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The Elliptic Wing Examined on the Basis of the Potential Theory. (K. Krienes, Z.A.M.M., Vol. 20, No. 2, April, 1940, pp. 65-88.) (107/1 Germany.)

The present paper is an extension of the theory of the lifting surface based on a linearised form of the acceleration potential as explained in an earlier paper by Prandtl (Z.A.M.M. Vol. 16, 1936, p. 300). It is assumed that the discontinuity of the potential function corresponding to the jump in pressure at the surface is treated on the basic ellipse and that the stream lines along which the convective integration of the acceleration is carried out are straight lines parallel to the incident flow.

In the case of an elliptic boundary, solutions of the Leplace differential equation can be obtained in the form of products of Lamé functions. These are examined by the author in detail and general expressions are obtained for the lift, moment and downwash for an elliptic surface of given curvature. For numerical calculations, the resulting infinite, series must be terminated after a few terms, depending on the accuracy required. This has only a negligible effect on the accuracy of the lift and moment values, but prevents any general statement on the induced resistance, since the evaluation of the letter necessitates the retention of all the coefficients of the infinite number of potential functions.

If shortened series are employed, the calculated lift distribution does not disappear at the wing tips and the correct distribution has to be estimated graphically.

In the first part of the paper, the investigation is restricted to symmetrical flow along either the major or minor axis of the ellipse. In the second part, oblique flow (*i.e.* side slip) is considered. In each case numerical examples for a flat surface are worked out.

It is interesting to note that the values obtained for the rolling moment under side slip are in good agreement with the experimental value of Hoerner (R.T.P. transl. No. T.M.906) obtained on wings of various plane form. From this it appears that, the rolling moment under these conditions depends mainly on the angle of side slip and the aspect ratio, but that the chord distribution has but a negligible effect.

The case of a circular wing has been treated previously by Kinner, Ing. Arch., Vol. 8, 1937, p. 47. In the case of equality of axes, the elliptical problem reduces to the circular case and the author's expressions for the potential and downwash functions assume the same forms as those employed by Kinner.

Two Dimensional Potential Flow Past an Arbitrary Thick Wing Profile. (F. Keune, Year Book of German Aeronautical Research, 1938, Vol. 1, pp. 36.) (R.T.P. Translation No. T.M. 1,023.) (107/2 Germany.)

The two-dimensioned flow about a very thin profile has been solved satisfactorily by assuring a suitable vortex distribution along the medium line. [Birnbaum and Glauert.] The corresponding case of a thick profile could be attacked by the method of conformal representation. In general, however, the labour involved would be excessive and this method is therefore restricted to certain special shapes (Joukowsky and Kármán-Trefftz classes of profiles). Even then, however, the solution is strictly two-dimensional and cannot be extended to finite aspect ratio, For this reason the author has developed an extension of the Birnbaum method, in which the profile is replaced by a distribution of singularities along the medium line. In the case of a very thin profile, these singularities consist of vortices only. In the case of finite thickness, however, a source distribution is required as well in order to account for the displacement flow. The author shows how the distribution functions for the vortex and source singularities can be obtained for the generalised Kármán-Trefftz profile by including the flow inside the circle undergoing conformal transformation. It appears that only five distinct distribution functions are necessary to obtain a closed streamline conforming to this generalised profile. For each of these functions, the author gives the corresponding induced velocity field so that the resultant effect of the continuation can be easily estimated.

It appears that the effect of profile thickness on the velocity distribution is appreciable over a distance of the order of one chord length from the surface.

It is generally a simple matter to approximate any given profile by a corresponding K.T. shape and the author also gives a method for estimating the error involved in any given case. The generalised problem of a thick section may then be considered as solved. The converse problem of determining a profile contour satisfying a given singularity distribution is also discussed.

Application of the Hodograph Method to the Flow of a Compressible Fluid Past a Circular Cylinder. (K. Tamada, Proc. of the Physico-Mathematical Society of Japan, Vol. 22, No. 3, March, 1940, pp. 208-219.) (107/3 Japan.)

The two-dimensional subsonic flow of a compressible fluid past a nearly elliptic cylinder at zero angle of attack has already been solved by Tsien using the Hodograph method (J. Aeron. Sci., Vol. 6, 1939, pp. 399-407). The case of a circular cylinder has also been treated by the method of successive approximations. the well known solution for the incompressible fluid being used as a starting point. In the present paper, the Hodograph method is also applied to this problem, on the assumption that the fluid obeys a law of the form

$$p_o - p = c_o^2 \rho_o^2 (v - v_o)$$

instead of the true adiabatic pv^8=constant. (c_0=velocity of sound under conditions p_0, v_0.)

Substituting this equation in the generalised Bernoulli equation, both the velocity potential ϕ and the stream function ψ can be expressed in terms of two new independent variables, q and β

where $q = \text{velocity} = \sqrt{(u^2 + v^2)}$.
β = inclination of q with x axis.

This is the basis of the Hodograph method as already employed in the earlier paper of Tsien mentioned above and by its means it is possible to transform the incompressible field of flow round a circular cylinder of radius a into the compressible flow round a slightly smaller cylinder which is now no longer truly circular. The deformation depends on the Mach Number of the undisturbed flow and for $M = .4$, the deformed cylinder approximates closely to a circle of radius $.942\ a$.

For this Mach number, the author has calculated the velocity distribution an compared it with that obtained by the second approximation of the iteration method as well as with the experimental distribution obtained by Taylor using the electric tank. The comparison is satisfactory.

It should specially be noted that the critical value of the Mach Number (local speed of sound first attained in the field of flow) is given very accurately by the Hodograph method (for a circular cylinder $M_c = .4$)

New Horton High Altitude Glider of the Flying Wing Type with Parabolic Wings. (G. Horton, Flugsport, Vol. 34, No. 23, 11/11/42, pp. 341-345.) (107/4 Germany.)

High altitude gliders intended to make use of uprising thermal currents must be very manœuvrable and capable of very tight turns so as to make full use of meteorological conditions. Now a turn is liable to produce tip stalling and thus a loss of control of the glider and the danger of this is obviously the greater, the larger the span. A small span on the other hand will increase the surface loading and thus increase the radius of turn for the same altitude of the machine. Evidently the best span is a matter of compromise and according to the author, a span of 12 in. represents the optimum. By keeping the aspect ratio very low, the rate of descent will not be appreciably affected, although the induced drag under those conditions will necessarily be high, unless a very favourable lift distribution exists along the wing. According to the author, such a distribution exists along a crescent shaped wing with parabolic leading and trailing edges and this shape has accordingly been adopted in the new Horton high altitude "flying wing" glider.

The machine has a span of 12 m., wing area 33 m², aspect ratio 4.3 and an empty weight of only 90 Kg. This corresponds to a surface loading of 51 Kg/m², assuming a weight of pilot of 80 Kg.

Radius of turn at lift coefficient $C_a = 1$ and 30° bank=9.6 m. Gliding ratio 19. Same details of the method of construction are given.

The central section (2.4 m. width) incorporates a tubular steel frame. The outer wings are built entirely of wood and the whole surface is covered in plywood, varying in thickness from .6 to 1.0 mm.

The controls resemble that of a previous flying wing design (Horton III) with the exception that the external flaps can be split by pedal control for neutralising the yawing moment.

Drag Reduction at High Speed by Inducing Supersonic Vibrations of the Surface. (*Pat. Series* 41, *No.* 726,324.) (Messerschmitt, Flugsport, Vol. 34, No. 23, 11/11/42, pp. 165-166.) (107/5 Germany.)

The object of the invention is to prevent steady flow conditions at the surface since, according to the inventor, such flow conditions are accompanied by greater friction than if the flow is unsteady. At the same time, surface roughness is much less important as regards drag if the flow is unsteady. In order to produce unsteady flow at the surface, the inventor proposes to subject the latter to vibrations of a very high frequency (supersonic) either by interposing struts of magnetic strictive material subjected to a high frequency electromagnetic field or using a piezo electric oscillator.

It is stated that the oscillations need not be induced all over the surface but may be restricted to such portions which, on account of their shape, roughness or high relative wind normally experiences a large drag increase.

Locking Device for Aircraft Control Surfaces. (*Pat. Series* 41, *No.* 726,207.) (Fieseler, Flugsport, Vol. 34, No. 23, 11/11/42, p. 167.) (107/6 Germany.)

Locking device for aircraft control surfaces consisting of a locking pin inserted in a corresponding hole of the surface, characterised by the fact that the pin is attached to the end of cylindrical corrugated metal box contained inside a cylindrical fixed guide. On subjecting the box to hydraulic pressure, the pin is projected into the corresponding hole of the control surface causing a positive lock. On relieving the pressure, the elasticity of the box withdraws the pin automatically inside the fixed guide, which is provided for this purpose with a rubber gland.

Installation of Fixed Guns Inside the Wing Root Attachment. (*Pat. Series* 41, *No.* 726,326.) (Heinkel, Flugsport, Vol. 34, No. 23, 11/11/42, p. 186.) (107/7 Germany.)

Gun installations inside wing root attachment characterised by the fact that the fixed axis of the gun is in the plan of separation between outer and central wing.

The weapon may pass through openings in the wing fittings or be rigidly attached to such fittings.

Spoiler Flaps (Combined with Air Injector). (*Pat. No.* 725,194.) (A.V.A. Goettingen, Flugsport, Vol. 34, No. 22, 28/10/42, Patent Series No. 40, p. 162.) (107/8 Germany.)

The spoiler is hinged at its lower end and in the retracted (or folded) position closely conforms to the wing contour. Holes are provided near the hinged end of the flap which register with an interval cavity in the wing through which warm air can be ejected, thus preventing icing up.

When the spoiler is in the operative position (almost perpendicular to the relative wind) the air ejected from the wing enters the dead angle formed between flap and wing and this together with the ventilation through the holes mentioned above increases the spoiler effect of the flap.

Application of Rotors to Air or Marine Craft. (*Pat. No.* 724,796.) (Holst, Flugsport, Vol. 34, No. 22, 28/10/42, Patent Series No. 40, p. 162.) (107/9 Germany.)

The so-called " Magnus " effect of a rotating cylinder is well known. The inventor claims that equally high lateral forces can be obtained by rotating an aerofoil about its longitudinal axis. The subject of the patent is to provide the main wing of an aircraft with tip sections which can rotate about a longitudinal axis and thus produce large aerodynamic forces (the outer end of the tip being provided with an end plate).

The tip is rotated either by an independent power supply or auto-rotation can be produced by proper choice of axis of rotation. Apart from this auto-rotation a further advantage of using aerofoil instead of circular sections for the rotor elements lies in the fact that the stationary rotor will develop some lift in the latter case. A stationary cylinder on the other hand exerts drag only.

Problem of Two-Stroke Engine Design with Special Reference to Continued Reciprocating and Rotation of the Piston. (R. Mertz, A.T.Z., Vol. 45, No. 6, 25/3/42, pp. 149-156.) (107/11 Germany.)

As is well known the fundamental problem of high performance two-stroke design is to provide adequate port area and suitable unsymmetrical valve timing for scavenging and supercharging. The opposed piston design has so far held the field, but is rather cumbersome. Other solutions necessitate the provision of sleeve or rotary valves and attempts have also been made to modify the normal poppet valve gear of the four-stroke for this purpose.

All these designs are rather complicated and for this reason the author suggests an alternative solution in which the unsymmetrical valve diagram is obtained without the provision of any additional governing device by imparting an oscillatory rotary motion to the piston. This can be achieved theoretically in a simple manner by departing from the orthodox crankshaft construction and adopting a crankpin which, whilst still in the same plane as the crankshaft axis, is now inclined to the latter. The crank throw thus resembles a right angled triangle rotating about its base and if the connecting rod is linked to a sleeve on the throw, rotation of the shaft is accompanied by a rotary motion of the piston which is superimposed on its reciprocation. In the case of an infinitely long connecting rod, the maximum angle of rotation of the piston on either side of the mean position is equal to the angle of slope of the crankpin and recurs when the crank throw is at right angles to the dead centre position.

The author obtains expressions for the angular displacement, velocity and acceleration of the piston as a function of crankshaft displacement and angle of slope of pin and concludes that the corresponding inertia loads can be kept small.

The new method of control is then applied to a standard three-port crank-scavenging engine in which the top of the piston controls the exhaust and scavenging ports whilst the inlet to the crankcase is controlled by the piston skirt. By cutting the piston crown at various angles it is possible to obtain a variety of unsymmetrical timings for a given angle of slope of the pin. This is shown in the following table:—

Crank pin slope, 30°.
Connecting rod crank ratio, $\frac{1}{4}$ or 1 : 4.
Stroke bore ratio, 1.0.

Piston crown slope.	$Q_1 = 20°$ $Q_2 = -20°$	$Q_1 = 30°$ $Q_2 = -30°$	$Q_1 = 30°$ $Q_2 = -20°$	$Q_1 = 20°$ $Q_2 = -30°$
Exhaust opens	65° b. B.D.C.	65° b. B.D.C.	65° b. B.D.C.	65° b. B.D.C.
Exhaust closes	43° a. ,,	29° a. ,,	29° a. ,,	43° a. ,,
Scavenge opens	43° b. ,,	43° b. ,,	43° b. ,,	43° b. ,,
Scavenge closes	65° a. ,,	79° a. ,,	65° a. ,,	79° a. ,,

It will be noted that four different timings are obtainable with only two different piston slopes. The available port areas compare favourably with those obtained in an opposed piston design.

Note.—The article gives no details concerning the method of attachment of connecting rod to a sloping crank pin.

Twin-Engined High Speed Experimental Aircraft, Arsenal V.G. 50. (Inter. Avia., No. 841-842, 31/10/42, p. 29.) (107/12 France.)

The engines (Hispano 12Y) are mounted exactly in line, the extension shaft of the rear engine lying on a support normally provided for the engine cannon mounted on the front engine. This shaft is connected to the rear engine via a special elastic coupling which incorporates an intermediate shaft and is designed to deal with the axial deflections unavoidably associated with this type of engine installation. Preliminary flight tests are stated to be primarily concerned with the testing of this novel form of transmission.

Four-Bank Six-Cylinder Radial Engine with Crank Throws in One Plane. (*Pat. Series* 41, *No.* 711,137.) (Junkers, Flugsport, Vol. 34, No. 23, 11/11/42, p. 346.) (107/13 Germany.)

The proposed radial design consists of four banks of six cylinders each placed immediately behind each other, each bank having the usual master rod assembly working on a single throw of the four-throw crankshaft.

The crankshaft resembles an ordinary four cylinder layout, with all the cranks in one plane. Starting at the front, with the first crank pointing, for example, downwards, crank two and three would point up and crank four down. The first and second bank form a group with opposed cylinders firing simultaneously. After two consecutive explosions of this type, the cylinders in banks three and four forming group two take over in a similar manner, ignition thus alternating between group one and group two.

