G.B.	*Standardised Controls.* (Aircraft Production, Vol. 4, No. 40, February, 1942, pp. 192-194.)
179	2910	G.B. ...	*Gliders to Utilise Plastics.* (Airc. Prod., Vol. 4, No. 40, Feb., 1942, p. 211.)
180	2924	U.S.A. ...	*Boeing* 307*A Stratoliner (Photograph).* (Aeroplane, Vol. 62, No. 1,622, 26/6/42, pp. 720, 733.)
181	2950	G.B.	*The Kort Nozzle System Applied to Marine Propellers.* (A. M. Riddell, Engineering, Vol. 154, No. 3,990, 3/7/42, pp. 18-20.)
182	2991	U.S.A. ...	*Glenn-Martin* 100-*Ton Flying-Boat (Model).* (Aeroplane, Vol. 63, No. 1,623, 3/7/42, p. 26.)
183	3007	U.S.A. ...	*Quality Control of Hollow Steel Blades.* (H. P. Reiber, Aviation, Vol. 41, No. 3, March, 1942, pp. 68-71, 196-197.)
184	3008	U.S.A. ...	*Geometric Airfoil Characteristics.* (C. F. Marshner, Aviation, Vol. 41, No. 3, March, 1942, pp. 73-74.)
185	3009	U.S.A. ...	*Charting Stability in Aircraft (Pt. I).* (C. D. Perkins, Aviation, Vol. 41, No. 3, March, 1942, pp. 75-79.)
186	3013	U.S.A. ...	*Arc Welded Servicing Jack for Aircraft.* (Aviation, Vol. 41, No. 3, March, 1942, p. 89.)
187	3028	U.S.A. ...	*The Seadrome Lighting System.* (W. A. Pennow, Aviation, Vol. 41, No. 3, March, 1942, pp. 144-145 and 303.)
188	*3058	U.S.A. ...	*Stress Analysis of Rings for Monocoque Fuselage.* (N. J. Hoff, J. Aeron. Sci., Vol. 9, No. 7, May, 1942, pp. 245-251.)
189	*3060	U.S.A. ...	*The Design of Rotor Blades.* (R. H. Prewitt, J. Aeron. Sci., Vol. 9, No. 7, May, 1942, pp. 255-260.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
190	3080	U.S.A.	...	*Aeroplane Propeller Balancing.* (M. Merrill, J.S.A.E., Vol. 50, No. 5, p. 46, May, 1942.)
191	3110	France	...	*Makhonine Variable Wing Aircraft.* (Inter. Avia., No. 821, p. 10, 18/6/42.)
192	3109	France	...	*New French Commercial Aircraft S.O. 30 and S.O. 31.* (Inter. Avia., No. 821, p. 9, 18/6/42.)
193	3119	Spain	...	*Hispano Suiza H.S.-34 Trials (Photograph).* (Inter. Avia., No. 821, pp. 15-16, 18/6/42.)
194	3129	U.S.A.	...	*Reconditioning Metal Propellers.* (Am. Av., Vol. 6, No. 1, p. 41, 1/6/42.)
195	3130	U.S.A.	...	*Separate "Maintenance Airports" for Airlines.* (E. J. Foley, Am. Av., Vol. 6, No. 1, pp. 36-38, 1/6/42.)
196	3143	G.B. ...	...	*Air Liner Maintenance.* (H. W. Perry, Flight, Vol. 42, No. 1,750, 9/7/42, pp. 47-49.)
197	3155	G.B. ...	...	*Jablo Airscrew Blades.* (Airc. Prod., Vol. 4, No. 42, pp. 277-282, April, 1942.)
198	3196	U.S.A.	...	*The Martin 100-Ton Aircraft Project.* (G. L. Martin, Aero Digest, Vol. 40, No. 5, pp. 142-150, May, 1942.)
199	3197	U.S.A.	...	*Aircraft Maintenance—II.* (W. E. Koneczny, Aero Digest, Vol. 40, No. 5, pp. 164, 261-264, May, 1942.)
200	3198	U.S.A.	...	*Analysis of Shear Stress in Aircraft Shells.* (J. Meyer, Aero Digest, Vol. 40, No. 5, pp. 170-176, 274-275, May, 1942.)
201	3201	U.S.A.	...	*Predicting Parasite Drag.* (W. N. Hammond, Aero Digest, Vol. 40, No. 5, pp. 224-226, 260, May, 1942.)
202	3202	U.S.A.	...	*Aircraft Weight Data Sheets.* (C. Dorsett, Aero. Digest, Vol. 40, No. 5, pp. 184-187, May, 1942.)

Engines and Accessories.

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
203	2679	G.B. ...	...	*The Vulture 24-Cylinder X Type Engine.* (Flight, Vol. 41, No. 1,745, 4/6/42, p. 557.)
204	2688	G.B. ...	...	*The Rolls-Royce Vulture (24-Cylinder X Type).* (Aeroplane, Vol. 62, No. 1,619, 5/6/42, p. 647.)
205	2720	G.B. ...	...	*The Internal Combustion Engine.* (H. Campbell, Engineer, Vol. 173, No. 4,509, 12/6/42, p. 495.)
206	2745	U.S.A.	...	*Wright 42-Cylinder Engine.* (Inter. Avia., No. 818, 26/5/42, pp. 18-19.)
207	*2803	Germany	...	*B.M.W. 801 Aero Engine (14-Cylinder Twin Row Radial, 1,600 h.p.).* (Inter. Avia., No. 819, 3/6/42, pp. 11-13.)
208	2853	G.B. ...	...	*Metallization of Light Alloy Cylinder Heads.* (Light Metals, Vol. 4, No. 52, May, 1942, pp. 165-166.)
209	2865	G.B. ...	...	*Carburettor Production.* (Autom. Eng., Vol. 32, No. 424, June, 1942, pp. 218-224.)
210	2866	G.B. ...	...	*High Speed Oil Engines.* (Autom. Eng., Vol. 32, No. 424, June, 1942, p. 224.)
211	2867	G.B. ...	...	*Fuel-Injection Nozzle (a New Design).* (C. R. Alden and R. K. Weldy, Autom. Eng., Vol. 32, No. 424, June, 1942, pp. 225-226.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
212	2868	G.B. ...	*The Combustion Turbines.* (Brown-Boveri, Autom. Eng., Vol. 32, No. 424, June, 1942, pp. 227-229.)
213	2870	G.B. ...	*Cylinder Bores (Methods for Reducing Rate of Wear).* (Autom. Eng., Vol. 32, No. 424, June, 1942, p. 236.)
214	2872	G.B. ...	*Aluminium Pistons (Special Casting Alloys).* (Autom. Eng., Vol. 32, No. 424, June, 1942, p. 242.)
215	*2899	Germany ...	*Twin Row Radial B.M.W.* 801 (*R.T.P. Translation No.* 1,519). (Flugsport, Vol. 34, No. 11, 27/5/42, pp. 159-170.)
216	2902	G.B. ...	*The Bristol Hercules (Part I).* (Aircraft Production, Vol. 4, No. 40, J. A. Oates, pp. 176-186, Feb., 1942.)
217	2909	G.B. ...	*Treatment of Piston with Graphite.* (Aircraft Production, Vol. 4, No. 40, February, 1942, p. 211.)
218	2932	U.S.A. ...	*Wear Resistant Coatings for Engine Cylinder Liners (Etching).* (Iro Age, Vol. 147, No. 24, 12/6/41, pp. 62-63.)
219	2944	Switzerland ...	*Sulzer Two-Shaft Opposed Piston Oil Engine.* (Engineer, Vol. 174, No. 4,512, 3/7/42, pp. 15-17.)
220	2958	G.B. ...	*Thrust Calculation in Jet Propulsion.* (R. M. Helsdon, Flight, Vol. 42, No. 1,749, 2/7/42, pp. 22.)
221	*2959	U.S.A. ...	*Piston Rings and Oil Control in Two-Cycle High Output Diesel Engines.* (F. G. Shoemaker and R. Allbright, S.A.E. Preprint, 17-19 June, 1942.)
222	*2960	U.S.A. ...	*Solutions for Diesel Piston Problems.* (F. Zollner, S.A.E. Preprint, 17-19 June, 1942.)
223	*2972	Germany ...	*B.M.W.* 801 *Air-Cooled Radial (Performance Data).* (Inter. Avia., No. 820, 10/6/42, p. 9.)
224	2990	U.S.A. ...	*Exhaust Driven Supercharger on Consolidated Liberator (Photograph).* (Flight, Vol. 41, No. 1,747, 18/6/42, p. 614.)
225	3000	Germany ...	*B.M.W.* 801*A Aero Engine.* (Aeroplane, Vol. 63, No. 1,623, 3/7/42, p. 20.)
226	3010	U.S.A. ...	*"Heli-Coil" Spark Plug Bushing.* (H. Caminez, Aviation, Vol. 41, No. 3, March, 1942, pp. 80-81, 192-195.)
227	3012	U.S.A. ...	*Dynamometers for Testing Engine Ratings.* (P. G. Lessman, Aviation, Vol. 41, No. 3, March, 1942, pp. 87-88.)
228	3014	U.S.A. ...	*Designing for "Ice Free" Induction System.* (Aviation, Vol. 41, No. 3, March, 1942, p. 89.)
229	3035	G.B. ...	*Metallizing Aircraft Engine Cylinder Heads.* (Light Metals, Vol. 4, No. 53, June, 1942, pp. 202-203.)
230	*3044	U.S.A. ...	*Turbines for Power Generation from Industrial Process Gases (Flue Gases, Natural Gas, etc.).* (J. Goldsbury and J. R. Henderson, Trans. A.S.M.E., Vol. 64, No. 4, May, 1942, pp. 287-298.)
231	*3048	U.S.A. ...	*Theoretical Consideration of Power Loss Caused by Combustion Knock.* (C. W. Good, Trans. A.S.M.E., Vol. 64, No. 4, May, 1942, pp. 317-321.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
232	*3049	U.S.A.	...	*Operation of Supercharged Engines in Pipe Line Service*. (J. B. Harshman, Trans. A.S.M.E., Vol. 64, No. 4, May, 1942, pp. 323-329.)
233	*3050	U.S.A.	...	*Pre-Exhaust Gas Pressure Measurements for Indicating Diesel Engine Performance*. (B. H. Jennings and T. E. Jackson, Trans. A.S.M.E., Vol. 64, No. 4, May, 1942, pp. 331-340.)
234	*3051	U.S.A.	...	*Design of Diesel Engine Foundation*. (K. H. Larkin, Trans. A.S.M.E., Vol. 64, No. 4, May, 1942, pp. 341-350.)
235	3053	U.S.A.	...	*Internal Combustion Engine Casualty Experience. (Insurance Statistic of Accidental Breakdown.)* (H. J. Van der Eb, Trans. A.S.M.E., Vol. 64, No. 4, May, 1942, pp. 363-371.)
236	*3054	U.S.A.	...	*Hydraulic Characteristics of Fuel Injection Nozzles*. (O. F. Zahn, Trans. A.S.M.E., Vol. 64, No. 4, May, 1942, pp. 373-377.)
237	*3057	U.S.A.	...	*The Control of Torsional Vibration in Radial Aircraft Engines by Means of Tuned Pendulums*. (V. Moore, J. Aeron. Sci., Vol. 9, No. 7, May, 1942, pp. 229-244.)
238	3072	U.S.A.	...	*Problems of Changing from Aluminium to Cast Iron Pistons (with Discussion)*. (W. S. James, J.S.A.E., Vol. 50, No. 5, pp. 177-187, May, 1942.)
239	*3073	U.S.A.	...	*Light Plane Engines and Their Fuel Problems*. (C. T. Doman, J.S.A.E., Vol. 50, No. 5, pp. 188-195, May, 1942.)
240	3083	G.B. ...	...	*Expanding Pulley Variable-Gear Drive*. (Met. Vick. Techn. News Bull., No. 810, p. 3, 17/4/42. From Mech. World, 10/4/42, pp. 313-315.)
241	3089	G.B. ...	...	*Boost Controls for Aero Engines*. (D. Ramsay, Airc. Eng., pp. 120-122, Vol. 14, No. 159, May, 1942.)
242	3085	G.B. ...	...	*The Skyhi Carmill Spray Gun and Compressor Equipment for Cylinder Protection*. (Aircraft Production, Vol. 4, No. 43, pp. 360-361, May, 1942.)
243	3104	Germany	...	*Modern Developments in Aero Engine Test Benches*. (K. Brode, Luftwissen, Vol. 9, No. 4, pp. 110-117, April, 1942.)
244	3127	U.S.A.	...	*N.A.C.A. Engine Test Cell (Photograph)*. (Am. Av., Vol. 6, No. 1, p. 12, 1/6/42.)
245	3131	Germany	...	*Japanese Aero Engine Construction*. (H. Yoshikawa, Luftwissen, Vol. 9, No. 5, May, 1942, pp. 132-135.)
246	3135	Germany	...	*Modern Aero Engine Test Benches—II*. K. Brode, Luftwissen, Vol. 9, No. 5, May, 1942, pp. 155-163.)
247	3136	Germany	...	*Bearing Lubrication—Definition of Concepts*. (Luftwissen, Vol. 9, No. 5, May, 1942, p. 164.)
248	3160	G.B. ...	...	*The Bristol Hercules (Pt. III)*. (J. H. Oates, Airc. Prod., Vol. 4, No. 42, pp. 303-310, April, 1942.)
249	3177	U.S.A.	...	*Franklin Air-Cooled Engines*. (Airc. Prod., Vol. 4, No. 44, pp. 415-418, June, 1942.)

Fuels and Lubricants.

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
250	2716	U.S.A.	...	*Type Analysis of Hydro Carbon Oils.* (R. M. Deanepley and T. L. Carleton, Ind. and Eng. Chem. (Anal. Ed.), 16/3/42, pp. 220-226.)
251	2732	G.B. ...	...	*Wood Charcoal in Vehicle Gas Producers.* (Engineering, Vol. 153, No. 3,987, 12/6/42, p. 477.)
252	2783	U.S.A.	...	*Substitutes for Lubricating Oils from Petroleum.* (Ind. and Eng. Chem (News Ed.), Vol. 20, No. 7, 10/4/42, pp. 463-464.)
253	2807	France	...	*French Synthetic Fuel.* (Inter. Avia., No. 819, 3/6/42, p. 15.)
254	2837	Sweden	...	*The Motor Fuel Problem in Sweden.* (G. Lindmark, Engineering, Vol. 153, No. 3,988, 19/6/42, pp. 481-483.)
255	2844	G.B. ...	...	*Fuel Technology and the Gas Industry.* (Engineering, Vol. 153, No. 3,988, 19/6/42, pp. 491-492.)
256	*3074	U.S.A.	...	*Changes Occurring in Oils and Engines from Use.* (F. A. Suess and others, J.S.A.E., Vol. 50, No. 5, pp. 196-208, May, 1942.)
257	3099	U.S.A.	...	*Pyrogallol Derivatives as Gasoline Antioxidants.* (W. W. Scheumann, Ind. and Eng. Chem., Vol. 34, No. 4, pp. 485-488, April, 1942.)
258	3183	G.B. ...	...	*Low-Compression Diesel Engine Fuel.* (Airc. Prod., Vol. 4, No. 44, p. 426, June, 1942.)
259	3190	U.S.A.	...	*Aircraft Fuel Line Strainers.* (Aero Digest, Vol. 40, No. 5, p. 290, May, 1942.)
260	3203	U.S.A.	...	*Degreasing Processes.* (J. L. Murphy, Aero Digest, Vol. 40, No. 5, pp. 232, 260, May, 1942.)
261	3210	U.S.A.	...	*Hydraulic Dynamometers for Engine Testing.* (E. L. Cline, Aero Digest, Vol. 40, No. 5, pp. 245-246, 266-269, May, 1942.)
262	3234	Italy ..	..	*On the Water Content of Castor Oil Used for Engine Lubrication.* (V. Cessarini, Atti di Guidonia, No. 64, pp. 5-16, 10/1/42.)

Instruments.

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
263	2708	U.S.A.	...	*An Improved Type of Electrically Driven High Speed Laboratory Centrifuge.* (E. G. Pickels, Rev. Scient. Insts., Vol. 13, No. 3, March, 1942, pp. 93-100.)
264	2710	U.S.A.	...	*An Improved Apparatus for Supersonic Velocity and Absorption Measurements.* (D. Telfair and W. H. Pielemeier, Rev. Scient. Insts., Vol. 13, No. 3, March, 1942, pp. 120-126.)
265	2840	G.B. ...	...	*The "Optigage" Optical Comparator.* (Engineering, Vol. 153, No. 3,988, 19/6/42, p. 486.)
266	2913	G.B. ...	...	*Thermetric Colours.* (Airc. Prod., Vol. 4, No. 40, Feb., 1942, p. 216.)
267	*3052	U.S.A.	...	*Instrumentation for Developing and Testing Diesel Engines.* (C. R. Maxwell and K. M. Brown, Trans. A.S.M.E., Vol. 64, No. 4, May, 1942, pp. 317-361.)
268	3063	G.B. ...	...	*Applications of the Cathode Ray Oscillograph in Industry.* (Wilson, Met. Vick. Tech. News Bull., No. 813, p. 8. From B.E.A.M.A.J., April, 1942, pp. 97-103.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
269	3082	G.B.	*Cathode Ray Oscillograph Applications.* (Wilson, Met. Vick. Tech. News Bull., No. 810, p. 10, 17/4/42. From B.E.A.M.A.J., Feb. and March, 1942, pp. 39-46 and 63-68.)
270	3086	G.B.	*Contour Projector for Inspection of Gauge and Thread Profile.* (Aircraft Production, Vol. 4, No. 43, p. 361, May, 1942.)
271	3093	G.B.	*German Aircraft Instruments.* (F. Postlethwaite, Airc. Eng., Vol. 14, No. 159, pp. 132-135, 137, May, 1942.)
272	3128	U.S.A. ...	*American School of Aircraft Instruments.* (Am. Av., Vol. 6, No. 1, p. 33, 1/6/42.)
273	3172	G.B.	*Optical Surface Gauge.* (B. P. Harrold, Airc. Prod., Vol. 4, No. 43, pp. 358-359, May, 1942.)
274	3235	U.S.A. ...	*Direct Pen Recordng of Galvanometer Deflections.* (D. J. Pompeo, Rev. of Scient. Insts., Vol. 13, No. 5, pp. 218-222, May, 1942.)