The simultaneous ignition of opposed cylinders reduces the load on the crankshaft bearings and this facilitates a very compact construction.

Production Testing Facilities of Allison Division of General Motors. (H. J. Buttner, S.A.E.J., Vol. 50, No. 10, Oct., 1942.) (107/14 U.S.A.)

Design features discussed include general building arrangement and construction, engine stands and mounts, operational equipment, temperature regulating equipment, plumbing, filters, weighing equipment, instrumentation and sound treatment.

The mount problem is discussed from the standpoint of design, vibration, and endurance operation. Methods for straightening air in U-shaped test cells are touched upon.

Layout of heat exchangers emphasizes rapid warm-up and economical water usage. Temperature control of glycol and oil is obtained by by-passing coolers. The plumbing is designed for ease and disassembly and cleaning. Full-flow filters have proved worth while in the oil system. Fuel measurement is obtained both by weight and by rotameters.

The operator's control layout is illustrated and discussed.

Sound-absorption problems are noted, and sound-absorption tests are illustrated.

Oxidation Characteristics of Lubricating Oils (Stability and Chemical Composition). (G. H. von Fuchs and H. Diamond, Ind. and Eng. Chem., Vol. 34, No. 8, Aug., 1942, pp. 927-937.) (107/15 U.S.A.)

For purposes of fundamental investigation, the oxygen-absorption measurement was chosen since it can be performed with precision and is probably the best single criterion of total deterioration. Measurements of this type are well adapted to kinetic interpretation, as the primary process in the oxidation of an oil is one involving oxygen regardless of the products which are eventually formed. On the other hand, sludge formation, for example, though a major problem in lubrication, does not indicate other phenomena which occur. Thus, a white oil may be oxidized until it contains large quantities of acids but without the formation of any insoluble products. Similary, changes in viscosity may be due to many causes. Furthermore, as discussed below, oxygen-absorption measurements properly applied and interpreted can furnish a means for evaluating stability which is more suitable than the customary routine tests from the viewpoint of actual service performance.

Analysis of rate curves obtained by measurement of oxygen absorption using a special magnetically operated pump has elucidated the effect of basic composition, methods of processing, and addition agents on the stability of oils. Oxidation characteristics are strongly influenced by interaction phenomena between different types of components. Saturated hydrocarbons in an oil have a tendency to rapid auto-catalytic oxidation, whereas aromatic compounds act as antioxidants by a mechanism of autoretardation. The balance between these opposing effects is strongly dependent on the reaction temperature. Under given conditions of temperature and metal catalysis, maximum stability is observed at an intermediate (optimum) aromaticity. The phenomenon of autoretardation is differentiated from conventional inhibitor action.

Reactions involved in the formation of saponifiable material (free, combined, and potential acids) may account for most of the oxygen absorbed by an oil. Results of the laboratory oxidation experiments have shown good correlation with oil deterioration and lacquer deposition in small-scale engine tests.

It is believed that laboratory oxidation experiments can be correlated with general rate of deterioration of oil in an engine, but agreement with the appearance of an engine cannot always be expected. For example, an unstable white oil may form abundant quantities of soluble oxidation products and yet deposit no sludge or lacquer; on the other hand, a heavy asphaltic aromatic could conceivably act as a powerful retardant but yet be so slightly soluble that its oxidation products tend to be precipitated readily. The fact that the S.A.E. No. 20 motor oil containing bright stock gave a cleaner engine than the corresponding neutral (Figure 10), in spite of such possible effects, strongly indicates that the intrinsic oxidation stability of oils is one of the important factors which determine engine performance. It is thus clear that oxygen-absorption measurements can yield information of practical as well as theoretical significance if the data are interpreted with care. Still greater confidence in work of this type will doubtless be developed as further laboratory and service data are accumulated.

The Testing of Heavy Duty Oils (with Discussion). (H. C. Mougey and J. A. Moller, S.A.E.J., Vol. 50, No. 10, Oct., 1942, pp. 417-438.) (107/16 U.S.A.)

Principal conclusions:—

1. By means of carefully controlled operating conditions, production multicylinder engines can be used, in conjunction with a series of standard test oils, to give a test pattern for these oils which are reproducible themselves, and which will coincide with the results obtained on these oils in service in so far as corrosion and oxidation resistance characteristics are concerned.

2. The description and specification of heavy-duty motor oils of known and unknown performance for oxidation and corrosion characteristics are, for the moment at least, most easily achieved by describing this oil in terms of a reference oil test pattern;

3. The 36-Hr. Oxidation Test Procedure (see Table 5, Appendix) is a satisfactory method for the evaluation of oils for heavy-duty service with respect to their oxidation and corrosion characteristics only; and an additional test procedure, such as the Caterpillar Test series, is required to measure certain other properties, such as resistance to ring sticking, resistance to port clogging, resistance to piston scuffing and cylinder scratching, and so on;

4. Therefore, by means of the 36-Hr. Test Procedure and the Caterpillar Test Series, a heavy-duty motor oil may be evaluated for most of the important characteristics; however, valve sticking, winter sludge, and other undesirable characteristics are not necessarily evaluated by these tests and, if these factors become important, a separate study will have to be made for their evaluation;

5. From the point of view of the engine manufacturer, not only can unknown oils be evaluated by means of the known reference test oil pattern, but so can engines of present and future designs; the severity of the conditions which the engine imposes on the oil may also be evaluated for the declared drain time;

6. To make these test procedures practical, an Engine Test Committee must continuously, and continually, follow the progress in both engine and oil design so that, once such a test procedure and description have been decided upon and accepted, changes such as must necessarily be demanded by progress shall be made only with the consent and approval of all those affected by such changes.

The Role of Surface Chemistry and Profile in Boundary Lubrication. (J. T. Burwell, S.A.E.J., Vol. 50, No. 10, Oct., 1942, pp. 450-457.) (107/17 U.S.A.)

Both the geometry and the chemistry of bearing surfaces have a marked effect on performance under conditions of boundary lubrication and the salient features of these factors are discussed in this paper.

It is pointed out that the average surface slope should be specified in addition to the root-mean-square roughness in grading surfaces for lubrication performance. The presence of loose material or " fuzz " on all commercially finished surfaces is noted.

Data are presented to show that one function of addition agents in oils is to mitigate the bad effect of poor surface finish. The affinity of lubricants for metal surfaces is discussed, and methods for experimentally measuring this property are outlined, together with results.

It is shown that a high affinity of " wettability " is a necessary but not a sufficient condition for a good boundary lubricant. Its molecules should also have the proper structure and the lubricant should contain a surface-active addition agent in adequate concentrations.

1941 *C.F.R. Road Detonation Tests.* (J. M. Campbell and others, S.A.E.J., Vol. 50, No. 10, Oct., 1942, pp. 458-464.) (107/18 U.S.A.)

The co-operative road tests carried out during 1941 have added considerable information and experience to that already existing on the subject of road detonation testing.

Extensive data were obtained on the fuel requirements of the 1940 and 1941 models of the three most popular cars. Corresponding data were obtained on the knocking characteristics of current gasolines representing the bulk of the sales volume in various parts of the United States.

On account of large variations in octane-number requirement among different cars of the same make—due to differences in ignition timing, combustion-chamber deposit, and other causes—and on account of variations in commercial gasolines, it has been necessary to use statistical methods of analysis in the appraisal of fuel and engine relationships.

These methods of analysis have been applied in a number of ways, and have proved very useful. For this reason, the continuance of co-operative activity in compiling current statistical information annually on fuels and car requirements is recommended.

Determination of Graphite in Pig and Cast Iron (Digest). (E. Drapschlag, Stahl und Eisen, Vol. 62, No. 15, 9/4/42, pp. 315-316.) (107/19 Germany.)

As is well known, graphite determinations are subject to a certain amount of error partly due to the method of sampling. The iron to be analysed is often of slightly variable composition and the answer may depend on the position of the drilling for the powdered specimen. The subsequent gravimetric analysis for graphite depends on the insolubility of the latter in nitric acid. Now graphite may be produced in the original iron by the decomposition of iron carbide during the solidification stage and since this is quite a lengthy process the carbon deposited may range over a series of forms intermediate between amorphous carbon and true graphite. We cannot therefore expect a sharp differentiation in solubility and the answer will depend to some extent on the concentration of the nitric acid employed. The author shows that the graphite will indeed be partially oxidised if the acid is above a certain limiting concentration. It appears that the effect depends on the total surface of the graphite particles and this can be used as a method of grading the iron if a metallographic estimate of the total number of carbon particles is available.

The Absolute and Practical Creep Strength and Their Relation to Fatigue Strength. (V. Dehlinger, Z.f. Metallk., Vol. 32, No. 6, June, 1940, pp. 199-200.) (107/20 Germany.)

The absolute creep strength is defined as the limiting load under which a material, after an initial extension, comes to rest, *i.e.*, no further extension takes place with time.

Similarly the absolute fatigue strength is the variable stress which can be supported indefinitely, *i.e.* for an infinite number of cycles.

Both these factors cannot be determined directly with any accuracy and are replaced in engineering by their " practical " equivalents. The practical creep strength is defined as the limiting load which during a 10 hour period between the 25th and 35th hour of load application does not produce an average extension exceeding 10^{-3} per cent. per hour. Similarly the fatigue strength is the limiting stress corresponding to a life of 10^6 or 10^7 load cycles.

Now whilst at relatively low temperatures, the practical fatigue strength as defined above approximates to the time value (asymptote to the Wohler curve) it appears that the practical creep strength as obtained by short time tests is quite useless in determining the ultimate load capacity of a material. The author has investigated this problem theoretically and concludes that in those cases where a true creep limit exists (recrystallisation avoided) the value will coincide with the practical fatigue strength for repeated loads (no stress reversal) as given by the horizontal portion of the fatigue temperature characteristic of the material. If such a horizontal portion (covering the lower temperature range) does not exist, the material has a zero value for the true creep limit.

The author replots some experimental values on this basis and shows that in general the practical creep strength will intersect the fatigue strength curve, both being plotted on a temperature basis. At low temperatures, the practical creep strength is considerably higher than the fatigue strength; the reverse holding after the cross-over. In conclusion, the author recommends that in future the practical creep strength be dropped as a criterion of the meterial and replaced by the temperature characteristics of the fatigue curve (repeated loads, 10^6 cycles).

Replacement of Rubber by Thermo-Plastic for Electric Cable Insulation (Polyvinychloride). (H. Beck, Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, pp. 629-632.) (107/21 Germany.)

Up to quite recently, rubber was used almost exclusively for electric cable insulation, the unvulcanised rubber mixture being applied either in the form of strips subsequently sealed by pressure (giving rise to longitudinal seams) or the mixture was squirted on to the wire by means of a nozzle through which the wire passed continuously. In each case the rubber has to be vulcanised subsequently.

With the advent of thermo plastic (igelite) attempts were soon made to utilise such substance for covering wire by the nozzle process. Whilst, however, the rubber mixture can be extruded at room temperature, the plastic requires a temperature of 160-180° C. to ensure satisfactory flow conditions.

The author describes early attempts to apply the necessary heat by means of steam or hot oil leading up to zoned electrical heating.

Although great advances have been achieved, a really satisfactory design suitable for mass production does not yet seem to have been evolved, although covering rates of the order of 20 m/min. for a wire of 2.5 mm² cross-section have been achieved. The chief difficulty appears to be the correct centering of the wire in the die.

The author's proposals for overcoming this trouble are described in detail.

It is stated that some of the improvements in nozzle design brought about mainly in an attempt to utilise thermoplastics have been adopted in the standard rubber covering process, leading to a great increase in the rate of work.

Speeding Up Production by Rapid Supply and Withdrawal of Goods in the Machine Shop. (Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, p. 632.) (107/22 Germany.)

It is most uneconomical to use the workshop travelling crane for supplying machine tools with light or medium weight articles. For this purpose special jib cranes should always be installed, capable of feeding several machine tools. These cranes are operated electrically and provided with high and low speed drives. Special machine tools handling bulky articles are best fitted with individual conveyers. In this connection attention is called to the possibility of mounting the tool in a pit so that the goods can be installed with greater ease. A lathe for machining wheel assemblies (railway trucks) embodying this feature is illustrated.

The Strength of Gear Wheels Made of Laminated Plastics. (Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, p. 638.) (Digest.) (107/23 Germany.)

The report covers investigations on the strength of individual teeth of gear wheels manufactured either from a plastic with fabric filler (coarse or fine) or from plastic bonded and compressed wood. All the wheels examined had a pitch circle of 159 mm., thickness 50 mm., and were provided with a central hole of 75 mm. The tooth modulus varied from 3 to 7.

The following average results were obtained:—

	Bending Strength.	Bending Fatigue (10^7 reversals).	Impact Strength.
Plastic with fabric filler (coarse)	1360 Kg./cm.^{2}	400 Kg./cm.^{2}	17-31 Kg. cm./cm.^{2}
Ditto (fine)	1588 ,,	—	—
Bonded wood	1785 ,,	800 ,,	55-160 ,,

It appears that the bending strength is independent of the tooth modulus. The value given for the bending fatigue apply for tooth modulus of 5 and 7. A smaller modulus (3°) gives apparently lower values.

In the case of impact strength, there is a marked effect of the tooth modulus, the values increasing with the latter. The figures given for the bonded wood are for a tooth modulus of 7 and the large range of experimental value will be noted.

A Practical Method of Allowance for Shear Lag. (J. S. Coutinho, J. Aeron. Sci., Vol. 9, No. 12, Oct., 1942, pp. 471-477.) (107/24 U.S.A.)

The calculation of stresses in a semi-monocoque cantilever wing is discussed from an engineering-office point of view.

The influence of various factors on the stress distribution in thin-walled structures is considered, especially the effects of shear lag for which a simple empirical method of allowance is suggested. The use of the method is illustrated in the example of a box-beam wing, and the results of the calculations are checked by stress measurements on a full-size test specimen.

The curves of stress distribution calculated according to the suggested method follow the shape of the measured stress distribution curves considerably better than the curves calculated by the standard method. By a better choice of the efficiency curves, the exact shape of the measured curve could be reproduced.

It is expected that a man of good judgment will be able, with some experience, to estimate effective areas and efficiency curves with reasonable accuracy, so that this method can be of considerable value in the practical design of efficient metal aircraft structures.

It is, however, highly desirable that reliable methods of estimating effective areas and efficiency curves be developed.

Weight per Foot Run of Circular and Hexagon Wires. (Hutte, Vol. 1, p. 815.) (107/25 Germany.)

If D = diameter of circular wire (in.).
d = distance between opposite flat faces of the hexagon (in.).

Volume of wire per foot run = $9.426\ D^2$ cubic inches (circular) or $10.392\ d^2$ cubic inches (hexagon).