MATERIALS AND ELASTICITY.

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
275	2672	G.B.	*The Fine Chemical Industry as a Servant of the Community (Oils, Plastics, etc.), Part II.* (T. H. Durrans, Chem. and Ind., Vol. 61, No. 20, 16/5/42, pp. 219-222.)
276	2673	G.B.	*The Fine Chemical Industry as a Servant of the Community (Dealing with Plastics, Resin, Rubber and Paint), Part I.* (T. H. Durrans, Chem. and Ind., Vol. 61, No. 19, 9/5/42, pp. 211-214.)
277	2674	G.B.	*High Strength Resins (Plastics).* (T. S. Carswell, Chem. and Ind., Vol. 61, No. 19, 9/5/42, p. 214.)
278	2693	G.B.	*The Utilisation of Secondary Light Metals.* (H. G. Warrington, Metal Industry, Vol. 60, No. 20, 15/5/42, pp. 332-333.)
279	2694	G.B.	*The Drawability of Thin Metals.* (T. F. Mika, Metal Industry, Vol. 60, No. 20, 15/5/42, pp. 334-337.)
280	2695	G.B.	*Designing with Magnesium Alloys.* (Metal Industry, Vol. 60, No. 20, 15/5/42, p. 337.)
281	2696	G.B.	*Metallising in Aircraft Maintenance.* (Metal Industry, Vol. 60, No. 20, 15/5/42, p. 338.)
282	2697	G.B.	*The Technique of Heavy Nickel Plating.* (W. M. Tucker, Metal Industry, Vol. 60, No. 20, 15/5/42, pp. 339-340.)
283	2698	G.B.	*High Efficiency Cyanide Copper Bath.* (H. L. Benner and C. J. Wernlund, Metal Industry, Vol. 60, No. 20, 15/5/42, pp. 341-342.)
284	2699	Germany ...	*Germany's Light Metal Output.* (Metal Industry, Vol. 60, No. 20, 15/5/42, p. 342.)
285	2700	G.B.	*Silver in Industry.* (Metal Industry, Vol. 60, No. 21, 22/5/42, p. 347.)
286	2701	G.B.	*Cold-Pressing Properties of Duralumin Type Alloy Sheets.* (J. C. Arrowsmith, Metal Industry, Vol. 60, No. 21, 22/5/42, pp. 348-352.)
287	2702	G.B.	*Properties of Low-Tin Solders.* (G. Murray, Metal Industry, Vol. 60, No. 21, 22/5/42, p. 352.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
288	2703	G.B. ...	*Gravity Die-Casting. A Comparison with Sand Casting.* (G. W. Lowe, Metal Industry, Vol. 60, No. 21, 22/5/42, pp. 353-354.)
289	2704	G.B. ...	*Atmosphere Control in the Heat Treatment of Magnesium Products.* (C. E. Nelson, Metal Industry, Vol. 60, No. 21, 22/5/42, pp. 355-356.)
290	2705	G.B. ...	*Manufacture of Bronze Pigments.* (H. W. Mandle, Metal Industry, Vol. 60, No. 21, 22/5/42, pp. 357-358.)
291	2707	G.B. ...	*The Rapid Determination of Aluminium in Magnesium Alloys by Means of 8-Hydroxyquinoline (Oxine).* (C. H. Wood, Soc. Chem. and Ind., Vol. 61, No. 2, Feb., 1942, pp. 29-31.)
292	2709	U.S.A.	*Stress Analysis and Design of High Speed Angle Centrifuges.* (E. G. Pickels, Rev. Scient. Insts., Vol. 13, No. 3, March, 1942, pp. 101-114.)
293	*2711	G.B. ...	*Some Observations on the Mechanical Testing and Flow Properties of Industrial Plastics.* (E. G. Couzens and W. G. Wearmouth, J. Chem. and Ind., Vol. 61, No. 5, May, 1941, pp. 69-74.)
294	2715	U.S.A.	*Electrolytic Determination of Iron.* (W. H. Armistead, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 3, 16/3/42, pp. 207-209.)
295	*2721	G.B. ...	*Heat-Resisting Steels.* (Engineer, Vol. 173, No. 4,509, 12/6/42, pp. 499-501.)
296	*2723	G.B. ...	*New Bessemer Plant (South African Iron and Steel Corporation).* (Engineer, Vol. 173, No. 4,509, 12/6/42, p. 501.)
297	2724	G.B. ...	*Armour Plate Plant.* (Engineer, Vol. 173, No. 4,509, 12/6/42, p. 501.)
298	2725	G.B. ...	*Raw Materials (New Sources in S. Africa).* (Engineer, Vol. 173, No. 4,509, 12/6/42, pp. 501-502.)
299	2727	U.S.A.	*Why Are We Short of Aluminium?* (H. W. Roberts, Scientific American, Vol. 166, No. 5, May, 1942, pp. 232-234.)
300	2729	G.B. ...	*Vertical Milling Machine.* (Engineering, Vol. 153, No. 3,987, 12/6/42, p. 466.)
301	2730	G.B. ...	*Luminescent Coatings.* (Engineering, Vol. 153, No. 3,987, 12/6/42, p. 466.)
302	2731	G.B. ...	*Canadian Metal Supplies.* (Engineering, Vol. 153, No. 3,987, 12/6/42, p. 472.)
303	2733	G.B. ...	*The Damping Capacity of Engineering Materials.* (W. H. Hatfield and others, Engineering, Vol. 153, No. 3,987, 12/6/42, pp. 478-480.)
304	2746	G.B. ...	*Plastics. Their Origin and Formation (Three Cellulose Plastics cont.).* (Plastics, Vol. 6, No. 61, June, 1942, p. 163.)
305	2747	G.B. ...	*Plastics versus Leather.* (Haydon K. Wood, Plastics, Vol. 6, No. 61, June, 1942, pp. 164-165.)
306	2748	G.B. ...	*Lignin—A Plastic from Wood.* (J. Grant, Plastics, Vol. 6, No. 61, June, 1942, pp. 166-171.)
307	2749	G.B. ...	*Polyvinyl Acetate Adhesives.* (E. E. Halls, Plastics, Vol. 6, No. 61, June, 1942, pp. 183-186.)

https://doi.org/10.1017/S0368393100140659 Published online by Cambridge University Press

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
308	2750	G.B. ...	... *Heating Pans and Thermostatic Control (Prod.).* (Plastics, Vol. 6, No. 61, June, 1942, pp. 190-191.)
309	2751	G.B. ...	... *Plastics Cutting Tools (Prod.).* (Plastics, Vol. 6, No. 61, June, 1942, p. 191.)
310	2753	G.B. ...	... *Resinoids and Other Plastics as Film Formers—VIII. Industrial Synthesis of Styrene.* (B. J. Brajnikoff, Plastics, Vol. 6, No. 61, June, 1942, pp. 193-200.)
311	2756	G.B. ...	... *Aircraft Tyres and Their Characteristics (Wellington and Hampden).* (Flight, Vol. 41, No. 1,746, 11/6/42, pp. a-b.)
312	2757	G.B. ...	... *Non-Priority Materials in Aircraft Construction.* (Flight, Vol. 41, No. 1,746, 11/6/42, pp. 590-591.)
313	2769	G.B. ...	... *Water Power. Its Application to the Production of Metals.* (W. T. Halcrow, Metal Industry, Vol. 60, No. 24, 12/6/42, pp. 398-400.)
314	*2771	G.B. ...	... *Ammonium Stannous Oxalate Plating Baths.* (L. C. Mathers and B. H. Johnson, Metal Industry, Vol. 60, No. 24, 12/6/42, pp. 404-405.)
315	2772	G.B. ...	... *Electrodeposition of Indium.* (V. A. Mullin, Metal Industry, Vol. 60, No. 24, 12/6/42, pp. 405-406.)
316	2773	G.B. ...	... *Etch Films on Magnesium Alloys.* (Metal Industry, Vol. 60, No. 24, 12/6/42, p. 406.)
317	2774	G.B. ...	... *Copper Scrap Scarce.* (Metal Industry, Vol. 60, No. 24, 12/6/42, p. 407.)
318	2775	Canada	... *Canadian Metal Control.* (Metal Industry, Vol. 60, No. 24, 12/6/42, pp. 407-408.)
319	2776	U.S.A.	... *Industrialization of Plast Sponge and Plast Iron.* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 7, 10/4/42, p. 445.)
320	2777	U.S.A.	... *Adjusting the Silicon Content in Gray Cast Iron Production.* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 7, 10/4/42, pp. 445-446.)
321	2778	U.S.A.	... *Research in Steel Technology (Methods in Oxygen Analysis, New Protective Coatings, etc.).* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 7, 10/4/42, p. 446.)
322	2779	U.S.A.	... *Investigations on Coke Oven Light Oil and its Derivatives.* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 7, 10/4/42, pp. 448-449.)
323	2780	U.S.A.	... *Defining the Architecture of Silicon Polymers.* (Ind. and Ind. Chem. (News Ed.), Vol. 20, No. 7, 10/4/42, p. 455.)
324	2781	U.S.A.	... *Novel Plastic Functioning Parts for Meters.* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 7, 10/4/42, p. 455.)
325	2782	U.S.A.	... *Germany Develops Standard Practice for Protection of Magnesium by Paints.* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 7, 10/4/42, p. 463.)
326	2784	U.S.A.	... *Iron and Steel Institute Reports on Protective Coatings.* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 7, 10/4/42, p. 467.)
327	2788	U.S.A.	... *New Synthetic Resin Glue.* (Chem. and Ind. (News Ed.), Vol. 20, No. 8, 25/4/42, p. 529.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
328	2789	U.S.A. ...	*Lithopone as a Luminous Paint.* (Chem. and Ind. (News Ed.), Vol. 20, No. 8, 25/4/42, p. 529.)
329	2790	U.S.A. ...	*Synthetic Resins and Synthetic Rubbers (Chart).* (P. O. Powers, Chem. and Ind. (News Ed.), Vol. 20, No. 8, 25/4/42, pp. 536-538.)
330	2791	U.S.A. ...	*Rust Protection.* (Chem. and Ind. (News Ed.), Vol. 20, No. 8, 25/4/42, p. 560.)
331	2792	U.S.A. ...	*Production of Powdered Chromium (of 99.8 per cent. Purity).* (Chem. and Ind. (News Ed.), Vol. 20, No. 8, 25/4/42, p. 560.)
332	2793	U.S.A. ...	*Electrolytic Process for Tin-Plating Strip Steel.* (Chem. and Ind. (News Ed.), Vol. 20, No. 8, 25/4/42, p. 569.)
333	2794	U.S.A. ...	*Glue Shortage Partially Relieved by Addition of Chemical (Arlex).* (Chem. and Ind. (News Ed.), Vol. 20, No. 8, 25/4/42, p. 570.)
334	2813	G.B. ...	*Synthetic Resins for Surface and Protective Coatings.* (E. A. Bevan, Chem. and Ind., Vol. 61, No. 24, 13/6/42, pp. 261-267.)
335	2821	G.B. ...	*Modulus of Elasticity and Damping Capacity of Iron and Iron Alloys.* (Engineer, Vol. 173, No. 4,510, 19/6/42, pp. 514-515.)
336	2822	G.B. ...	*Soft Solder (B.S.I.).* (Engineer, Vol. 173, No. 4,510, 19/6/42, p. 515.)
337	2823	G.B. ...	*Copper Alloy Ingots and Castings (B.S.I.).* (Engineer, Vol. 173, No. 4,510, 19/6/42, p. 515.)
338	2827	G.B. ...	*Durability of Gears (Lubricants).* (H. D. Mansion, Engineer, Vol. 173, No. 4,510, 19/6/42, pp. 522-524.)
339	2828	G.B. ...	*Insulated Wire-Stripping Device.* (Engineer, Vol. 173, No. 4,510, 19/6/42, p. 524.)
340	2829	G.B. ...	*Substitute Solders.* (Engineer, Vol. 173, No. 4,510, 19/6/42, p. 524.)
341	2830	U.S.A. ...	*The Treatment of Low-Grade Chromite in U.S. (Roasting and Leaching).* (Engineer, Vol. 173, No. 4,510, 19/6/42, p. 525.)
342	2831	G.B. ...	*Control of Aluminium.* (Engineer, Vol. 173, No. 4,510, 19/6/42, p. 525.)
343	2832	G.B. ...	*Silver for Industry.* (Engineer, Vol. 173, No. 4,510, 19/6/42, p. 526.)
344	2833	G.B. ...	*New Electro-Tinning Process.* (Engineer, Vol. 173, No. 4,510, 19/6/42, p. 526.)
345	2834	G.B. ...	*Bauxite Test Drillings.* (Engineer, Vol. 173, No. 4,510, 19/6/42, p. 526.)
346	2835	G.B. ...	*Lubrication of Routing Machines.* (Engineer, Vol. 173, No. 4,510, 19/6/42, p. 526.)
347	2842	G.B. ...	*Heavy "Hicycle" Drill and Reamer.* (Engineering, Vol. 153, No. 3,988, 19/6/42, p. 487.)
348	2843	G.B. ...	*Bibliography on Metal Machining.* (Engineering, Vol. 153, No. 3,988, 19/6/42, p. 487.)
349	2848	G.B. ...	*Economics in Tungsten Steels.* (Engineering, Vol. 153, No. 3,988, 19/6/42, p. 497.)
350	2849	G.B. ...	*The Damping Capacity of Engineering Materials.* (W. H. Hatfield and others, Engineering, Vol. 153, No. 3,988, 19/6/42, pp. 498-500.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
351	2850	G.B.	*Finishing Soldering Iron Bits by Aluminium Spray.* (Light Metals, Vol. 4, No. 52, May, 1942, pp. 145-148.)
352	2851	G.B.	*Corrosion Currents and Cathode Protection of Al.* (Light Metals, Vol. 4, No. 52, May, 1942, pp. 149-155.)
353	2852	G.B.	*Beryllium, Its Economics and Technology.* (W. F. Chubb, Light Metals, Vol. 4, No. 52, May, 1942, pp. 156-164.)
354	2854	G.B.	*Precision Diamond Turning (The Bryant Simons Diamond Turning Lathe).* (Light Metals, Vol. 4, No. 52, May, 1942, p. 167.)
355	2855	G.B.	*Modern Welding Technique (Memoranda Issued by the Advisory Service on Welding, Ministry of Supply).* (Light Metals, Vol. 4, No. 52, May, 1942, p. 168.)
356	2856	G.B.	*Cladding Mg-Cu-Al Alloys.* (Light Metals, Vol. 4, No. 52, May, 1942, p. 169.)
357	2857	G.B.	*Electrolytic Magnesium.* (Light Metals, Vol. 4, No. 52, May, 1942, p. 170.)
358	2858	G.B.	*Electro-Deposition on Spluttered Film.* (Light Metals, Vol. 4, No. 52, May, 1942, p. 170.)
359	2861	G.B.	*Impact Extrusion in Practice.* (Light Metals, Vol. 4, No. 52, May, 1942, pp. 177-184.)
360	2862	Italy/Sweden	*Aluminium Production in Italy and Sweden.* (Light Metals, Vol. 4, No. 52, May, 1942, pp. 185-186.)
361	2864	G.B.	*Machinability of Steels.* (Autom. Eng., Vol. 32, No. 424, June, 1942, p. 236.)
362	2869	G.B.	*The Steelmaker's Viewpoint.* (Donald Taylor, Autom. Eng., Vol. 32, No. 424, June, 1942, pp. 230-234.)
363	2871	G.B.	*Cast Iron (Future Developments and Possibilities in the Automobile Industries).* (Autom. Eng., Vol. 32, No. 424, June, 1942, pp. 237-242.)
364	2874	G.B.	*Spot-Welding Nickel Alloys.* (Autom. Eng., Vol. 32, No. 424, June, 1942, p. 246.)
365	2875	G.B.	*Tyre Wear.* (Autom. Eng., Vol. 32, No. 424, June, 1942, p. 246.)
366	2876	G.B.	*Speedometers (Various Types).* (D. B. Browne, Autom. Eng., Vol. 32, No. 424, June, 1942, pp. 247-249.)
367	2877	G.B.	*Tyre Life.* (Autom. Eng., Vol. 32, No. 424, June, 1942, p. 249.)
368	2878	G.B.	*Current Patents (Oil Coolers, Brake Pumps).* (Autom. Eng., Vol. 32, No. 424, June, 1942, pp. 250-251.)
369	*2879	G.B.	*New Methods for Mechanical Testing of Plastics.* (L. H. Callender, British Plastics, Vol. 13, No. 155, April, 1942, pp. 445-458.)
370	2880	G.B.	*Protecting Cellulose Acetate Against Weather Influences.* (British Plastics, Vol. 13, No. 155, April, 1942, p. 458.)
371	2881	G.B.	*Cast Resin Models for Instructional Purposes.* (British Plastics, Vol. 13, No. 155, April, 1942, pp. 463-464.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
372	2882	G.B.	*Indian Chemical Progress.* (British Plastics, Vol. 13, No. 155, April, 1942, p. 467.)
373	2883	G.B.	*"Preformed" Plastics.* (British Plastics, Vol. 13, No. 155, April, 1942, p. 468.)
374	*2884	G.B.	*A New Insulation Material.* (British Plastics, Vol. 13, No. 155, April, 1942, p. 468.)
375	2885	G.B.	*Synthetic Rubber Production.* (British Plastics, Vol. 13, No. 155, April, 1942, p. 468.)