The following table gives average density values γ for various materials:—

Material.	γ lb./cubic inches.
Dural	.101
Copper	.321
Steel	.283
Brass	.307

In case of Dural, weight per foot run is thus

$$.952\ D^2 \text{ (circular) or}$$
$$1.05\ d^2 \text{ (hexagon).}$$

Thus a one inch wire of this material weighs approximately 1 lb. per foot run = 100 feet of .1 in. wire. In the case of copper, the weight is approximately three times as great.

Rapid Identification of Non-Ferrous Scrap. (Metal Industry, Vol. 61, No. 19, 6/11/42, pp. 294-295.) (107/26 Great Britain.)

Material.	Surface Appearance.	Magnet Test.	Lathe Chip Test.	Blowpipe Test.
Nickel	Dark grey; smooth; sometimes green (oxide)	Magnetic	Cuts easily: smooth edges; can be continuous	Melts slower than steel; less slag than Monel; quiet puddle
Monel	Dark grey; smooth	Slightly magnetic at room temperature	Cuts easily: smooth edges; can be continuous	Melts slower than steel; considerable quiet slag; quiet puddle
"Nickel Silver"	Grey to yellow or yellow to green	Non-magnetic	Smooth, long, often continuous chips	Moderate melting speed; fumes
Brass	Yellow to green or brown	Non-magnetic	Smooth, long chips; more brittle than copper	Moderate melting speed; gives off fumes; puddle like water
Tin Bronze	Red to brown	Non-magnetic	Smooth, long chips; more brittle than copper	Fast melting, some fumes; puddle like water
Aluminium Bronze	Yellow-brown	Non-magnetic		
Copper	Smooth; red-brown to green (oxides)	Non-magnetic	Smooth, long easily cut chips	Slow melting; very little slag puddle bubbles
Aluminium	Light grey to white; dull or brilliant	Non-magnetic	Smooth chips; saw edges where cut; chips can be continuous	Very fast melting; quiet black scum forms, quiet puddle

Material.	Surface Appearance.	Magnet Test.	Lathe Chip Test.	Blowpipe Test.
Magnesium Alloy	White; surface coating may be yellow-brown	Non-magnetic	Short, easily cut chips	
Lead	Smooth, velvety; white to grey	Non-magnetic	Cut by knife; any shape chip	Melts very fast; quiet slag, dull grey coating; quiet puddle
Lead-Silver Solder	Smooth; dark grey; sometimes discoloured	Non-magnetic	Harder than lead; any shape chip	Slower melting than Pb or Pb-Sn
Lead-Tin Solder	Smooth; white to grey; may be frosty	Non-magnetic	Harder than lead; any shape chip	Faster melting than Pb-Ag; about same as lead

Chemical or Spot Tests.

Material.	Nitric Acid.	"Iron Nail" Test.	Ammonia Test.	Others.
Nickel	Reacts slowly; pale green solution	Negative	Blue	No. 4—Intense red colour
Monel Metal	Reacts; greenish-blue solution	Copper plates out	Dark blue	No. 4—Intense red colour
"Nickel Silver"	Reacts; bluish-green solution	Copper plates out	Dark blue	No. 4—Red colour varies in intensity with nickel content
Brass	Reacts vigorously; green solution	Copper plates out	Dark blue	No. 4—No red colour in nickel-free alloys
Tin Bronze	Reacts vigorously; blue-green solution	Copper plates out	Dark blue	—
Aluminium Bronze	Reacts vigorously; blue-green solution	Copper plates out	White ppt.: blue soln.	—
Copper	Reacts vigorously; blue-green solution	Copper plates out	Dark blue	—
Aluminium	Soluble	—	White ppt.	—
Magnesium Alloy	Soluble	—	Colourless	—
Lead	Soluble	—	Colourless	No. 5—No ppt.
Lead-Silver Solder	Soluble	—	Colourless	No. 5—No precipitate in absence of tin
Lead-Tin Solder	Soluble	—	Colourless	No. 5—Black deposit with white ppt.

Spot Test Procedures.

Test No. 1—Nitric Acid Test.

Place 1 or 2 drops of concentrated nitric acid on the clean metal surface. Observe any reaction for 1-2 minutes. Then dilute with 3-4 drops of water, and observe reaction. If solution turns green or blue use it for the "iron-nail" test.

Test No. 2—Iron Nail Test.

Rub a clean iron nail in the coloured acid solution, in contact with the specimen. If the alloy contains copper, copper will be deposited on the nail or the metal surface.

Test No. 3—Ammonia Test.

Dissolve a bit of the metal in nitric acid, or attack the surface with a few drops of acid. Dilute somewhat, carefully add ammonium hydroxide to the solution until the latter is strongly alkaline. If copper or nickel is present, a pale blue precipitate will form, which on further ammonium hydroxide addition becomes a dark blue solution.

Test No. 4—Paper Test for Nickel. (Williams, Ind. and Eng. Chem., January, 1942.)

One drop of acid mixture (10 ml. H_2SO_4, 10 ml. HNO_3, 10 ml. H_3PO_4, 10 g. citric acid, 25 ml. water) is placed on the metal for 15-30 seconds, then absorbed in a paper test strip (filter paper dipped in a solution of 10 g. citric acid, 25 ml. H_2O, 10 ml. of 1 per cent. dimenthyglyoxime in isopropanol and dried). When KOH is dropped on the paper, a red colour will form if nickel is present. This test is free of colour interference from iron or other elements.

Test No. 5—Silver Nitrate Test for Tin.

Treat the clean metal surface with a few drops of 2½ per cent. silver nitrate solution. If tin is present, a black deposit with a white precipitate will form.

The Development of Light Alloy Gas Cylinders in Switzerland. (T. Wyss, Light Metals, Vol. 5, No. 58, Nov., 1942, pp. 448-456.) (107/27 Switzerland.)

The light alloy gas bottles at present in use in Switzerland are the outcome of 10 years' development work. Swiss law requires that such bottles satisfy stringent mechanical tests, details of which are given.

The body of the report deals with tests carried out on a number of bottles which had been in service over different periods. Details are given below:—

Material	Manufacture	Period in use
Lantal	German	1928-34
Anticorodal	Swiss	1934-38
Avional D	,,	1935-37
Avional DTI	,,	1938-40

Location of the test pieces on the bottles and details of the mechanical tests are given. In the case of Lantal, tensile tests met minimum requirements in all cases. Some of the other factors did not, however, always come up to specification. It is interesting to note that after eight years' storage this material showed no deterioration compared with the new state. Anticorodal proved less satisfactory and the same applied to the original form of Avional (1935). This material has, however, been greatly improved in the meantime (addition of Ti and better heat treatment), and is now considered the most satisfactory for pressure bottles.

The composition of the various alloys is given below:—

Name.	Si.	Cu.	Mn.	Mg.	Fe.	Ti.	Al.
Lantal	1.2-2.1	4.4-4.7	.55	—	.36	—	rest
Anticorodal	.9-1.1	—	.6-.8	.65-.75	.2-.4	—	rest
Avional D	.2-.35	3.6-3.8	.5	.55	.23-.3	—	rest
Avional DT1	.25	3.8	.5	.5	.27	.16	rest

Bottles can be manufactured either from small tubes by pressing (Erhard process), or by welding of neck and base or by deep drawing from slugs. The last process is now adopted for the Avional bottles, the finished product being anodised to prevent corrosion.

It appears likely that industrial light metal gas cylinders will be confined at present to the smaller sizes (1-3 litres). In all cases, however, where dead weight must be reduced to a minimum, such bottles open interesting possibilities (oxygen equipment for high altitude flying).

It is regretted that the report gives no details on the weights of such alloy bottle nor is their behaviour when subjected to machine gun fire discussed.

It is stated, however, that under certain conditions compressed oxygen escaping from small fissures in light alloy may cause the latter to burn. This danger can apparently be completely avoided if the light alloy has previously been anodised.

The Wear of Plastic Gear Wheels. (Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, p. 638.) (Digest.) (107/28 Germany.)

The gear wheels had a pitch circle of 195 mm. and their wear was investigated when running in conjunction with cast iron wheels with grease as a lubricant. Two kinds of plastic with coarse and fine fabric filler respectively were investigated, as well as plastic bonded and compressed wood. Three different values of the tooth modulus were employed (3, 5 and 7), corresponding to 65, 39 and 28 teeth respectively. In the case of compressed wood, best results were obtained with a veneer thickness of 1mm. with grain direction at 45°. For this arrangement the wear was practically the same as that obtained with the plastic containing coarse fabric filler. It appears that an increase in bonding pressure of the wood above 200 atmosphere is not warranted. Generally speaking, wear is reduced as the tooth modulus decreases (number of teeth increasing). At very small circumferential speed, however, the reverse holds.

The load coefficient c depends on the tooth number and the circumferential velocity v on the pitch circle. The following values were obtained for a tooth modulus 5 (39 teeth) :—

v (m/sec.)	c (kg./cm.^{2}).
3	35
11	15

Bonding of Plastic to Metal Sheet (Anchoring by Means of Burred Holes in the Latter) (Plastel). (N. A. de Bruyne, British Plastics, Vol. 14, No. 162, November, 1942, pp. 306-316 and 349.) (107/29 Great Britain.)

By bonding sheet metal to plastics, both the flexural stiffness and dimensional stability of the panel are increased. It is easily shown that if the bonding is perfect, much greater stiffness can be obtained than is possible for the same weight of steel alone or plastic alone. By choosing the optimum ratio between thickness of filler and thickness of cover plates, the composite structure will be 2½ times as stiff as a dural panel and 15 times as stiff as a steel panel of the same weight. Similarly the stiffness of plywood can be increased 10 per cent. by sheathing it with dural. Approximately perfect bonding can be obtained with certain kinds of cement. As an alternative, the metal sheet can be attached to the plastic direct, by providing the former with burred holes in which the plastic (thermosetting or thermoplastic) is anchored. The product obtained by this simple method is known as Plastel and although the adhesion is not perfect, the resultant structure is still about 20 per cent. stiffer than a dural panel of equal weight. Quite apart from increased flexural stiffness, the metal bonding ensures greater dimensional stability to the plastic under changes of humidity and temperature. As is well known, transparent panels of cellulose acetate are apt to crack round the bolt holes where they are secured. This can be completely cured by bonding the edges with metal. In the same way, the danger of starring or splintering when drilling holes in acryl resin sheets can be avoided by "plastelising."

Another interesting application of metal bonded plastics is the construction of screening panels for wireless installation. By removing the surface metal by means of a simple trepanning tool, through connections can be made without the use of separate insulating bushes. The simple method of bonding is also applicable to the surface of airscrew blades made of resin bonded wood.

The Tee Bend Test to Compare the Welding Quality of Steels R.P. 1,444. (G. A. Ellinger and others, J. Res. Bur. of Stands., Vol. 28, No. 1, January, 1942.) (107/30 U.S.A.)

A bend test for comparing the welding quality of steels is described in this paper. Specimens of fillet-welded T-sections of a number of low-alloy high-tensile steels were bent in special testing jigs at room temperature and at temperatures as low as $-20°$F. Several criteria, such as maximum load, angle at maximum load, type and location of fractures, were used to compare the specimens. A special method of statistical analysis, which is described in detail in the paper, was used to evaluate the data and to compare and rate the welding quality of the steels.

No good correlation was found between any of the usual tensile properties or Vickers numbers of the steel and weldability; therefore they cannot be used for determining the welding quality.

Usually normalised plates had higher welding quality than the rolled plates of the same steels, due probably to relief to stresses set up during rolling and to a more homogeneous structure of the metal.

Most "dirty" steels had lower welding quality than clean steels.

Austenitic grain size and grain-coarsening temperatures apparently had little effect on welding quality.

Steels containing nickel and copper had the highest welding qualities of the steel tested, while those containing more than 0.70 per cent. of manganese had the lowest welding quality. Phosphorus greater than 0.10 per cent. also is believed to contribute to low welding quality in steels.

Plates welded at low temperature had lower angles of bend and more plate metal failures than welded at room temperature. The temperature of testing apparently had more effect on the angle of bend and plate metal failures than the temperature of the plates when welding was begun.

This bend test provides a reliable means for determining the welding quality of steels. A structural weld is tested without machining the surface, leaving the welds intact as deposited. The reproducibility of results of duplicate specimens is excellent. The angle of bending and the kind, extent, and location of the fractures are important criteria of the welding quality of steels and not a function of the shape of the specimen.

Tensile Elastic Properties of Nickel, Copper, Open-Hearth Iron and Typical Steels. (*R.P.* 1,459.) (D. J. McAdam and R. W. Mebs, J. Res. Bur. Stands., Vol. 28, No. 3, March, 1942, pp. 311-378.) (107/31 U.S.A.)

From stress-set curves are derived proof stresses for five values of permanent set. From corrected stress-strain curves are derived values of the modulus at zero stress and its stress coefficient. The diagrams show the influence of prior plastic extension on these indices.

The curves of variation of the proof stresses with plastic extension are affected by the rate of work-hardening, by variation of internal stresses of two kinds, and by the rest interval; the curves of variation of crystal orientation, internal stress, and lattice expansion, and by rest. The curves of variation of the stress coefficients of the modulus are affected by all these factors except possibly the reorientation factor.

Wear of Cutting Tools as Affected by Shape of Tool. (H. Ferchland, Der Betrieb, Vol. 28, No. 8, Aug., 1942, pp. 333-336.) (107/32 Germany.)

Unless the tool is presented symmetrically the finite force in the direction of cut will necessarily cause the fine edge to break off until a sufficient depth of material is reached so that the shearing and bending stresses in the tool can balance the cutting force. The subsequent wear of the tool is entirely due to friction and the author shows that, other things being equal, the time required to produce a given shortening of the tool tip is approximately proportional to the clearance angle and almost independent of the slope.

These conclusions are verified by experiments carried out on a laminated plastic plate 16 mm. thick cut by a circular saw of high speed tool steel at a cutting speed of 50 m./sec. (feed 166 mm./min., width of tooth 4 mm., pitch 6.8 mm.). Under these conditions, the life of the tool increased from .3 h. to 1.3 h. as the clearance angle was increased from 10° to 30°.

It appears that too little attention is paid to the clearance angle in practice whilst the importance of the slope is exaggerated. The opinion is then often expressed that it is only necessary to provide sufficient clearance to prevent the back of the tool from rubbing. Whilst this may be approximately true for steel, such small angles lead to rapid wear of the tool if employed on softer materials such as plastics.

The following table gives values suggested by the author:—

Materials to be worked.	Tool Angles. Slope.	Clearance. (min. value.)	Lip (min.)
Soft steel	5°-15°	10°	60°
Silumin	,,	12°	50°
Electron	,,	15°	55°
Plastics	,,	25°	55°

It will be noted that the range of slope angles is the same for all the materials. It need only be sufficient to ensure a free flow of the working chips and has practically no effect on tool wear.