376	2886	G.B.	*Design of a Urea Resin Plant.* (A. Brothman and A. P. Weber, British Plastics, Vol. 13, No. 155, April, 1942, pp. 473-480.)
377	2887	G.B.	*Thermo-Setting of Phenolic Resins.* (C. A. Redfern, British Plastics, Vol. 13, No. 155, April, 1942, pp. 481-483.)
378	2888	G.B.	*Review of Cellulose Acetate Patents—III.* (V. E. Yarsley, British Plastics, Vol. 13, No. 155, April, 1942, pp. 487-492.)
379	2889	G.B.	*Determination of Phase-Boundaries in Metallurgical Equilibrium Diagrams.* (W. Hume Rothery, Metal Ind., Vol. 60, No. 25, 19/6/42, pp. 412-416.)
380	2890	G.B.	*Explosion Hazards from Powdered Metals.* (Metal Industry, Vol. 60, No. 25, 19/6/42, pp. 416-417.)
381	2891	G.B.	*Gravity Die-Casting—Special Applications.* (G. W. Lawe, Metal Industry, Vol. 60, No. 25, 19/6/42, pp. 418-419.)
382	2892	G.B.	*Manufacture of Magnesium.* (Metal Industry, Vol. 60, No. 25, 19/6/42, pp. 420-421.)
383	2894	G.B.	*Cathodic Protection of Aluminium Equipment.* (Metal Industry, Vol. 60, No. 25, 19/6/42, p. 422.)
384	2895	G.B.	*Industrial Indium.* (Metal Industry, Vol. 60, No. 25, 19/6/42, p. 422.)
385	2908	G.B.	*Magnesium Castings.* (Aircraft Production, Vol. 4, No. 40, February, 1942, pp. 210-211.)
386	2910	G.B.	*Gliders to Utilise Plastics.* (Aircraft Production, Vol. 4, No. 40, February, 1942, p. 211.)
387	2916	G.B.	*Cabin Windows (Pat. No.* 534,761). (Airc. Prod., Vol. 4, No. 40, Feb., 1942, p. 218.)
388	2917	G.B.	*Light Alloy Heat Exchangers (Pat. No.* 533,692). (Airc. Prod., Vol. 4, No. 40, Feb., 1942, p. 218.)
389	2918	G.B.	*Laminated Wood (Pat. No.* 533,369). (Airc. Prod., Vol. 4, No. 40, Feb., 1942, p. 218.)
390	2920	G.B.	*Malleable Beryllium.* (G. E. Claussen and J. W. Skelan, Metal Industry, Vol. 61, No. 1, 3/7/42, pp. 10-12.)
391	2921	G.B.	*Surface Hardness of Metals (Sand Blast Method).* (Metal Industry, Vol. 61, No. 1, 3/7/42, p. 12.)
392	2931	U.S.A. ...	*Tips on Grinding Coolants.* (H. J. Wills, Iron Age, Vol. 147, No. 24, 12/6/41, pp. 60-61.)
393	2942	G.B.	*Non-Metallic Chemical Plant (Stoneware).* (A. E. Williams, Engineer, Vol. 174, No. 4,512, 3/7/42, pp. 5-6.)
394	2947	G.B.	*Research on Refractories.* (Engineering, Vol. 154, No. 3,990, 3/7/42, p. 5.)
395	2948	G.B.	*Fabrication of Steel Girders by Arc Welding.* (Engineering, Vol. 154, No. 3,990, 3/7/42, p. 6.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
396	*2974	Germany ...	*Design of Steel Castings.* (H. Ocking, Stahl und Eisen, Vol. 43, No. 26, 28/6/23, pp. 841-843.)
397	3011	U.S.A. ...	*Synthetic Resin in Construction (Pt. I).* (H. N. Haut, Aviation, Vol. 41, No. 3, March, 1942, pp. 84-85.)
398	3015	U.S.A. ...	*New Type Air-Cooled Welded Tip.* (Aviation, Vol. 41, No. 3, March, 1942, p. 89.)
399	3019	U.S.A. ...	*The "Evertite" Mixing Chamber for Oil Storage Tanks.* (Aviation, Vol. 41, No. 3, March, 1942, p. 97.)
400	3020	U.S.A. ...	*Roxalin Safety Glass.* (Aviation, Vol. 41, No. 3, March, 1942, p. 97.)
401	3021	U.S.A. ...	*Hobart Welders.* (Aviation, Vol. 41, No. 3, March, 1942, p. 105.)
402	3022	U.S.A. ...	*Progressive Welder.* (Aviation, Vol. 41, No. 3, March, 1942, p. 106.)
403	3023	U.S.A. ...	*Keystone Carbon Bearings.* (Aviation, Vol. 41, No. 3, March, 1942, p. 107.)
404	3033	G.B.	*Corrosion of Light Alloys by Tap Water.* (Light Metals, Vol. 4, No. 53, June, 1942, pp. 190-196.)
405	3037	G.B.	*Defects in Al. Alloy Castings.* (Light Metals, Vol. 4, No. 53, June, 1942, pp. 219-222.)
406	3038	G.B.	*Bending Fatigue Strength of Anodized Al.* (Light Metals, Vol. 4, No. 53, June, 1942, pp. 223-224.)
407	3040	G.B.	*Press Forge Joints of Al. Alloy and Steel.* (Light Metals, Vol. 4, No. 53, June, 1942, pp. 230-231.)
408	3041	G.B.	*New Methods for Mechanical Testing of Plastics.* (L. H. Callendar, British Plastics, Vol. 13, No. 156, May, 1942, pp. 506-519.)
409	3042	G.B.	*The Birth of Celluloid.* (R. Schofield, British Plastics, Vol. 13, No. 156, May, 1942, pp. 528-529.)
410	3046	U.S.A. ...	*The Application of the Gerbotol Process to Industry (Recovery of Acid Gases from Gaseous Mixtures by Scrubbing with Amines).* (B. D. Storrs and R. M. Reed, Trans. A.S.M.E., Vol. 64, No. 4, May, 1942, pp. 299-302.)
411	*3047	U.S.A. ...	*Corrosion of Unstressed Steel Specimens and Various Alloys by High Temperature Steam.* (H. L. Solberg and others, Trans. A.S.M.E., Vol. 64, No. 4, May, 1942, pp. 303-316.)
412	*3055	U.S.A. ...	*Progress in Methods of Edge Gluing Lumber and Veneers.* (H. K. von Maltitz and O. Bolling, Trans. A.S.M.E., Vol. 64, No. 4, May, 1942, pp. 387-392.)
413	*3065	U.S.A. ...	*Variation in Shrinking and Swelling of Wood.* (A. J. Stamm and W. K. Loughborough, Trans. A.S.M.E., Vol. 64, No. 4, May, 1942, pp. 379-386.)
414	*3065	G.B.	*Non-Destructive Testing of Metals and Alloys.* (Donaldson, Met. Vick. Tech. News Bull., No. 813, p. 3. From Met. Treat., 1942 (Spring), pp. 2-8.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
415	3067	G.B. ...	... *Vibration of a Thin Vertical Cantilever Caused by a Damped Harmonic Disturbance of the Ground.* (Max Born, J. Inst. Civil Engs., Vol. 17, No. 7, pp. 279-293, June, 1942.)
416	*3068	G.B. ...	... *Effect of Rate of Loading on the Mechanical Properties of Some Materials (Steels, etc.).* (R. Harding Evans, J. Inst. Civil Engs., Vol. 17, No. 7, pp. 296-306, June, 1942.)
417	3069	G.B. ...	... *The Stresses in an Extensile Suspension Cable.* (A. J. Sutton Pippard, J. Inst. Civil Engs., Vol. 17, No. 7, pp. 322-333, June, 1942.)
418	3075	U.S.A.	... *"Scarce" List of Materials in the U.S.A.* (J.S.A.E., Vol. 50, No. 5, p. 26, May, 1942.)
419	3079	U.S.A.	... *The American Rubber Situation.* (P. W. Drew, J.S.A.E., Vol. 50, No. 5, pp. 15-17, May, 1942.)
420	*3081	G.B. ...	... *Crack Sensitivity in Welded Cr Mo Steels.* (Ball, Met. Vick. Tech. News Bull., No. 810, p. 7, 17/4/42. From Iron and Steel, 10/4/42, pp. 233-238.)
421	3091	G.B. ...	... *Torsion in Box Beams.* (J. S. Braybrooke, Airc. Eng., Vol. 14, No. 159, p. 130, May, 1942.)
422	3097	U.S.A.	... *Extraction of Al. from Clay.* (Ind. and Eng. Chem. News Edition, Vol. 20, No. 9, p. 630, 10/5/42.)
423	3098	U.S.A.	... *Tubing of Transparent Plastics.* (Ind. and Eng. Chem. News Edition, Vol. 20, No. 9, p. 632, 10/5/42.)
424	3100	U.S.A.	... *Polysulfide Theory of Accelerator Action during Vulcanization.* (R. E. Morris, Ind. and Eng. Chem., Vol. 34, No. 4, pp. 503-506, April, 1942.)
425	3150	U.S.A.	... *Phase Transition and Elastic Behaviour of High Polymers.* (H. Mark, Ind. and Eng. Chem., Vol. 34, No. 4, pp. 449-454, April, 1942.)
426	3151	U.S.A.	... *Physical Properties of Polyistyrene as Influenced by Temperature.* (T. S. Carswell and others, Ind. and Eng. Chem., Vol. 34, No. 4, pp. 454-457, April, 1942.)
427	3152	U.S.A.	... *Solvents and Plasticizers for Chlorinated Rubber.* (M. R. Radcliffe, Ind. and Eng. Chem., Vol. 34, No. 4, pp. 466-473, April, 1942.)
428	3154	G.B. ...	... *A New Lead-Base Alloy for Soldering.* (Airc Prod., Vol. 4, No. 42, p. 276, April, 1942.)
429	3162	G.B. ...	.... *Resin-Bonded Plywood for Aircraft Construction.* (Airc. Prod., Vol. 4, No. 42, pp. 312-315, April, 1942.)
430	3164	Germany	... *New German Plastic Bearing.* (Airc. Prod., Vol. 4, No. 43, p. 331, May, 1942.)
431	3165	G.B. ...	... *Reflection Proof Glass.* (Airc. Prod., Vol. 4, No. 43, p. 331, May, 1942.)
432	3167	G.B. ...	... *Use of Molydenum in Tool Steel and Alloys instead of Tungsten.* (Airc. Prod., Vol. 4, No. 43, p. 342, May, 1942.)
433	3171	G.B. ...	... *The Advantages of Lanolin Compounds for Rust Prevention.* (E. E. Halls, Airc. Prod., Vol. 4, No. 43, pp. 355-357, May, 1942.)
434	3173	G.B. ...	... *Diamonds for Industrial Purposes.* (Airc. Prod., Vol. 4, No. 43, p. 362, May, 1942.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
435	3185	G.B. ...	... *Inspection of Light Castings.* (F. A. Allen, J Morgan, Airc. Prod., Vol. 4, No. 44, pp. 424-426, June, 1942.)
436	3199	U.S.A.	... *Properties and Uses of Resistoflex.* (W. MacWilliam, Aero Digest, Vol. 40, No. 5, pp. 229, 260, May, 1942.)
437	3205	U.S.A.	... *Substitute for Rubber and Silk.* (E. Engel and J. Steel, Aero Digest, Vol. 40, No. 5, pp. 212-214, May, 1942.)
438	3209	U.S.A.	... *X-Ray Examination of Castings.* (Aero Digest, Vol. 40, No. 5, pp. 209, 357, May, 1942.)
439	3211	G.B. ...	... *Non-Metallic Chemical Plant—II (Utilisation of Glass and Silica).* (A. E. Williams, Engineer, Vol. 174, No. 4,513, pp. 25-27, 10/7/42.)
440	3212	G.B. ...	... *High Speed Tensile Tests.* (Engineer, Vol. 174, No. 4,513, pp. 28-29, 10/7/42.)
441	3218	Japan	... *Stress Systems in an Aeolotropic Rectangular Plate.* (H. Okubo, Z.A.M.M., Vol. 21, No. 3, pp. 162-176, June, 1941.)

PRODUCTION.

442	2675	G.B. ...	... *Statistical Control of Production.* Dr. C. G. Darwin, Nature, Vol. 149, No. 3,786, 23/5/42, pp. 573-575.)
443	2718	G.B. ...	... *Post-War Disposal of Redundant Machinery and Plant.* (D. A. Bremmer, Engineer, Vol. 173, No. 4,509, 12/6/42, pp. 492-493.)
444	2768	G.B. ...	... *Salvage of Metal from Non-Ferrous Residues.* (L. Readman, Metal Industry, Vol. 60, No. 24, 12/6/42, pp. 396-398.)
445	2826	G.B. ...	... *Redundant Machinery After the War.* (Engineer, Vol. 173, No. 4,510, 19/6/42, p. 517.)
446	2839	G.B. ...	... *Water Power and the Production of Metals.* (W. T. Halcrow, Engineering, Vol. 153, No. 3,988, 19/6/42, p. 484.)
447	2847	G.B. ...	... *The Organisation of Industry (Reconstruction).* (Engineering, Vol. 153, No. 3,988, 19/6/42, pp. 496-497.)
448	2859	G.B. ...	... *Bending Light and Ultra-Light Alloy Sheet (Continental Practice).* (Light Metals, Vol. 4, No. 52, May, 1942, pp. 171-174.)
449	2860	G.B. ...	... *Selecting Works Personnel.* (Light Metals, Vol. 4, No. 52, May, 1942, pp. 175-176.)
450	2873	G.B. ...	... *New Plant and Tools (Production Equipment).* (Autom. Eng., Vol. 32, No. 424, June, 1942, pp. 243-246.)
451	2893	G.B. ...	... *Repairing Copper Cable.* (Metal Industry, Vol. 60, No. 25, 19/6/42, p. 421.)
452	2896	G.B. ...	... *Changes in Production.* (Metal Industry, Vol. 60, No. 25, 19/6/42, p. 423.)
453	2897	G.B. ...	... *Factory Ventilation.* (Metal Industry, Vol. 60, No. 25, 19/6/42, p. 424.)
454	2901	G.B. ...	... *Shop Transport.* (Aircraft Production, Vol. 4, No. 40, February, 1942, pp. 172-175.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
455	2905	G.B. ...	... *Directional Flow Production.* (Aircraft Production, Vol. 4, No. 40, February, 1942, pp. 200-204.)
456	2906	G.B. ...	... *New Aircraft Arc-Welder.* (Aircraft Production, Vol. 4, No. 40, February, 1942, pp. 208-209.)
457	2907	G.B. ...	... *Sieray-Dual Lamps for Economical Lighting.* (Aircraft Production, Vol. 4, No. 40, February, 1942, p. 209.)
458	2911	G.B. ...	... *Plastics for Dies.* (Airc. Prod., Vol. 4, No. 40, Feb., 1942, p. 211.)
459	2912	U.S.A.	... *Fabric Attachment (Method Employed by the Bell Aircraft Corp.).* (Airc. Prod., Vol. 4, No. 40, Feb., 1942, p. 214.)
460	2914	U.S.A.	... *Standardised Drawing Office Practice (for American Aircraft Industry).* (Airc. Prod., Vol. 4, No. 40, Feb., 1942, p. 216.)
461	2915	G.B. ...	... *The Dubilier Rivet.* (Airc. Prod., Vol. 4, No. 40, Feb., 1942, p. 217.)
462	2928	U.S.A.	... *Carburization and Decarburization.* (F. A. Locke, Iron Age, Vol. 147, No. 24, 12/6/41, pp. 41-44.)
463	2929	U.S.A.	... *Inspection of Aircraft Components by X-Rays.* (R. C. Woods and T. M. Nolan, Iron Age, Vol. 147, No. 24, 12/6/42, pp. 46-49.)
464	2930	Germany	... *Magnetic Hardness Testing of High Speed Steels.* (H. Springer, Iron Age, Vol. 147, No. 24, 12/6/42, p. 49.)
465	2933	U.S.A.	... *Bell Airacobra Assembly (Photograph).* (Iron Age, Vol. 147, No. 24, 12/6/41, p. 87.)
466	2945	G.B. ...	... *Inspecting Workmen's Passes by Means of Fluorescent Light (Glo-Pass System).* (Engineer, Vol. 174, No. 4,512, 3/7/42, pp. 17-18.)
467	2946	G.B. ...	... *High Speed Steel-Tipped Cutting Tools.* (Engineering, Vol. 154, No. 3,990, 3/7/42, p. 4.)
468	3006	U.S.A.	... *Speeding Up Deep Drawing of Aircraft Parts.* (C. C. Misfeldt, Aviation, Vol. 41, No. 3, March, 1942, pp. 64-65, 203.)
469	3034	U.S.S.R.	... *Production of Al. Powder in Russia by the Flinger Wheel Method.* (Light Metals, Vol. 4, No. 53, June, 1942, pp. 197-201.)
470	3039	G.B. ...	... *New Designs of Holders-on for Light Alloy Sheet Riveting.* (Light Metals, Vol. 4, No. 53, June, 1942, pp. 230-231.)
471	3062	G.B. ...	... *A Survey of Aircraft Resistance Welding Equipment.* (Wood, Weld. Engr., Feb., 1942, pp. 33-37. Met. Vick. Tech. News Bull. 813, p. 2.)
472	3070	G.B. ...	... *Temporary Storage of Structural Steel (Ingenuity Competition of 1941).* (R. Cowan Macdonald, J. Inst. Civil Engs., Vol. 17, No. 7, pp. 333-335, June, 1942.)
473	3071	U.S.A.	... *Engineering Liaison and Production Control (Engines).* (Donald V. Kudlich, J.S.A.E., Vol. 50, No. 5, pp. 169-176, May, 1942.)
474	3076	U.S.A.	... *Spot Welding Speeds Plane Output.* (P. Merriman, J.S.A.E., Vol. 50, No. 5, p. 44, May, 1942.)
475	3077	U.S.A.	... *Women Workers in the Optical Industry.* (E. Phillips, J.S.A.E., Vol. 50, No. 5, p. 44.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
476	3078	U.S.A.	...	*Automatic Technique Used in Plane Production.* (J. Geschelin, J.S.A.E., Vol. 50, No. 5, p. 45, May, 1942.)
477	3084	G.B. ...	...	*Diamond Tools.* (P. Grodzinski, Aircraft Prod., Vol. 4, No. 42, pp. 318-322, April, 1942.)
478	3088	G.B. ...	...	*Ford Salvage Scheme.* (Airc. Prod., Vol. 4, No. 43, p. 366, May, 1942.)
479	3087	G.B. ...	...	*Precision Pipe Bending.* (Airc. Prod., Vol. 4, No. 43, pp. 363-366, May, 1942.)
480	3094	G.B. ...	...	*The Motor Industry and Aircraft Production.* (H. H. Budds, Airc. Eng., Vol. 14, No. 159, pp. 139-140, May, 1942.)
481	3106	Germany	...	*Detachable Metal Sheet Fastening.* (Luftwissen, Vol. 9, No. 4, pp. 120-121, April, 1942.)
482	3107	Germany	...	*Box Spanner with Torque Indicator.* (Luftwissen, Vol. 9, No. 4, p. 122, April, 1942.)
483	3142	G.B. ...	...	*Portable Runways.* (Flight, Vol. 42, No. 1,750, 9/7/42, pp. 41-43.)
484	3153	G.B. ...	...	*Refrigeration for Assembly (Aircraft Engines).* (Airc. Prod., Vol. 4, No. 42, pp. 275-276, April, 1942.)
485	3156	G.B. ...	...	*Underground Factories.* (Airc. Prod., Vol. 4, No. 42, p. 282, April, 1942.)
486	3157	G.B. ...	...	*Large Scale Production of the Bell Airacobra.* (Airc. Prod., Vol. 4, No. 42, p. 283, April, 1942.)
487	3158	G.B. ...	...	*The Spitfire in Production.* (W. E. Goff, Airc. Prod., Vol. 4, No. 42, pp. 284-294, April, 1942.)
488	3159	G.B. ...	..	*Douglas Line Assembly.* (Airc. Prod., Vol. 4, No. 42, p. 297, April, 1942.)
489	3161	G.B. ...	...	*Tube Bending (a Simple Method).* (Airc. Prod., Vol. 4, No. 42, p. 310, April, 1942.)
490	3163	G.B. ...	...	*Efficient Sub-Contracting (Lower Defence Mountings for Bombers).* (F. G. Sheffield, Airc. Prod., Vol. 4, No. 43, pp. 327-331, May, 1942.)
491	3166	G.B. ...	...	*The Spitfire in Production.* (W. E. Goff, Airc. Prod., Vol. 4, No. 43, pp. 332-342, May, 1942.)
492	3169	G.B. ...	...	*Surface Finish.* (Airc. Prod., Vol. 4, No. 43, p. 343, May, 1942.)
493	3170	G.B. ...	...	*Building the Allison Engine.* (Airc. Prod., Vol. 4, No. 43, pp. 348-354, May, 1942.)
494	3174	G.B. ...	...	*Shop Equipment and Small Tools (Cable Markers, Cutter, Grinding, etc.).* (Airc. Prod., Vol. 4, No. 43, p. 362, May, 1942.)
495	3175	G.B. ...	...	*Landing Gear Components on the Halifax.* (Airc. Prod., Vol. 4, No. 44, pp. 379-382, June, 1942.)
496	3176	G.B. ...	...	*Handley Page Halifax (Building Centre Section and Main Planes).* (W. E. Goff, Airc. Prod., Vol. 4, No. 44, pp. 384-393, June, 1942.)
497	3178	G.B. ...	...	*Practical Suggestions for Economy in Use of Tungsten Steels for Tools.* (Airc. Prod., Vol. 4, No. 44, pp. 397-399, June, 1942.)
498	3181	G.B. ...	...	*Flame Hardening (Shorter Process).* (Airc. Prod., Vol. 4, No. 44, pp. 419-423, June, 1942.)
499	3182	G.B. ...	...	*Thread Grinding.* (Airc. Prod., Vol. 4, No. 44, pp. 406-408, June, 1942.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
500	3184	U.S.A. ...	*Fortress II in Production.* (Airc. Prod., Vol. 4, No. 44, June, 1942, pp. 409-412.)
501	3187	U.S.A. ...	*Lofting Problems of Streamline Bodies (VI).* (C. M. Hartley, Aero Digest, Vol. 40, No. 5, pp. 249-250, 271, May, 1942.)
502	3192	U.S.A. ...	*Use of Steel and Wood to Conserve Al. in Aircraft Construction.* (Aero Digest, Vol. 40, No. 5, pp. 127-130, 272-274, May, 1942.)
503	3200	U.S.A. ...	*Controlling Physical Properties of Rivets.* (J. H. Eades, Aero Digest, Vol. 40, No. 5, pp. 179-183, May, 1942.)
504	3204	U.S.A. ...	*Engineering Progress and Cost Control.* (E. E. Roberts, Aero Digest, Vol. 40, No. 5, pp. 188-191, 196, May, 1942.)
505	3206	U.S.A. ...	*Grinding and Setting Metal Turning Cutters.* (Aero Digest, Vol. 40, No. 5, pp. 192-196, May, 1942.)
506	3207	U.S.A. ...	*New Tubular Blind Rivet.* (J. J. Russell, Aero Digest, Vol. 40, No. 5, pp. 239-240, May, 1942.)
507	3208	U.S.A. ...	*Drop Harmonic Method in Aircraft Production.* (C. J. Frey and S. S. Koght, Aero Digest, Vol. 40, No. 5, pp. 199-204, 272, May, 1942.)
508	3213	G.B.	*Production of Uniform Steel for a Light Castings Foundry.* (C. H. Kain and L. W. Sanders, Engineer, Vol. 174, No. 4,513, pp. 38-40, 10/7/42.)
509	3214	G.B.	*Precision Pipe Bending.* (Engineer, Vol. 174, No. 4,513, p. 40, 10/7/42.)