Performance of Mechanically Reconditioned and Chemically Sharpened Files. (H. Schallbroch and W. Bieling, Werkstatt and Betrieb, Vol. 75, No. 8, Aug., 1942, pp. 175-179.) (107/33 Germany.)

The mechanical reconditioning virtually consists of grinding off the teeth and fitting new teeth to the resulting steel blank. Since the subsequent hardening can never be as favourable as that carried out by the manufacturer of the original file (due to lack of knowledge of material specification) such reconditioned file seldom approach the performance of the original article. Moreover the grinding leads to a serious loss in strength due to loss of material and this cannot be applied to small thin files. As an alternative to this method of reconditioning, attempts have been made to utilise sand blasting, wire brushes or chemical treatment. The authors are primarily concerned with the latter method and carried out extensive experiments on files " resharpened " by the Zoppi and Ullmann methods respectively.

Zoppi Method (German Patent application Z. 23,562 VI/48d).

The files are first degreased in an alkaline bath and then freed from rust by immersion in a 50 per cent. HCC bath for 12 hours at room temperature. A mechanical treatment with rotating brushes is interposed at various stages of the treatment. The sharpening process proper is carried out in a 16 per cent. HNO_3 bath and lasts 10-20 minutes. The files are then washed and provided with a protection against corrosion.

Ullman Process (German Patent No. 709,248).

After degreasing, derusting and brushing as in the Zoppi process, the files are immersed in a bath of the following composition by weight:—

Copper sulphate	11.2
Concentrated H_2SO_4 (free from arsenic) .	27.5
Nitric acid	36.3
Potassium Dichromate	9.0
Water	500.0

The time of immersion is about 8-10 minutes. The file is then rinsed and any remaining acid neutralised.

By choosing the angle of immersion correctly, it is claimed that the clearance flank of the tooth is covered with a deposit of cover, the chemical etching effect then being concentrated on the steeper cutting edge.

Files reconditioned by both methods were tested in a special test rig, in which the file is reciprocated under load on a ball bearing steel. Records were kept of the gradual blunting of the file teeth (actual tooth profile photographed at grazing incidence). The wear of the steel specimen and the nature of the filings produced. It appears from these experiments that both the chemical methods described produce a marked improvement in the performance of the previously blunted file and that moreover the treatment can be repeated several times.

Creep Rates of Cold-Drawn Nickel-Copper Alloy (Monel Metal). (J. A. Bennett and D. J. McAdam, J. Res. Bureau of Stands., Vol. 28, No. 4, April, 1942, pp. 417-437.) (107/34 U.S.A.)

A description is given of new equipment recently assembled at this Bureau for testing the creep of metals.

The apparatus was used to study the creep rate of cold-drawn nickel-copper alloy over a wide range of stress and temperature. Each specimen was used for a series of tests, which allowed a more rapid determination of the characteristic creep rates than using a single specimen for each test. The data indicate that the characteristic creep rate depends only on the stress and temperature, and is not affected by prior stresses or temperatures. The influence of stress on the rate of creep increases with increasing stress, while the influence of temperature on the rate of creep decreases with increasing temperature. The results of the tests are shown in graphs, as no mathematical expression was found which would represent them..

Frictional Properties of Rubber. (F. L. Roth and others, J. Res. Bureau of Stands., Vol. 28, No. 4, April, 1942, pp. 439-462.) (107/35 U.S.A.)

Laboratory measurements of coefficients of friction of soft rubber compounds were made by towing specimens on horizontal tracks and by allowing them to slide down inclined tracks. The specimens were prepared by attaching the rubber to a metal backing and moulding it against glass surfaces having different degrees of roughness. The coefficients increase markedly with speed, ranging from about 1 at 10^{-4} cm./sec. to more than 4 at 5 cm./sec. The occurrence of vibrations prevented observations at higher speeds. Static friction is greater than dynamic friction for speeds appreciably less than 10^{-3} cm./sec. and less than dynamic friction for greater speeds. The coefficients decrease slightly with increasing pressures and are independent of the size of the specimen. Except at very low speeds the smoother surfaces yield the higher coefficients. Materials such as talc or bloom on the sliding surfaces cause large decreases in the coefficients.

Attention is called to the dependence of the coefficients of friction on the speed, which is shown in several previous investigations on rubber and other materials.

It appears that the coefficient of friction of a rubber compound depends more on the rubber metrix than on the corresponding ingredients and fillers.

Structural Changes in the Bonding Layer of Soft Soldered Joints in Copper Pipe Lines on Long Continued Heating. (W. H. Swanger and A. R. Maupin, J. Res. Bureau of Stands., Vol. 28, No. 4, April, 1942, pp. 479-487.) (107/36 U.S.A.)

In the course of previous investigations to establish the merits of soldered joints in copper tube lines for domestic plumbing and other purposes, it became evident that in the evaluation of such joints consideration must be given to possible deterioration with time of the bond of the soldered joint if the service involves use at elevated temperatures. Joints made with solder containing tin were found to be susceptible to such a change, under favourable circumstances, whereas many lead-base solders were not. By means of metallographic studies of specimens cut from soldered joints held at elevated temperature for long periods, the nature of the microstructural change was established and correlated with the lowering of the bonding properties of the soldered joint. Essentially, this consists in the formation of a bonding layer adjacent to the copper base by alloying, by diffusion, of the tin of the solder and the adjacent copper. Micro-hardness determinations showed this constituent to be much harder than the initial solder and also harder than the copper base. Evidence of brittleness was also found. Most tin-free lead-base solders, including lead-silver solder, were found not to be susceptible of this change. Lead-cadmium solder was an exception.

Tensile and Compressive Properties of Some Stainless Steel Sheets. (C. S. Aitchison and others, J. Res. Bureau of Stands., Vol. 28, No. 4, April, 1942, pp. 499-567.) (107/37 U.S.A.)

Tensile and compressive tests were made on specimens from chromium-nickel (17-7 and 18-7) stainless-steel sheets, with cold-reductions from zero per cent. (annealed) to 50 per cent., and thicknesses from 0.01 to 0.06 in. The tensile yield strengths ranged from 34 to 200 kips/in^2. The effect of a stress-relieving treatment at 300° C. for 24 hours was investigated for one of the compositions.

The tensile tests were made on standard specimens. The compressive tests were made by the pack method developed at the National Bureau of Standards and by the cylinder method developed by Russell Franks, of the Union Carbide and Carbon Research Laboratories. Tests were made on both longitudinal and transverse specimens from each sheet.

The results are given in table and stress-strain curves to facilitate application in the design of light-weight structures from these materials. The effect of the degree of cold-reduction and of the stress-relieving treatments on the shape of the stress-strain curves and on the tensile and compressive properties is discussed.

Elimination of Oxide Films on Ferrous Materials by Heating in Vacuum. (V. C. F. Holm, J. Res. Bureau of Stands., Vol. 28, No. 5, May, 1942, pp. 569-579.) (107/38 U.S.A.)

In the bright annealing of stainless steels, extreme precautions are necessary and the partial pressure of oxygen must be kept at a very low value. This has been accomplished, in some cases, by the use of atmospheres formed by cracking anhydrous ammonia. Such atmospheres obviously have a high percentage of hydrogen and would tend to cause decarburization at the temperatures necessary for annealing. However, recent work on the effect of hydrogen in iron and steel has demonstrated that heating a metal in the gas may have other harmful effects.

The use of some chemically inert gas would be the ideal solution of the problem except that the removal of the last traces of oxygen presents difficulties. Utilisation of vacuum furnaces as a means of obtaining inert environments for annealing has been suggested, but for practical reasons these appear applicable only in relatively few instances. However, because vacuum heating offers a means of investigating the changes that occur during bright annealing without the effect of the usual gas-metal equilibria, it was felt that such a study might provide some pertinent information regarding the behaviour of metals in inert atmospheres at high temperatures.

An investigation of the mechanism by which lightly oxidized specimens of ferrous materials were brightened when heated in vacuum showed that the presence of carbon was essential. Oxidized specimens of iron containing small amounts of carbon were brightened in 15 to 20 minutes at 800° C., and the elimination of the oxide film was accompanied by decreases in the carbon content. Clean-up of oxide films on stainless steel occurred also when the specimens were heated to about 1,050° C. Oxidized high-purity iron which contained less than 0.001 per cent. of carbon could not be brightened by vacuum heating at temperatures up to 1,250° C. Vacuum heating of lightly oxidized specimens of high-purity iron sometimes caused the oxide film to agglomerate, forming distinct, geometric patterns that could be observed under the microscope.

Rate of Oxidation of Typical Non-Ferrous Metals as Determined by Interference Colours of Oxide Films. (D. J. McArthur and C. W. Geil, J. Res. Bureau of Stands., Vol. 28, No. 5, May, 1942, pp.593-635.) (107/39 U.S.A.)

An investigation has been made of the rate of oxidation of 18 non-ferrous metals by means of the interference colours of oxide films. With eight of these metals complete diagrams were obtained; with seven metals the approximate forms and positions of the graphs were obtained for interference colours of the first order; with three metals, only the approximate positions of the graphs were obtained. A comparison is made between the results obtained with these metals and with typical steels.

The diagrams obtained with these non-ferrous metals are similar to those obtained with steels. For a constant film thickness, the relation between temperature and oxidation time is linear when plotted with logarithmic co-ordinates. The variation of the film thickness either with time at constant temperature or with temperature for constant oxidation time, when plotted with logarithmic co-ordinates, is represented by a reversed curve When plotted with Cartesian co-ordinates, the variation of film thickness with time at constant temperature is represented by a curve without reversal; this is a complex curve becoming approximately parabolic at the upper end.

An attempt is made to correlate the forms and positions of the curves with the affinities of the metals for oxygen, with the resistances at the metal-oxide interface and with the resistivity of the oxide film. The variation of the rate of oxidation with the film thickness is such that it may be expressed in terms of an assumed variation of the resistivity with the film thickness. This means merely that the film behaves as if its resistivity (not necessarily its electrical resistance) varies in the manner described.

Compacting Steel Swarf by Auto-Combustion (Scrap Disposal). (Stahl und Eisen, Vol. 62, No. 44, 29/10/42, pp. 921-922.) (107/40 Germany.)

Steel wool or swarf is very awkward material to handle. If spread relatively thinly in the open, considerable space is required and if stacked to any height subsequent handling is made very difficult by interlocking.

Transport is very uneconomical since a 20 ton truck will not normally hold more than about five tons of swarf. Remelting at the steel works is also difficult, the possible rate of addition to the normal charge being strictly limited (stoppage of flue and air filters especially if swarf is oily). The author describes a simple method of compacting the swarf by purely thermal means before despatch for disposal.

For this purpose the swarf is introduced into a simple type of vertical furnace (illustrated) and ignited by means of a small wood or coke fire. Once combustion has started, no fresh fuel need be added, the heat generated by the combustion of part of the bottom layer of swarf being sufficient to either melt the swarf or break it up into very small lengths. Less than 10 per cent. of the charge leaving the furnace is in the form of oxide, the remainder being metallic iron. In practice, the compacting furnace is set up in close proximity to the swarf mound and charged with a crane as required. The compacted product leaves the furnace at the bottom and is directed into a conveyor, the belt of which is continuously cooled with loamy water. The standard furnace will handle about two tons of swarf an hour, and the resultant product presents no difficulty when added to the normal charge of the blast, Siemens Martin or Electrifurnace. A large number of such furnaces are now in use, and by this means storage room is reduced, transport of swarf rendered economical and scrap recovery facilitated.

Rapid Determination of Magnetic Characteristics by Means of the Ferrograph. (F. Forster, Z.f. Metallk., Vol. 32, No. 6, June, 1940, pp. 184-190.) (107/42 Germany.)

The apparatus depends on the following principle three small search coils, A, B and C are placed inside a larger coil fed by the alternating current supply of the laboratory and thus subjected to a variable magnetic field $H \sin wt$. Under these conditions, Coil C experiences an $EMF = E_1 = K\,(dH/dt)$, where K is a constant. Coils A and B are exactly similar and connected in series in such a manner that the resultant EMF is zero.On inserting the specimen to be tested inside Coil A, this balance is upset and an $EMF = E_2 = D\,(dJ/dt)$ is generated, where J is the magnetisation induced in the specimen.

By means of suitable resistance and capacity circuits, both E_1 and E_2 are integrated electrically, amplified and led to the horizontal and vertical deflector plates of a cathode ray oscillograph, thus producing a direct visible record of the hysterisis loop of the specimen, which can be recorded photographically. Depending on whether the latter is magnetically soft or hard, the field strength can be adjusted between 0 and 2, and 0 and 2000 Oersted respectively. Small differences in magnetic quality can be shown up easily by inserting the two specimens in coils A and B and increasing the sensitivity of the J circuit (so called differential method). Due to the small size of the sample required, measurements can be carried out easily at elevated temperatures (up to 900° C.)

Modern electrical valves will operate at high amplification without distortion with the result that accurate values for the coercivity, saturation and remanence can be obtained by direct measurement from the diagrams making use of the sensitivity value selected.

The apparatus is specially suited for continuous control of specimen in wire form, the wire being passed through Coil B by means of an electric motor, whilst Coil A contains a short length of standard wire.

Experiments on magnetostriction are also easily carried out.

Characteristics of Wide Angle Aeroplane Camera Lenses (*R.P.* 1,498). (F. E. Washer, J. Res. Bur. Stands., Vol. 29, No. 3, Sept., 1942, pp. 233-246.) (107/43 U.S.A.)

The relative illumination in the focal plane was measured for a number of wide-angle aeroplane-camera lenses, using a method depending upon the determination of the light-transmitting area of the lens effective at definite orientations of the lens. A new factor dependent on the lens design was found to be operative in reducing the values of the relative illumination in the unvignetted portion of the field for certain types of lenses. Determinations of the resolving power were also made and showed considerable variation in performance with type of lens. The effect of basing the distortion values upon the calibrated focal length instead of the equivalent focal length was determined.

X-Ray Measurement of the Thickness of the Cold-Worked Surface Layer Resulting from Metallographic Polishing (*R.P.* 1,494). (H. C. Vacher, J. Res. Bur. of Stands., Vol. 29, No. 2, Aug., 1942, pp. 177-181.) (107/44 U.S.A.)

A series of annealed specimens, each having a surface free from cold-work, was prepared from each of the following metals: steel (0.34 per cent. C.), copper, and aluminium. The surface was finished with one of several abrasives commonly used in preparing a surface for metallographic examination, and X-ray back-reflection patterns were obtained by using copper, cobalt, and chromium targets. The thicknesses of the layers altered by the abrasive treatments then were used to estimate the thicknesses of cold-worked layers between 2 and 25 microns on annealed steel, 2 and 42 microns on annealed copper, and 5 and 95 microns on annealed aluminium.

The experiments are described to illustrate the use of back-reflection X-ray patterns as a means of evaluating individual abrasive treatments employed in obtaining a metallographic polish.

Measurement of Degree of Roughness of High Quality Surfaces. (W. Lueg, Der Betrieb, Vol. 28, No. 8, Aug., 1942, p. 340.) (107/45 Germany.)

Mechanical profilographs are unsuitable for surface testing if the roughness is below 1μ. Such high degrees of smoothness are becoming increasingly common in certain classes of engineering products (super finish) and a simple method of evaluating the surface of the finished article is badly needed. As is well known, microscopic examination of the surface under conditions of dark field illumination reveals irregularity of a very small order (light scattering) and under certain conditions (grazing incidence) an indication of the surface profile can be obtained. This, however, still leaves the problem of obtaining a numerical estimate of the degree of finish for which various rather complicated methods have already been proposed (see for example the German text book, " Technische Ober-Flachenkunde "—G. Schmaltz)

The author has investigated an interesting modification of the optical method leading to a direct numerical evaluation of the average surface roughness by comparing the intensity of the light reflected from the surface under conditions of bright and dark field illumination to be symmetrical in azimuth, the integral of its light reflected under these conditions is independent of the direction of the surface scratches, provided the surface is perpendicular to the optic axis of the microscope. The reflected light falls on a photo cell and the corresponding current is measured on an electrometer by determining the time required to produce a certain charge. By thus separating the measuring and recording instruments, the method can be applied to the specimen whilst still clamped to the machine tool.

It is stated that the new method gives consistent results and that a direct comparison over the surface roughness range 1μ to 22μ as estimated from direct profile measurements (obtained optically by the so-called sectional method at grazing incidence) was also satisfactory. It is therefore claimed that the figures for surfaces of very high finish (for which a profile record is normally unobtainable are also trustworthy and much less ambiguous than those given by direct microscopic examination.

For various samples of steels, the light ratio values gave the following results:

(1)	Very finely ground	62.9×10^{-2}
(2)	Lapped	16.3×10^{-2}
(3)	Normal polish	2.1×10^{-2}
(4)	Super polish	$.3 \times 10^{-2}$

Of the above, surface (1) had a maximum surface roughness of 1.2μ as measured by the grazing incidence (optical) and profilograph (mechanical) methods respectively. The surface finish in cases 2-4 was so high that these two checks could not be applied. It will, however, be noted that the new method had no difficulty in grading the surfaces.

By suitably adjusting the field of view and magnification, the new method can also be applied to curved surfaces of small radii of curvature.

Improved Instrument for Measuring the Air Permeability of Fabrics. (H. F. Schiefe and P. M. Boyland, J. Res. Bureau of Stands., Vol. 28, No. 5, May, 1942, pp. 637-642.) (107/46 U.S.A.)

This paper described a new model of an instrument for the direct measurement of the air permeability of fabrics. The air, which is drawn through the fabric by a given suction, is measured with orifice-type flowmeters. The instrument is mounted in the top of a table and a new clamping device is provided, which permit measurements to be made rapidly on any part of a large piece of cloth without cutting.

The calibration and operation of the instrument are discussed. Results of measurements on two very different types of fabrics—parachute cloth and blankets—are given for several methods of clamping. The values are expressed in cubic feet of air per min. per sq. ft. of fabric for a pressure difference of .5 in. of water and ranged from 80 to 120 for parachute fabric, 60 to 270 for blankets respectively. A suitable method of clamping is described for which the edge leakage is negligible. The random sampling error of the average of five tests for air permeability is less than 5 per cent. approximately nine times out of 10.

The Icing of Aircraft. (M. Robitzsch, Beitrage. z. Physik der freien Atmosphare, Vol. 18, No. 4, 1932, pp. 235-241.) (R.T.P. Translation No. T.M. 1,028.) (107/47 Germany.)

Starting from purely theoretical considerations, the author shows that the rate of ice deposition per unit surface of a body and fixed air flow conditions is given by

$$\left(\frac{C}{B}\right)(e_2 - \bar{E}_1) = \left(\frac{C}{B}\right)\Delta$$

C = constant.

B = barometric pressure.

e_2 = partial pressure of water vapour in the air at temperature T_2.

E_1 = saturation pressure of water vapour referred to ice at temperature T_1 = surface temperature of body.

Other things being equal therefore, the rate of ice formation increases at altitude (reduction of B).

Δ = can be expressed more conveniently in the form:—

$$\Delta = E_1 [1 + .073 (T_2 - T_1)] R_2 - E_1$$

where E_1 = saturation pressure of water vapour referred to water at T_1.

R_2 = saturation ratio of air at T_2.

Δ can now be plotted on a T_1 (body temperature) basis with $T_2 - T_1$ as abscissa and R_2 as parameter. With $R_2 = 1$ (saturated air) it appears that ice will only deposit to any marked extent if the temperature of the air is substantially higher than that of the body. If, however, the air is supersaturated ($R_2=2$), ice will deposit even if the body is appreciably warmer than the surrounding air. The icing hazard is still further increased, if supercooled water is present in the air. Experiments show that the amount of such supercooled water may reach several gm. per kg. of air. Unfortunately this condition is not yet amenable to theoretical treatment, since only a portion of this water will freeze on striking the body.

The Formation of Ice on Aircraft. (W. Bleeker, Meteorological Zeitschrift, Sept., 1932 (R.T.P. Translation No. T.M. 1,027), pp. 349-354.) (107/48 Germany.)

It is generally recognised that the icing danger of aircraft is enhanced in the presence of supercooled water drops in the air but the reason for the sudden solidification of the drops on meeting the aeroplane is not yet clear. The author shows that the difference in the freezing point produced by changes in the radius of curvature of the drop when spread out on the wing cannot possibly account for the phenomenon, nor can the observed rate of ice accretion be reconciled with the difference in the saturation pressure of water with respect to the liquid and solid phase.

The author is of the opinion that the icing is mainly produced by rapid evaporation of the surface film in the high relative wind, and introduces the concept of the so-called " icing time " factor. This enables him to calculate the time required for a given quantity of water to freeze by " Ventilation." It appears that under favourable conditions an evaporation of 12 per cent. is sufficient to cause the remaining 88 per cent. to freeze.

The new factor introduced explains the possibility of ice accretion above the freezing point, and the peculiar mushroom appearance of the deposits on the leading edge of a wing. The question remains whether the quantity of water (in the form of drops) actually impinging on an aircraft in flight is sufficient to account by evaporation alone for the rate of ice formation observed. Obviously the drops will not follow the stream lines, if the latter are curved, but will be deflected by centrifugal action. Thus only a percentage will strike the aircraft. The author has examined the case of a circular boundary theoretically and concludes that even in this unfavourable case 10 per cent. of the drops in the space crossed by the circle are caught. This should be sufficient to account for the phenomena observed and the author therefore concludes that it is interception of the droplets rather than sublimation which plays the most important part in ice accretion.

Measurement of Ultra-Violet Solar and Sky Radiation Intensities in High Altitudes. (W. W. Coblentz and others, J. Res. Bureau of Stands., Vol. 28, No. 5, May, 1942, pp. 581-591.) (107/49 U.S.A.)

Data are given on the intensity of the biologically effective ultraviolet radiation, of wavelengths 3200 A and shorter, from the sun and the entire sky, incident on a horizontal plane, under various meteorological conditions, in high latitudes. These data were secured by means of a photoelectric cell and automatic recording apparatus, whereby a continuous record of ultraviolet intensities, in absolute value, was obtained during the voyage of the Louise A. Boyd Arctic Expedition, up the west coast of Greenland to Etah (lat. 78.3° N.) and down the coast to Baffin Land and Labrador.

The outstanding results of this survey are, that, for the same solar heights, in the highest latitudes visited (78° N.) the ultraviolet intensities appear to be somewhat higher than in latitude 62° N., but somewhat lower than in latitude 39° N. (Washington), in agreement with expectation, taking into consideration the distribution of ozone in the stratosphere with latitude and the season. In the highest latitudes, at the noon hour, on the clearest days, in midsummer, the intensity of the ultraviolet solar and sky radiation ranged from 30 to 40μW/cm^2, which is a significant value biologically, of especial interest to the medical profession in connection with the question of the incidence of rickets.

Carbon Dioxide Breathing at High Altitudes and its Effect on Oxygen-Want. (A. Rühl and W. Spiess, Luftfahrtmedizin, Vol. 1, No. 4, 24/4/37, pp. 272-291.) (107/50 Germany.)

Low atmospheric pressure at high altitudes not only reduces oxygen tension but also carbon-dioxide tension in the blood and alveolar air. This paper deals with the effect of CO_2 on the oxygen supply of the body. It is shown that the saturation of the arterial system is greatly improved by the addition of CO_2 to the inspired air. The latter increases breathing volume, improves the breathing mechanism and also favourably affects the acid-base equilibrium, as evidenced by the drop in the high lactic acid values and by the increase in alkali reserve.

The authors show that cramp due to low pressure can be promptly and effectively relieved by CO_2 breathing. In this respect CO_2 breathing is an effective antidote to altitude sickness and is certainly superior to other methods applied to cope with this condition.

In regard to the general problem of oxygen-want at high altitudes, the authors find that whilst the addition of CO_2 to the normal atmospheric air produced various beneficial results, it provided no completely satisfactory remedy against oxygen-want at altitudes of 6,000-6,500 m. It was, however, successful in preventing altitude sickness at altitudes in the region of 4,000-5,000 m., thus only effecting an extension of the altitude limit at which oxygen is normally applied.

Pulse Rate and Blood Pressure as Affected by Gradually Decreasing and Increasing Pressures in the Low Pressure Chamber. (Georg Besseres, Luftfahrtmedizin, Vol. 1, No. 4, 24th April, 1937, pp. 301-306.) (107/51 Germany.)

Twenty-one subjects were tested in the low compression chamber as regards fitness for altitude flying. Pulse rate and blood pressure were observed under gradual reduction of air pressure (corresponding to various altitudes) and then under gradually increasing pressures until normal atmospheric pressure was reached. A marked increase in pulse rate was observed at an altitude of 3,000 m. in the case of subjects not acclimatised to altitude. There was no uniformity of reaction among the subjects tested. In some cases there was even an initial decrease in pulse rate. To evaluate these differences the author shows that it is essential not only to consider the curves of pulse rate and blood pressure for gradual altitude ascent but also those obtained for the gradual descent from high altitude to normal atmospheric pressure.

The Time Reserve of Human Beings After Interruption of the Oxygen Supply at High Altitudes. (H. Strughold, Luftfahrtmedizin, Vol. 3, No. 1, 1938-1939, pp. 55-63.) (107/52 Germany.)

This paper discusses the problem of "time-reserve" which is defined as being the time elapsing between interruption of the oxygen supply and the occurrence of the first physiological disturbances. By means of the behaviour of the natural reflexes of the striated muscles it is shown that the time-reserve decreases with increasing altitude and that at altitudes of 8,000-9,000 m. the time-reserve would be a matter of seconds rather than minutes. This leads to the conclusion that if the oxygen supply is interrupted for any reason the pilot will have to get the aeroplane as quickly as possible out of this zone of pronounced oxygen deficiency into at least the upper region of the physiological atmosphere, *i.e.* into strata from 3,000-4,000 m.

Tests, however, showed large variations between individuals at different altitudes. In this connection the author considers the possibility of taking the time-reserve as a measure of the suitability of pilots for high altitude flying. The shortness of the time of normal efficiency after discontinuing the breathing of oxygen of very high altitudes makes the time-reserve one of the most important factors in selecting high altitude flyers.

On the Causes and Prevention of Severe Internal Injuries in Gliding Accidents. The Problem of the Capacity of the Body to Endure Extreme Impact Shock is also Discussed. (S. Ruff, Luftfahrtmedizin, Vol. 3, No. 2, pp. 267-276, 1938-1939.) (107/53 Germany.)

Cases of severe internal injuries occurred in accidents involving the glider model Zögling commonly used in German gliding schools. It was noticed, for example, that when this glider landed somewhat heavily on frozen ground the damage to the glider was slight, whereas the pilot sustained serious kidney injury. These injuries always occurred in the part of the body close to the abdominal belt, the latter showing no evidence of damage in nearly all the cases reported. Investigations disclosed that these injuries were due mainly to the way the belt was attached, causing the impact load to bear directly on the stomach.

Various tests were then carried out to determine the impact pressure loads that arise on landing and methods were investigated whereby these pressure loads could best be absorbed. It was found that special oval-shaped rings incorporated in the abdominal belt reduced the impact loads to a minimum, the energy being absorbed by distortion of the rings. These oval rings were preferred to rubber shock-absorbers because of the recoil of the latter under impact.

The Oxygen Saturation of the Blood when Breathing CO at High Altitudes. (H. v. Diringshofen, Luftfahrtmedizin, Vol. 3, No. 2, 1938-1939, pp. 216-217.) (107/54 Germany.)

This paper supplements an earlier one by Diringshofen and Hartman (see Luftfahrtforschung, Vol. 12, No. 4, 37/7/35, pp. 121-3, R.T.P.3 Translation No. 1135). In that earlier study the authors discussed the conditions of oxygen saturation in the blood brought about at high altitudes and the modification of these conditions due to the presence of CO in the inspired air. It was then shown that small quantities of CO combine with the hæmoglobin with the result that part of this substance is rendered useless for the purpose of oxygen transport.

The author of the present paper shows, however, that the " additional altitude effect " attributed to CO is not as large as was suggested in the earlier paper. It is shown that CO does not directly affect the oxygen tension in the blood which is a factor of importance when considering altitude effects.

On the Problem of Acclimatization to Oxygen Deficiency at Low Pressure. (Hans Koltze and W. Kühn, Luftfahrtmedizin, Vol. 3, No. 2, 1938-1939, pp. 183-190.) (107/55 Germany.)

Tests were carried out in the low compression chamber on a number of subjects at various rate of ascent, repeated tests being carried out on the same subject. An improvement in both the electro cardiogram and general physical well-being was observed when the ascent to altitude was carried out at a low rate. This improvement was attributed not so much to the low rate of ascent but rather to the repeated residence in the low pressure chamber, in other words, to acclimatization. It was, however, not found possible to improve altitude tolerance beyond an altitude of 6,500 m. by a process of slow acclimatization.

The authors stress the importance of assessing flying efficiency by means of the electrocardiogram which, if it is to be of any real value, must be obtained by repeated tests in the low pressure chamber.

Development of Abnormal Symptoms in the Lungs and Heart as a Result of Adaptation to Flying Conditions.—(U. Schaare, Luftfahrtmedizin, Vol. 3, No. 2, 1938-1939, pp. 104-115.) (107/56 Germany.)