METEOROLOGY, PHYSIOLOGY AND PHYSICS.

510	2754	G.B.	*Stratosphere Flight.* (V. L. Gruberg, Flight, Vol. 41, No. 1,746, 11/6/42, pp. 581-582.)
511	2941	G.B.	*Vapour Trails.* (Flight, Vol. 41, No. 1,748, 25/6/42, p. 652.)
512	2938	U.S.A. ...	*Boeing Altitude Research.* (H. W. Perry, Flight, Vol. 41, No. 1,748, 25/6/42, pp. 641-643.)
513	3031	G.B.	*Electricity of Cloud and Rain.* (J. A. Chalmers, Nature, Vol. 149, No. 3,789, 13/6/42, pp. 659-661.)
514	*3059	U.S.A. ...	*The Problems Inherent in the Protection of Flying Personnel Against Temperature Extremes Encountered in Flight.* (O. O. Benson and E. A. Pinson, J. Aeron. Sci., Vol. 9, No. 7, May, 1942, pp. 252-254.)
515	*3061	U.S.A. ...	*The Ability to See Low Contrasts at Night.* (M. Luckiesh and F. K. Moss, J. Aeron. Sci., Vol. 9, No. 7, May, 1942, pp. 261-263.)
516	*3108	Switzerland ...	*Medical Problem of High Level Flight.* (F. V. Tavel, Inter. Avia., No. 821, pp. 1-7, 18/6/42.)
517	3125	G.B.	*Contact Potentials (Part I, Gen. Principles).* (J. A. Chalmers, Phil. Mag., Vol. 33, No. 221, pp. 399-430, June, 1942.)
518	3191	U.S.A. ...	*Lightning—Its Effects on Aircraft.* (Aero Digest, Vol. 40, No. 5, pp. 122 and 134, May, 1942.)

PHOTOGRAPHY.

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
519	*2706	G.B. ...	... *Spectrographic Analysis (Photographic Aspects of the Internal Standard Method—Part I).* (A. C. Coates, Soc. Chem. and Ind., Vol. 61, No. 2, Feb., 1942, pp. 21-29.)
520	*2712	G.B. ...	... *The Rapid Spectrographic Determination of Minute Amounts of Arsenic, Lead and Copper and Other Heavy Metals in Foodstuff, Colours and Medicinals.* (D. A. Harper and N. Strafford, J. Chem and Ind., Vol. 61, No. 5, May, 1942, pp. 74-77.)
521	*2713	G.B. ...	... *An Iodine Reaction and a Mercury Reaction of Photographic Importance.* (A. Steigman, J Chem. and Ind., Vol. 61, No. 5, May, 1942, pp. 80-84.)
522	2846	G.B. ...	... *Illustrating the Technical Lecture (Photo).* (E. S. Tompkins, Engineering, Vol. 153, No. 3,988, 19/6/42, p. 495.)
523	2949	G.B. ...	... *Typing on Cellophane for Lantern Slides.* (H. E. Dance, Vol. 154, No. 3,990, 3/7/42, p. 15.)
524	3146	———	... *A New Apparatus for Rapid Photographic Spectrophotometry.* (G. E. Davis, Rev. of Scient. Insts., Vol. 13, No. 5, pp. 223-228, May, 1942.)
525	3220	Germany	... *On the Distortion Introduced by Photographing an Original Photograph from Different Angles.* (V. Graf, Z.A.M.M., Vol. 21, No. 3, pp. 183-189, June, 1941.)