Certain abnormalities affecting the condition of the heart and lungs in the case of a number of Luftwaffe recruits who had already undergone more than one year's training, led to this investigation being carried out. These abnormalities consisted of a marked increase of blood in the lung vessels, enlargement of the heart accompanied by hypertrophy of the muscles, bradycardia, increased dimensions of the thorax, etc. The question whether these abnormalities were symptoms of injury due to oxygen-deficient breathing when flying at high altitudes is discussed. The author tends to the opinion that they are to be regarded as symptoms of physical adaptation to altitude which in no way affect flying efficiency.

LIST OF SELECTED TRANSLATIONS.

No. 52.

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

THEORY AND PRACTICE OF WARFARE (A.R.P.).

TRANSLATION NUMBER AND AUTHOR.		TITLE AND REFERENCE.
1638	——	*Technical Standards for the Air Raid Protection of Japanese Buildings.* (Gas und Luftschutz, Vol. 2, No. 2, Sept., 1941, pp. 23-27.)
1641	Schneider, W.	*Earth and Air Vibrations Accompanying Explosions and Gunfire, and Their Effect on Structures.* (Gas u. Luftschutz, Vol. 2, No. 2, 1941, pp. 24-34, and No. 3, pp. 42-52.)

AERO AND HYDRODYNAMICS.

1624	Behrbohm, H. Pinl, M.	*On the Theory of Compressible Potential Flow, II.* (Z.A.M.M., Vol. 21, No. 6, Dec., 1941, pp. 341-350.)
1625	Behrbohm, H. Pinl, M.	*New Linearisation of the Fundamental Equation of the Two-Dimensional Adiabatic Compressible Potential Flow.* (Z.A.M.M., Vol. 21, No. 4, Aug., 1941, pp. 193-203.)

ENGINES AND ACCESSORIES.

1614	Lutz, O.	*Resonant Vibrations in Pipe Lines of Reciprocating Engines.* (Ber. a.d. Lab. f. Verb., No. 3, pp. 17-109.)
1617	——	*Rotary Engine Valve.* (German Patent 702,413.) (Digest.) (A.T.Z., Vol. 44, No. 8, 25/4/41, p. 219.)
1618	——	*Device for the Utilisation of Exhaust Gas Energy.* (Digest, German Patent 716,158.) (A.T.Z., Vol. 45, No. 8, 25/4/42, p. 227.)

FANS AND BLOWERS (U.S.S.R.).

1628	Struve, E. E.	*A Straight-Flow Centrifugal Fan.* (Trans., C.A.H.I., No. 211, 1935, pp. 266-275.)
1629	Struve, E. E. Surnov	*Reversible Fan of the C.A.H.I. Type.* (Trans., C.A.H.I., No. 211, 1935, pp. 276-284.)
1630	Kissina, L. A. Tchebyshova	*Friction Losses in Rotating Discs.* (Trans., C.A.H.I., No. 211, 1935, pp. 166-178.)

TRANSLATION NUMBER AND AUTHOR.		TITLE AND JOURNAL.
1631	Kalinushkin, M. P....	*A New Dust Fan of the C.A.H.I. Type.* (Trans., C.A.H.I., No. 211, 1935, pp. 255-265.)
1632	Ovchinnikov, V. ...	*The Parallel and Series Works of Fans.* (Trans., C.A.H.I., No. 211, 1935, pp. 186-202.)
1633	Ovchinnikov, V. ... Polikovsky, V. ...	*Steady Performance of Fans Working in Parallel.* (Trans., C.A.H.I., No. 211, 1935, pp. 203-216.)
1634	Polikovsky, V. ... Ovchinnikov, V. ...	*Investigation on the Influence of Different Variations in Design on the Performance of Centrifugal Sirroco Fans.* (Trans., C.A.H.I., No. 211, 1935, pp. 241-250.)
1635	Nevelson	*Investigation of a Rateau Fan System for Mine Ventilation.* (Trans., C.A.H.I., No. 211, 1935, pp. 215-240.)

MATERIALS.

1616	Tammann, G. ... Bochow, K.... ...	*On the Absorption of Hydrogen by Rubber Under Increased Pressure and the Behaviour of Rubber After Release of Pressure.* (Z.A.A. Chemie, Vol. 168, No. 3-4, 1928, pp. 322-324.)
1636	Stager, H. ... ... Siegfried, W. ... Sanger, R.	*Investigations on Phenol Plastics.* (Schweizer Archiv., Vol. 7, Nos. 5, 6, 7, May-July, 1941, pp. 129-139, 153-174, 201-208.)

LIGHT ALLOYS (RAPID CHEMICAL ANALYSIS).

1619	Steinhauser, K. ...	*Determination of Zinc in Aluminium and its Alloys, including Secondary Metal.* (Aluminium, Vol. 24, No. 5, May, 1942, pp. 173-176.)
1620	Steinhauser, K. ...	*Determination of Alumina in Aluminium.* (Aluminium, Vol. 24, No. 5, May, 1942, pp. 176-178.)
1621	Steinhauser, K. ... Aust, K. H.... ...	*Determination of Tin in Secondary Aluminium.* (Aluminium, Vol. 24, No. 5, May, 1942, pp. 172-173.)
1622	Stellies, A. J. ... Langer, P.	*Rapid Method of the Determination of Copper Manganese and Iron in Aluminium Alloys.* (Aluminium, Vol. 24, No. 5, May, 1942, pp. 169-172.)
1623	Geigenmuller, M. ...	*Determination of the Silicon in Silumin.* (Aluminium, Vol. 24, No. 5, May, 1942, pp. 178-179.)

INSTRUMENTS.

1615	Theis, A.	*Stress Determination and the Investigation of Mechanical Vibrations by Strip and Ring Gauges of the Electrical Resistance Type.* (Z. f. Tech. Physik, No. 11, 1941, pp. 273-280.)
1640	Teofilato, P. ...	*Mechanical Determination of the Differential Coefficients of a Given Function by Means of an Elastic Strip.* (Atti di Guidonia, No. 48, 1941, pp. 113-132.)

PHYSIOLOGY.

1637	Strughold, H. ...	*New Results and Problems in Medical Stratosphere Research.* (Luftwissen, Vol. 9, No. 6, June, 1942, pp. 177-181.)

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.
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2	5284	Germany ...	*New German Aircraft Types (Ju. 86P, Ju. 288, Me. 109G).* (Inter. Avia., No. 837-838, 7/10/42, p. 14.)
3	5285	U.S.A. ...	*Consolidated B-24 Liberator (Transport Version).* (Inter. Avia., No. 837-838, 7/10/42, p. 14.)
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7	5293	U.S.A. ...	*American Wooden Aircraft (AT 13, DRD-1, Krochler-Doak).* (Inter. Avia., No. 837-838, 7/10/42, pp. 20-21 and I.)

* Abstract available.

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
8	5295	U.S.A. ...	*U.S.A. Service Markings.* (Inter. Avia., No. 837-838, 7/10/42, pp. 23-24.)
9	5296	U.S.A. ...	*Curtiss SO3C-1 "Seagull" Reconnaissance Plane (Photograph).* (Inter. Avia., No. 837-838, 7/10/42, p. I.)
10	5297	G.B. ...	*Miles Master III (Recog. Details).* (Flight, Vol. 42, No. 1,765, 22/10/42, p. a.)
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12	5299	U.S.A. ...	*Vought-Sikorsky "Kingfisher" (Recog. Details).* (Flight, Vol. 42, No. 1,765, 22/10/42, p. b.)
13	5320	U.S.A. ...	*CO_2 Fire Fighting.* (P. W. Eberhardt, Sci. Am., Vol. 166, No. 6, June, 1942, pp. 269-271.)
14	5321	G.B. ...	*Westland Whirlwind (Drawing).* (Aeroplane, Vol. 163, No. 1,639, 23/10/42, p. 469.)
15	5322	Germany ...	*Junkers Ju. S2/3M.* (Flight, Vol. 42, No. 1,763, 8/10/42, p. 390a.)
16	5323	Germany ...	*Gotha Gliders.* (Flight, Vol. 42, No. 1,762, 8/10/42, p. b.)
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21	5330	G.B. ...	*The British Air Mission to Japan in 1921.* (Aeroplane. Vol. 63, No. 1,639, 23/10/42, pp. 476-478.)
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33	5358	U.S.A. ...	*Douglas C47 Transport (Photograph).* (Flight, Vol. 42. No. 1,762, 1/10/42, p. 354.)
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43	5371	U.S.A. ...	*Martin B26B Marauder (Photograph).* (Aeroplane, Vol. 63, No. 1,637, 9/10/42, p. 416.)
44	5372	Germany ...	*Leaders of the Luftwaffe (V).* (Aeroplane, Vol. 63, No. 1,637, 9/10/42, p. 419.)
45	5374	U.S.A. ...	*Glenn Martin 187 Baltimore I (Recognition Details).* (Aeroplane, Vol. 63, No. 1,637, 9/10/42, p. 427.)
46	5375	U.S.A. ...	*Lockheed Ventura (Recognition Details).* (Aeroplane, Vol. 63, No. 1,637, 9/10/42, p. 427.)
47	5380	Germany ...	*Example of Damage to German Aircraft in Combat (Photographs).* (Der Adler, No. 17, 25/8/42, pp. 520-521.)
48	5391	Germany ...	*The History of the German Military Air Transport.* (W.T.M., Vol. 46, No. 8, Aug., 1942, pp. 191-198.)
49	5392	U.S.S.R. ...	*The U.S.S.R. Automatic Infantry Rifle, Model 36 and 40.* (W.T.M., Vol. 46, No. 8, Aug., 1942, pp. 198-203.)
50	5393	G.B.	*The Organisation of the British Air Force.* (Inter. Avia., No. 837-838, 7/10/42, pp. 1-9.)
51	5423	Japan ...	*Mitsubishi OO Fighter.* (Autom. Ind., Vol. 87, No. 3, 1/8/42, pp. 19 and 70.)

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52	5424	U.S.A. ...	*Production of Oerlikon A.A. Guns in the U.S.A.* (J. Geschelin, Autom. Ind., Vol. 87, No. 3, 1/8/42, pp. 20-24 and 70.)
53	5427	Germany ...	*Dornier Do. 217E Bomber.* (M. W. Bourdon, Autom. Ind., Vol. 87, No. 3, 1/8/42, pp. 35-39.)
54	5471	Germany ...	*Technical Problems of Anti-Aircraft Batteries.* (K. Becker, Schriften Akad L.F.F., No. 23, 8/4/38, pp. 1-18.)
55	5472	Germany ...	*Some Notes on Technical Development of Air Fighting.* (F. N. Scheubel, Schriften Akad L.F.F., No. 24, 20/5/38, pp. 1-33.)
56	5502	Germany ...	*Sailing Flight Training in the German Air Force.* (Flugsport, Vol. 34, No. 20, 30/9/42, pp. 303-305.)
57	5508	Germany ...	*Ring Mounting for Hand Pointed Aircraft Guns (Pat. Series* 38, *No.* 723,034). (I. Karia, Flugsport, Vol. 34, No. 20, 30/9/42, p. 154.)
58	5509	Germany ...	*Gun Turret Mounting (Pat. Series* 38, *No.* 723,485). (L.A.B., Flugsport, Vol. 34, No. 20, 30/9/42, p. 154.)
59	5512	Canada ...	*R.A.F. Organisation (Air Ministry and Commands: Bomber, Fighter, Coastal, Middle East, Balloon, Maintenance and Ferry).* (Various Authors, Flying and Popular Aviation, Vol. 31, No. 3, Sept., 1942, pp. 41-104 and 252, 254, 262, 216, 220, 256.)
60	5513	Canada ...	*History of the R.A.F.* (Flying and Popular Aviation, Vol. 31, No. 3, Sept., 1942, pp. 177-181 and 186-188.)
61	5515	Canada ...	*Training and Manpower (R.A.F.).* (A. G. R. Garrod, Flying and Popular Aviation, Vol. 31, No. 3, Sept., 1942, pp. 107-110 and 206 and 215-216.)
62	5514	Canada ...	*Works Directorate (R.A.F.).* (E. Holloway, Flying and Popular Aviation, Vol. 31, No. 3, Sept., 1942, pp. 107-110 and 242.)
63	5517	Canada ...	*Signals and Radio (R.A.F.).* (C. W. Nutting, Flying and Popular Aviation, Vol. 31, No. 3, Sept., 1942, pp. 138-146.)
64	5518	Canada ...	*Air Intelligence (R.A.F.).* (E. H. Medhurst, Flying and Popular Aviation, Vol. 31, No. 3, Sept., 1942, pp. 141, 196 and 200-204.)
65	5520	Canada ...	*Air Sea Rescue (R.A.F.).* (E. F. Waring, Flying and Popular Aviation, Vol. 31, No. 3, Sept., 1942, pp. 152-154 and 275.)
66	5522	Canada ..	*Silhouettes of British Military Aircraft.* (Flying and Popular Aviation, Vol. 31, No. 3, Sept., 1942, pp. 182-184.)
67	5532	Germany ...	*Aircraft Torpedo Release Gear. Pat. Series No.* 39 721,943 *and* 723,316). (M. W. Neubrandenburg, Flugsport, Vol. 34, No. 21, 14/10/42, pp. 159-160.)

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68	5533	Germany ...	*Bomb Release Gear. Pat. Series No.* 39 (723,605). (M. W. Neubrandenburg, Flugsport, Vol. 34, No. 21, 14/10/42, p. 160.)
69	5535	G.B.	*Organisation of the British Air Force.* (Inter. Avia., No. 839-840, 19/10/42, pp. 1-10.)
70	5536	G.B.	*D.H.* 98 "*Mosquito.*" (Inter. Avia., No. 839-840, 19/10/42, pp. 19-20.)
71	5538	U.S.A. ...	*Fairchild AT-13 (Photo).* (Inter. Avia., No. 839-840, 19/10/42, p. 1.)
72	5540	Germany ...	*Messerschmidt Me. 109G.* (Inter. Avia., No. 839-840, 19/10/42, pp. 22-23.)
73	5543	U.S.A. ...	*Mass Production of Vought Sikorsky VS-44A.* (Inter. Avia., No. 839-840, 19/10/42, p. 25.)
74	5544	U.S.A. ...	*Douglas C-47 Transport.* (Inter Avia.. No. 839-840, 19/10/42, p. 25.)
75	5545	U.S.A. ...	*New American Bomber B-27.* (Inter. Avia., No. 839-840, 19/10/42, p. 25.)
76	5546	G.B.	*High Speed Target Boats for Coastal Command Training.* (Inter. Avia., No. 839-840, 19/10/42, pp. 27-28.)
77	5547	Germany/ Japan ...	*Aircraft Carried by Submarines.* (Inter. Avia., No. 839-840, 19/10/42, p. 31.)
78	5549	U.S.A. ...	*Tail Gun on B-17F Bomber.* (Inter. Avia., No. 839-840, 19/10/42, p. 1.)
79	5559	U.S.A. ...	*Extra Wide Airscrew Blades of Lockheed Bomber "Ventura."* (Bee-Hive (United Aircraft), Vol. 16, No. 12, Dec., 1941, p. 15.)
80	5560	G.B.	*Fighter Armament (Modern Fixed Gun Installation).* (Flight, Vol. 42, No. 1,768, 12/11/42, pp. 518-522.)
81	5564	G.B.	*Spitfire V (Recog. Details).* (Flight, Vol. 42, No. 1,768, 12/11/42, p. a.)
82	5565	Italy	*Reggiane Re. 2001 (Recognition Details).* (Flight, Vol. 42, No. 1,768, 12/11/42, p. b.)
83	5566	U.S.S.R. ...	*Russian Method for Finding Night Targets* (A. Goryev, Flight, Vol. 42, No. 1,768, 12/11/42, p. 530.)
84	5567	U.S.A. ...	*Ryan P.T.-25 Plastic Trainer.* (Flight, Vol. 42, No. 1,768, 12/11/42, p. 531.)
85	5572	G.B.	*Avro Manchester Long Range Bomber.* (Flugwehr und Technik, Vol. 4, No. 10, Oct., 1942, p. 274.)
86	5573	Germany ...	*New German Gliders (24 m Span, 2,250 kg. Useful Load).* (Flugwehr und Technik, Vol. 4, No. 10, Oct., 1942, p. 275.)
87	5621	Germany ...	*The Interpolation of Family Curves with Special Reference to the Calculation of Shell Trajectories.* (R. Sauer, Z.A.M.M., Vol. 20, No. 5, Oct., 1940, pp. 280-284.)
88	5648	U.S.A. ...	*American Opinion on U.S. Aircraft (with British Comments).* (Aeroplane, Vol. 63, No. 1,642, 13/11/42, pp. 156-157.)

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89	5649	Germany	...	*Leaders of the Luftwaffe (X).* (Aeroplane, Vol. 63, No. 1,642, 13/11/42, p. 569.)
90	5651	G.B.	...	*Advantages of Rearward Fire.* (Aeroplane, Vol. 63, No. 1,642, 13/11/42, p. 578.)
91	5660	U.S.A.	...	*Army Glider Pilot Training.* (U.S. Air Services, Vol. 27, No. 9, Sept., 1942, pp. 15-46.)
92	5661	U.S.A.	...	*Curtiss "Helldiver" (Photo).* (U.S. Air Services, Vol. 27, No. 9, Sept., 1942, p. 12.)
93	5703	U.S.A.	...	*American Opinions on American Flying Equipment.* (Inter. Avia., No. 841-842, 31/10/42, pp. 17-19.)
94	5705	U.S.A.	...	*Vultee Vengeance Dive Bomber taken over by U.S. Army Air Force (Vultee A-31 "Georgia.").* (Inter. Avia., No. 841-842. 31/10/42, p. 19.)
95	5707	U.S.A.	...	*Lockheed-Vega "Ventura" (U.S. Army B-34).* (Inter. Avia., No. 841-842, 31/10/42, pp. 19-20.)
96	5708	Canada	...	*Canadian Production of Mosquito Aircraft.* (Inter. Avia., No. 841-842, 31/10/42, pp. 23-24.)
97	5709	G.B. ...	...	*Aircraft Conversions (Hampden, Mustang, Sea Hurricane, etc.).* (Inter. Avia., No. 841-842, 31/10/42, pp. 1 and 21.)
98	5710	Germany	...	*New German Flying Equipment (Ju. 288, He. 177).* (Inter. Avia., No. 841-842, 31/10/42. p. 25.)
99	5711	G.B. ...	...	*De Havilland Mosquito.* (Inter. Avia., No. 841-842, 31/10/42, p. 22.)
100	5713	France	...	*Bloch 175 Torpedo Aircraft.* (Inter. Avia., No. 841-842, 31/10/42, p. 28.)
101	5718	U.S.A.	...	*Boeing B-17F Flying Fuselage Floor Turret.* (Inter. Avia., No. 841-842, 31/10/42, p. 1.)
102	5719	G.B. ...	...	*Organisation of the British Air Force.* (Inter. Avia., No. 841-842, 31/10/42, pp. 1-14.)
103	5726	U.S.A.	...	*Air Power and Sea Strategy.* (J. A. Ward, Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 68-71 and 241-242.)
104	5734	U.S.A.	...	*Consolidated Catalina (Sect. Drawing).* (Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 152-153.)
105	5744	U.S.A.	...	*Martin "Mars" Patrol Bomber.* (Aero Digest, Vol. 41, No. 2, Aug., 1942, p. 194.)
106	5746	U.S.A.	...	*Improvised Bomb Sight (20 cents) Used on the Tokio Raid (The Greene Sight).* (Aero Digest, Vol. 41, No. 2, Aug., 1942, p. 214.)
107	5748	U.S.A.	...	*Comfortization of Military Aircraft (II).* (A. A. Arnhym, Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 220-236.)
108	5749	U.S.A.	...	*Boeing XPP-1 Patrol Bomber (Photograph).* (Aero Digest, Vol. 41, No. 2, Aug., 1942, p. 309.)
109	5780	G.B. ...	...	*De Havilland Mosquito.* (Engineer, Vol. 174, No. 4,529, 30/10/42, pp. 356-357.)
110	5784	G.B. ...	...	*Parnall Power Operated Gun Turret.* (Engineering, Vol. 154, No. 4,008. 6/11/42, pp. 366-367 and 378.)

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111	5811	U.S.A. ...	*Gun Mountings on B17 (Flying Fortress) (Photograph).* (Aeronautics, Vol. 7, No. 3, Oct., 1942, p. 71.)
112	5813	Japan ...	*British Air Mission to Japan 1921-22 (IV).* (Aeroplane, Vol. 63, No. 1,641, 6/11/42, pp. 535-537.)
113	5814	G.B.	*De Havilland Day Bombers (1916-1941) (Photograph).* (Aeroplane, Vol. 63, No. 1,641, 6/11/42, pp. 538-540.)
114	5815	Germany ...	*Leaders of the Luftwaffe (IX).* (Aeroplane, Vol. 63, No. 1,641, 6/11/42, p. 541.)
115	5816	Germany ...	*Bucker Bu. 181 (Bestmann).* (Aeroplane, Vol. 63, No. 1,641, 6/11/42, p. 541.)
116	5817	G.B.	*Wellington III (Recog. Details).* (Aeroplane, Vol. 63, No. 1,641, 6/11/42, p. 543.)
117	5818	U.S.A. ...	*Douglas Boston III (Recog. Details).* (Aeroplane, Vol. 63, No. 1,641, 6/11/42, p. 543.)
118	5819	G.B.	*Fire Power and Tail Turret.* (Aeroplane, Vol. 63, No. 1,641, 6/11/42, p. 552.)
119	5832	Japan ...	*Mitsubishi S-OO Fighter (Photo).* (Aeroplane, Vol. 63, No. 1,640, 30/10/42, p. 499.)
120	5833	G.B.	*Fire Power and the Tail Turret.* (Aeroplane, Vol. 63, No. 1,640, 30/10/42, p. 500.)
121	5839	G.B.	*De Havilland Mosquito.* (Aeroplane, Vol. 63, No. 1,640, 30/10/42, p. 500.)
122	5835	U.S.A. ...	*North American B.25 Mitchell (Photo).* (Aeroplane, Vol. 63, No. 1,640, 30/10/42, p. 504.)
123	5836	Germany ...	*Leaders of the Luftwaffe, VIII.* (Aeroplane, Vol. 63, No. 1,640, 30/12/42, p. 507.)
124	5838	U.S.A. ...	*American Criticism of Their Aircraft.* (Aeroplane, Vol. 63, No. 1,640, 30/10/42, pp. 510-511.)
125	5839	G.B.	*Experiences of the British Air Mission to Japan, 1921-1922.* (Aeroplane, Vol. 63, No. 1,640, 30/10/42, pp. 512-513.)
126	5840	G.B.	*Fowler Flaps in Westland "Whirlwind" (Photo).* (Aeroplane, Vol. 63, No. 1,640, 30/10/42, pp. 519 and 520.)
127	5857	G.B.	*De Havilland Mosquito.* (Flight, Vol. 42, No. 1,766, 29/10/42, pp. 466-467.)
128	5858	G.B.	*Fairey Fulmar (Recog. Details)* (Flight, Vol. 42, No. 1,766, 29/10/42, p. a.)
129	5859	U.S.A. ...	*Arado Ar. 196 (Recog. Details)* (Flight, Vol. 42, No. 1,766, 29/10/42, p. b.)
130	5860	U.S.A. ...	*Some Arado Types (80, 199, 198, 81).* (Flight, Vol. 42, No. 1,766, 29/10/42, pp. 473-477.)
131	5878	Germany ...	*Tail Guns on F.W. 198 (Photograph).* (Flight, Vol. 42, No. 1,767, 5/11/42, p. 498.)
132	5879	G.B.	*Bristol Beaufort II (Recog. Details).* (Flight, Vol. 42, No. 1,767, 5/11/42, p. a.)
133	5880	Italy	*Savoia Marchetti S.M. 84 (Recog. Details).* (Flight, Vol. 42, No. 1,767, 5/11/42, p. b.)

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134	5881	G.B. ...	*Parnall Hydraulic Gun Turret Operation.* (Flight, Vol. 42, No. 1,767, 5/11/42, pp. 502-503,)
135	5893	Germany	*Air Attacks on Convoys (Illustrated).* (Luftwelt, Vol. 9, No. 19, 1/10/42, pp. 362-371.)
136	5897	Germany	*Internal Ballistics—on the Pressure Required to Force Guide Ring Through the Rifling.* (F. Gabriel, W.T.M., Vol. 46, No. 9, Sept., 1942, pp. 223-224.)
137	5898	G.B. ...	*New Spitfire with Merlin LXI Engine and Four-Bladed Airscrew (Photo).* (Aeroplane, Vol. 63, No. 1,644, 27/11/42, p. 612.)
138	5899	G.B. ...	*Supermarine Seafire (Spitfire Vc Modified for Deck Landing (Photo).* (Aeroplane, Vol. 63, No. 1,644, 27/11/42, p. 614.)
139	5900	U.S.A.	*Douglas C53 (Dakota II) Transport (Photo).* (Aeroplane, Vol. 63, No. 1,644, 27/11/42, pp. 616 and 617.)
140	5901	Germany	*Leaders of the Luftwaffe.* (Aeroplane, Vol. 63, No. 1,644, 27/11/42, p. 619.)
141	5902	G.B. ...	*Parachutes, II (Historical).* (C. G. Grey, Aeroplane, Vol. 63, No. 1,644, 27/11/42, pp. 620-621.)
142	5903	G.B. ...	*Advantages of Rearward Fire, with Photographs of Representative Rear Turrets.* (W. S. Shackleton, Aeroplane, Vol. 63, No. 1,644, 27/11/42, pp. 622-625.)
143	5905	U.S.A.	*Consolidated C-87 Transport (Liberator) (Photograph).* (Aeroplane, Vol. 63, No. 1,644, 27/11/42, p. 633.)
144	5908	U.S.A.	*Consolidated "Catalina". (Sectional Drawing).* (Autom. Ind., Vol. 87, No. 4, 15/8/42, pp. 30-31.)
145	5910	G.B. ...	*Spitfire V in Production.* (Autom. Ind., Vol. 87, No. 4, 15/8/42, pp. 36-39 and 82.)
146	5911	U.S.S.R.	*Russian Military Aircraft.* (M. W. Bourdon, Autom. Ind., Vol. 87, No. 4, 15/8/42, pp. 40-42 and 72-74.)
147	5915	U.S.A.	*Crowell Ground Trainer.* (Flugsport, Vol. 34, No. 23, 11/11/42, pp. 346-347.)
148	*5924	Germany	*Installation of Fixed Guns in the Wing Root Joint (Pat. Series 41, No. 726,326).* (Heinkel, Flugsport, Vol. 34, No. 23, 11/11/42, pp. 167-168.)
149	5925	Germany	*Fuselage Turrets (Pat. Series 41, No. 726,209).* (Heinkel, Flugsport, Vol. 34, No. 23, 11/11/42, p. 168.)
150	5928	G.B. ...	*New Spitfire (Merlin 61 Engine and Four-Bladed Airscrew) (Photo).* (Flight, Vol. 42, No. 1,769, 19/11/42, p. 545.)
151	5930	Germany	*Blohm and Voss Ha. 138 (Recog. Details).* (Flight, Vol. 42, No. 1,769, 19/11/42, p. a.)
152	5931	U.S.A.	*Martin 162 "Mariner" (Recog. Details).* (Flight, Vol. 42, No. 1,769, 19/11/42, p. b.)

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153	5932	G.B. ...	... *Fighter Armament, II (Modern Gun Installations).* (Flight, Vol. 42, No. 1,769, 19/11/42, pp. 553-557.)
154	5933	G.B. ...	... *Torpedo Bombers.* (L. W. Rosenthal, Flight, Vol. 42, No. 1,769, 19/11/42, pp. 561-562.)
155	5939	G.B. ...	... *New Spitfire with Merlin 61 Engine (Photograph).* (Aeroplane, Vol. 63, No. 1,643, 20/11/42, pp. 583 and 586.)
156	5940	Germany	... *Dornier Do. 217 E2 Bomber (Photograph).* (Aeroplane, Vol. 63, No. 1,643, 20/11/42, p. 558.)
157	5941	Germany	... *Leaders of the Luftwaffe (XI),* (Aeroplane, Vol. 63, No. 1,643, 20/11/42, p. 591.)
158	5942	G.B. ...	... *Glider Training in the A.T.C.* (Aeroplane, Vol. 63, No. 1,643, 20/11/42, p. 592.)
159	5943	G.B. ...	... *Parachutes, I.* (C. G. Grey, Aeroplane, Vol. 63, No. 1,643, 20/11/42, pp. 594-595.)
160	5944	U.S.A.	... *Grumman G-44 (Gosling) (Recog. Details).* (Aeroplane, Vol. 63, No. 1,643, 20/11/42, p. 597.)
161	5945	U.S.A.	... *Grumman G21B (Goose) (Recog. Details).* (Aeroplane, Vol. 63, No. 1,643, 20/11/42, p. 597.)
162	5947	U.S.A.	... *American Transport Aircraft.* (Aeroplane, Vol. 63, No. 1,643, 20/11/42, p. 605.)
163	5948	G.B. ...	... *Advantages of Rear Fire.* (Aeroplane, Vol. 63, No. 1,643, 20/11/42, p. 606.)
164	5949	G.B. ...	... *Catapult Training.* (Flight, Vol. 42, No. 1,770, 26/11/42, pp. 575-577.)
165	5950	U.S.A.	... *Douglas Dauntless (Recog. Details).* (Flight, Vol. 42, No. 1,770, 26/11/42, p. a.)
166	5951	Germany	... *Junkers Ju. 87B (Recog. Details).* (Flight, Vol. 42, No. 1,770, 26/11/42, p. b.)
167	5952	Various	... *Fighter Armament, III (German, American, Russian and Japanese).* (Flight, Vol. 42, No. 1,770, 26/11/42. pp. 579-584.)