SOUND, LIGHT AND HEAT.

526	2752	G.B. ...	... *Infra-Red Drying.* (Plastics, Vol. 6, No. 61, June, 1942, p. 192.)
527	3043	G.B. ...	... *Refrigeration Insulation.* (B. Quarnly, British Plastics, Vol. 13, No. 156, May, 1942, pp. 545-550.)
528	3045	U.S.A.	... *A Method for Estimating the Circulation in Steam Boiler Furnace Circuits.* (A. A. Markson and others, Trans. A.S.M.E., Vol. 64, No. 4, May, 1942, pp. 275-286.)
529	3233	Germany	... *On the Reduction of Aircraft Noise.* (W.T.M., Vol. 46, No. 4, pp. 96-99, April, 1942.)

WIRELESS AND ELECTRICITY.

530	2717	G.B. ...	... *The Control of Voltage Regulations.* (Engineer, Vol. 173, No. 4,509, 12/6/42, pp. 491-492.)
531	2820	G.B. ...	... *Testing High Voltage Circuit Breakers (I).* (C. J. O. Garrard, Engineer, Vol. 173, No. 4,510, 19/6/42, pp. 511-512.)
532	2838	G.B. ...	... *Surge Propagation—III (Electrical).* (T. F. Wall, Engineering, Vol. 153, No. 3,988, 19/6/42, pp. 483-484.)
533	2919	G.B. ...	... *X-Ray Analysis in Industry—Precipitation in the Solid State.* (G. D. Preston, Metal Industry, Vol. 61, No. 1, 3/7/42, pp. 8-9.)
534	3025	U.S.A.	... *Design Problems of Directional Loop Antennas for Aircraft.* (G. F. Levy, Aviation, Vol. 41, No. 3, March, 1942, p. 135.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
535	3026	U.S.A.	...	*Automatic Radio Compass.* (W. L. Webb and others, Aviation, Vol. 41, No. 3, March, 1942, pp. 135, 201-202.)
536	3148	U.S.A.	...	*Design and Development of Three New U.H. Frequency Tubes.* (C. E. Haller, Procs. I.R.E., Vol. 30, No. 1, pp. 20-26, Jan., 1942.)
537	3149	U.S.A.	...	*Radiating System for 75 Megacycle Cone of Silence Marker.* (E. A. Laport, Procs. I.R.E., Vol. 30, No. 1, pp. 26-29, Jan., 1942.)
538	3188	U.S.A.	...	*Airway Radio Standardisation.* (D. S. Little, Aero Digest, Vol. 40, No. 5, pp. 99-100, 269, May, 1942.)
539	3189	U.S.A.	...	*Pitfalls in Radio Orientation.* (R. B. Morse, Aero Digest, Vol. 40, No. 5, pp. 115-116, 269-270, May, 1942.)
540	3195	U.S.A.	...	*Vacuum Antenna Relay.* (Aero Digest, Vol. 40, No. 5, p. 317, May, 1942.)
				TRANSPORT.
541	2841	G.B. ...	...	*Pneumatic Tyres for Commercial Vehicles.* (Engineering, Vol. 153, No. 3,988, 19/6/42, p. 487.)
542	2863	G.B. ...	...	*The Vulcan Six-Ton Chassis (a Long Wheelbase Petrol Engine Vehicle for General Purposes with Forward Control).* (Autom. Eng., Vol. 32, No. 434, June, 1942, pp. 211-217.)
				MISCELLANEOUS.
543	3230	Germany	...	*The Statistical Problem of Correlation Considered as a Variational and Eigenivert Problem and its Connection with Mean Value Calculations.* (H. Gebelein, Z.A.M.M., Vol. 21, No. 6, pp. 364-379, Dec., 1941.)
544	3224	Germany	...	*The Numerical Evaluation of an Equation of the 4th Degree.* (H. Heinrich, Z.A.M.M., Vol. 21, No. 5, pp. 304-307, Oct., 1941.)
545	3219	Germany	...	*Incomplete Anger-Weber Functions.* (P. and E. Brauer, Z.A.M.M., Vol. 21, No. 3, pp. 177-182, June, 1941.)
546	3194	U.S.A.	...	*The Stars in May.* (W. C. Youngclaus, Aero Digest, Vol. 40, No. 5, pp. 132-134, May, 1942.)
547	3103	Germany	...	30 *Years' Work at the D.V.L.* (R. Lucht, Luftwissen, Vol. 9, No. 4, pp. 107-109, April, 1942.)
548	3102	Germany	...	*Details of Prize Offered by the Lilienthal Society for Progress in Aeronautical Sciences.* (Luftwissen, Vol. 9, No. 4, pp. 105-106, April, 1942.)
549	3101	U.S.A.	...	*Particle Size in Relation to Insecticide Efficiency.* (C. S. Smith, Ind. and Eng. Chem., Vol. 34, No. 4, pp. 490-493, April, 1942.)
550	3090	G.B. ...	...	*Annual Meeting of the I.Ae.S. (Review of Papers).* (Alexander Klemin, Airc. Eng., Vol. 14, No. 159, pp. 123-129, May, 1942.)
551	3066	G.B. ...	...	*Aerodrome Abstracts (compiled by Dept. of Scientific Research).* (J. Inst. Civil Engs., Vol. 17, No. 7, pp. 21-30, June, 1942.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
552	3064	G.B. ...	...	*Automatic Monitory Circuit for Air Raid Warning.* (Marx, Met. Vick. Tech. News Bull., No. 813, p. 8. From Electronics, March, 1942, p. 39.)
553	3030	U.S.A.	...	*Review of Papers Presented to the Institute of the Aeronautical Sciences.* (Aviation, Vol. 41, No. 3, March, 1942, pp. 67-68, 204-205.)
554	2961	U.S.A.	...	*10th Annual Meeting of I.Ae.Sc. (Review of Papers Presented). (Preprints available in R.T.P.3.)* (Inter. Avia., No. 820, 18/6/42, pp. 1-3.)
555	2801	G.B. ...	...	*Technical Abstracts and Information Issued by Rolls-Royce, Ltd.* (Vol. 3, No. 6, June, 1942.)
556	2800	G.B. ...	...	*Technical Abstracts Issued by the Aero Engine Dept., Bristol Aeroplane Co.* (Vol. 6, No. 25, 24/6/42.)
557	2799	G.B. ...	...	*Technical Abstracts Issued by the Aero Engine Dept., Bristol Aeroplane Co.* (Vol. 6, No. 24, 17/6/42.)
558	2798	G.B. ...	...	*Rotol Digest.* (Vol. 3, No. 25, 24/6/42.)
559	2797	G.B. ...	...	*Rotol Digest.* (Vol. 3, No. 24, 17/6/42.)
560	2796	G.B. ...	...	*Fuel Research Intelligence Section, Summary of Work for Weeks ending 6th, 13th and 20th June.*
561	2795	U.S.A.	...	*Industrial Development of Synthetic Vitamins.* (R. T. Major, Chem. and Ind. (News Ed.), Vol. 20, No. 8, 25/4/42, pp. 517-523.)
562	2787	G.B. ...	...	*Fuel Research Intelligence Section, Summary of Work for Weeks ending 23rd and 30th May, 1942.*
563	2786	G.B. ...	...	*Abstracts and Information Issued by the Aero Engine Dept., Bristol Aeroplane Co., Ltd.* (Vol. 6, No. 23, 10/6/42.)
564	2714	U.S.A.	...	*Determination of Mixed Aniline Points of Hydro-Carbon Solvents.* (B. H. Shoemaker and J. A. Bolt, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 3, 16/3/42, pp. 200-201.)
565	2722	G.B. ...	...	*Railwaymen on War Work.* (Engineer, Vol. 173, No. 4,509, 12/6/42, p. 501.)
566	2785	G.B. ...	...	*Rotol Digest.* (Vol. 3, No. 23, 10/6/42.)
567	2769	Germany	...	*Physikalische Berichte (Covering Abstracts Nos. 365-556).* (Vol. 23, No. 4, 15/2/42.)
568	2670	Germany	...	*Physikalische Berichte (Covering Abstracts Nos. 557-660).* (Vol. 23, No. 5, 1/3/42.)
569	2671	Germany	...	*Physikalische Berichte (Covering Abstracts Nos. 661-772).* (Vol. 23, No. 6, 15/3/42.)