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168	5420	Germany	... *Basic Factors Influencing Shear Board Design of Deep Water Trawling Nets (Reduction of Drag).* (B. C. Grosskopf, W.R.H. Vol. 23, No. 16, 15/8/42, pp. 221-224.)
169	5422	Germany	... *Flexible Fairing for Ship Rudders (Pat. No. 713,600).* (T. Schneider, W.R.H., Vol. 23, No. 16, 15/8/42, p. 229.)
170	5455	Germany	... *Sound Propagation by Swiftly Moving Bodies.* (L. Prandtl, Schriften Akad L.F.F., No. 7, 18/2/38, pp. 1-14.)
171	5480	Germany	... *Compressibility Effects in Air Flow.* (L. Prandtl, Schriften Akad L.F.F., No. 30, 12/11/37, pp. 1-15.)
172	*5609	Germany	... *The Elliptical Wing Examined on the Basis of Potential Theory.* (K. Krienes, Z.A.A.M., Vol. 20, No. 2, April, 1940, pp. 65-68.)
173	5616	Germany	... *The Rotary Motion of a Fluid Above a Fixed Plane.* (U. T. Bodenwadt, Z.A.M.M., Vol. 20, No. 5, Oct., 1940, pp. 241-254.)

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174	5617	Germany	...	*The Transition from Subsonic to Supersonic Flow of Gas.* (H. Gortler, Z.A.M.M., Vol. 20, No. 5, October, 1940, pp. 254-262.)
175	*5623	Germany	...	*Effect of Aspect Ratio on the Relation Between Normal and Tangential Force on a Wing.* (D. Kuchemann, Z.A.M.M., Vol. 20, No. 5, Oct., 1940, pp. 284-290.)
176	5624	Germany	...	*Discussion on the Exact Solution of the Differential Equation of an Adiabatic Gas Flow (Shock Line and Limiting Lines).* (W. Tollmien and F. Ringleb, Z.A.M.M., Vol. 20, No. 5, Oct., 1940, pp. 295-296.)
177	5637	U.S.A.	...	*A Simplified Two-Dimensional Theory of Thin Airfoils.* (H. J. Stewart, J. Aeron. Sci., Vol. 9, No. 12, Oct., 1942, pp. 452-456.)
178	*5639	U.S.A.	..	*A Simple Method of Applying the Compressibility Corrections in the Determination of True Air Speed.* (W. C. Schoolfield, J. Aeron. Sci., Vol. 9, No. 12, Oct., 1942, pp. 457-464.)
179	5721	Germany	...	*The Navier-Stokes Stress for Viscous Fluids.* (E. Mohr, L.F.F., Vol. 18, No. 9, Sept. 20, 1941.) (R.T.P. Translation No. T.M. 1,029.)
180	5743	U.S.A.	...	*North American New Wind Tunnel.* (Aero Digest, Vol. 41, No. 2, Aug., 1942, p. 193.)
181	5758	U.S.A.	...	*Increased Importance of Small Scale Models in Ship Research (Based Mainly on Work Carried Out in the U.S.A.).* (W. Hintertham, W.R.H., Vol. 23, No. 18, 15/9/42, pp. 247-250.)
182	5766	U.S.A.	...	*Pressure Drop in the Flow of Compressible Fluids.* (W. E. Lobo and others, Ind. and Eng. Chem. (Ind. Ed.). Vol. 34, No. 7, July, 1942, pp. 821-823.)
183	5927	U.S.S.R.	...	*The Nature of the Destruction Action of Cavitation.* (M. Kornfeld and L. Smorov, J. of Physics, U.S.S.R., Vol. 6, No. 1-2, 1942.)
184	5938	Germany	...	*Potential Theory of the Vibrating Circular Wing (Part II—Numerical Calculations).* (K. Krienes and Th. Schade, L.F.F., Vol. 19, No. 8, 20/8/42, pp. 282-291.)
185	5954	U.S.A.	...	*Two-Dimensional Potential Flow Past an Arbitrary Thick Wing Profile.* (F. Keune, Jahrbuch 1938 der deutschen, L.F.F., Vol. 1, pp. 3-26.) (R.T.P. Translation No. T.M. 1,023.)
186	5955	U.S.A.	...	*The Stability of Laminar Flow Past a Sphere.* (J. Pretsch, L.F.F., Vol. 18, No. 10, 27/10/41.) (R.T.P. Translation No. 1,526 and T.M. No. 1,017.)
187	5956	U.S.A.	...	*On the Symmetrical Potential Flow of Compressible Fluid Past a Circular Cylinder in the Tunnel in the Subcritical Zone.* (E. Lamla, L.F.F., Vol. 17, No. 10, 26/10/40.) (R.T.P. Translation No. T.M. 1,018.)

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188	5282	France ...	*New French Aircraft or Projects (Bloch 157, 161, 162. 800, SO 90/91, SO 30N, SO 30R).* (Inter. Avia., No. 837-838, 7/10/42, pp. 11-13.)
189	5283	France ...	*S.E. 700 Gyroplane.* (Inter. Avia., No. 837-838, 7/10/42, pp. 13-14.)
190	5287	U.S.A. ...	*American Cargo Planes (B-24, Curtiss C-76 (C-46?), C-69 (L-49), C-60 (L-18), JR-25 (VS-44), JRF (Grumman)).* (Inter. Avia., No. 837-838, 7/10/42, pp. 16-17 and I.)
191	5289	U.S.A.	*Budd Stainless Steel Transport Planes Project.* (Inter. Avia., No. 837-838, 7/10/42, pp. 17-18.)
192	5290	U.S.A. ...	*Cargo Transport Difficulties (Fuel Supply).* (Inter. Avia., No. 837-838. 7/10/42, pp. 18-19.)
193	5294	U.S.A. ...	*U.S. Mobile Crane for Repair and Maintenance (Photograph).* (Inter. Avia., No. 837-838, 7/10/42, p. I.)
194	5307	G.B.	*Bibliography of Published Information on Runways (1, General; 2, Drainage; 3, Methods of Melting Ice and Snow).* (R.T.P.3, Bibliography No. 67, Oct., 1942.)
195	5376	G.B.	*Rotol Airscrew Development (including Cable Cutting Edge).* (Aeroplane, Vol. 63, No. 1,637, 9/10/42, p. 433.)
196	5431	U.S.A. ...	*Giant Lifting Crane for Aircraft (Photo).* (Autom. Ind., Vol. 87, No. 3, 1/8/42, p. 52.)
197	5443	Germany ...	*Aircraft Performance Improvements.* (W. Messerschmitt, Schriften Akad L.F.F., No. 1, 1/3/38, pp. 23-31.)
198	5445	Germany ...	*Measures for Improving the Zeppelin Airships for Long Distance Flights.* (L. F. Durr, Schriften Akad L.F.F., No. 2, 17/7/38, pp. 15-30.)
199	5446	Germany ...	*Development of the Zeppelin Airship for Long Distance Flights.* (A. Ehrle, Schriften Akad L.F.F., No. 2, 17/7/38, pp. 33-47.)
200	5453	Germany ...	*Problems and Present Development of Blind Landing System.* (P. F. Handel, Schriften Akad L.F.F., No. 6, 27/1/39, pp. 4-27.)
201	5466	Germany ...	*On the Stability of the Helicopter.* (B. Schlippe and R. Dietrich, Schriften Akad L.F.F., No. 16, 15/7/39, pp. 1-61.)
202	5470	Germany ...	*Autogyro and Helicopter Problems.* (H. Focke, Schriften Akad L.F.F., No. 22, 26/11/37, pp. 1-57.)
203	5478	Germany ...	*Problems of High Altitude Flight.* (A. Hansen, Schriften Akad L.F.F., No. 29, 28/10/37, pp. 1-34.)
204	5479	Germany ...	*Report on the Design of High Altitude Aircraft.* (H. Wagner, Schriften Akad L.F.F., No. 29, 28/10/37, pp. 35-56.)
205	5481	Germany ...	*The Resistance Problem of High Speed Flight.* (A. Busemann, Schriften Akad L.F.F., No. 30, 12/11/37, pp. 17-36.)

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206	5482	Germany ...	*Problems of High Speed Flight.* (W. Messerschmitt, Schriften Akad L.F.F., No. 31, 26/11/37, pp. 1-24.)
207	5485	Germany ...	*Inertia Effects of the Airscrew During a Turn.* (R. Grammel, Schriften Akad L.F.F., No. 36, 25/4/41, pp. 1-23.)
208	5488	Germany ...	*Fundamental Equations of Flight Mechanics.* G. A. Crocco, No. 38, 20/3/41, pp. 3-169.)
209	*5490	U.S.A. ...	*Tricycle Landing Gear Design (Part 2).* (E. S. Jenkins and A. F. Donovan, J. Aeron. Sciences, Vol. 9, No. 11, Sept., 1942, pp. 397-410.)
210	5492	U.S.A. ...	*Rotor Bending Moments in Plane of Flapping.* (A. Klemin and others, J. Aeron. Sciences, Vol. 9, No. 11, pp. 411-418.)
211	5505	Germany ...	*Device for Closing Gap in Slotted Flaps (Pat. Series* 38, *No.* 724,233). (Junkers, Flugsport, Vol. 34, No. 20, 30/9/42, p. 153.)
212	5506	Germany ...	*Mounting for Automatic Nose Slots on Wings (Pat. Series* 38, *No.* 724,312). (Arado, Flugsport, Vol. 34, No. 20, 30/9/42, p. 153.)
213	5507	Germany ...	*Controllable Mounting of Wing Nose Spoiler and Interconnection with Flap Mechanism (Pat. Series* 38, *No.* 724,126). (Messerschmitt, Flugsport, Vol. 34, No. 20, 30/9/42, p. 153.)
214	5510	Germany ...	*Spherical Tyres for Aircraft Wheels (Pat. Series* 38, *No.* 724,314). (D.V.L., Flugsport, Vol. 34, No. 20, 30/9/42, pp. 155-156.)
215	5511	Germany ...	*Retractable Undercarriages (Pat. Series* 38, *No.* 722,977). (Henschel, Flugsport, Vol. 34, No. 20, 30/9/42, p. 156.)
216	5524	Germany ...	*Oil Seal for Variable Pitch Airscrew Blade Foot Mounting (Pat. Series* 39, *No.* 724,362). (G. Schwarz, Flugsport, Vol. 34, No. 21, 14/10/42, p. 157.)
217	5525	Germany ...	*Automatic Pitch Changing Mechanism (Pat. Series* 39, *No.* 724,317). (Alfa Romeo, Flugsport, Vol. 34, No. 21, 14/10/42, pp. 157-158.)
218	5531	Germany ...	*Evaporative Heating Circuit for Aircraft Cabins (Pat. Series* 39, *No.* 723,857). (Dornier, Flugsport, Vol. 34, No. 21, 14/10/42, p. 159.)
219	5534	Germany ...	*Flexible Mounting for Airfield Surface Lights (Retract Underwheel Pressure) (Pat. Series* 39, *No.* 723,807). (Pintsch, Flugsport, Vol. 34, No. 21, 14/10/42, p. 160.)
220	5542	Sweden ...	*Glider Construction in Sweden.* (Inter. Avia., No. 839-840, 19/10/42, p. 24.)
221	5548	... ...	*Giant Flying Boat S.E. 200 (Photograph).* (Inter. Avia., No. 839-840, 19/10/42, p. I.)
222	5563	Germany ...	*Floating Landing T for Seaplane Bases.* (Flight, Vol. 42, No. 1,768, 12/11/42, p. 526.)
223	5571	Switzerland ...	*Flutter of Aircraft Wings without Separation of Flow.* (G. Datwyler, Flugwehr und Technik, Vol. 4, No. 10, Oct., 1942, pp. 270-274.)

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224	5603	U.S.A. ...	*Requirements for Aircraft Oil Servicing Equipment for the War Effort.* (C. W. McAllister, S.A.E. Preprint, October Meeting, 1942, pp. 1-11.)
225	5626	Switzerland ...	*Aerodynamic Design of Strut Roots and Fairings.* (W. Pfenninger, Flugwehr und Technik, Vol. 4, No. 9, Sept., 1942, pp. 237-241.)
226	*5635	Germany ...	*Conversion Tables for Airscrew Coefficients.* (W. Weinig, Aerodynamics of the Airscrew (Text Book).)
227	5636	U.S.A. ...	*Vector Methods of Flutter Analysis.* (W. M. Bleakney and J. D. Hamm, J. Aeron Sci., Vol. 9, No. 12, Oct., 1942, pp. 439-451.)
228	*5640	U.S.A. ...	*Propeller Forces Due to Yaw and Their Effect on Aircraft Stability.* (L. B. Rumph and others, J. Aeron. Sci., Vol. 9, No. 12, Oct., 1942, pp. 465-470.)
229	5662	U.S.A. ...	*Synthetic Rubber Fuel Tanks.* (U.S. Air Services, Vol. 27, No. 9, Sept., 1942, p. 24.)
230	5702	France ...	*New Type Breguet Helicopter G 10A.* (Inter. Avia., No. 841-842, 31/10/42, pp. 26-28.)
231	5704	G.B.	*Rotol Airscrews Development (Electrical Operation).* (Inter. Avia., No. 841-842, 31/10/42, p. 23.)
232	*5714	France ...	*High Speed Aircraft, Arsenal V.G.* 50. (Inter. Avia., No. 841-842, 31/10/42, p. 28.)
233	5715	France ...	*Sea Rudder of Latecoere* 631 *Giant Flying Boat* (Inter. Avia., No. 841-842, 31/10/42, pp. I and 28.)
234	5716	France ...	*Flight Trials of Potez Scan* 161 *Giant Flying Boat.* (Inter. Avia., No. 841-842, 31/10/42, p. 28.)
235	5717	France ...	100-*Ton Flying Boats—French Project.* (Inter. Avia., No. 841-842, 31/10/42, p. 29.)
236	5729	U.S.A. ...	*Fire Truck for Airports.* (Aero Digest, Vol. 41, No. 2, Aug., 1942, p. 106.)
237	5730	U.S.A. ...	*Technique in Aerobatic Manœuvres.* (C. C. Ferranti, Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 124-128 and 247.)
238	5735	U.S.A. ...	*Diehls Static Stability Coefficient.* (M. M. Munk, Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 154 and 236-237.)
239	5740	U.S.A. ...	*Handley Tricycle Landing Gears.* (J. A. Johnson, Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 174-181 and 191.)
240	5791	G.B.	*Servicing Civil Aircraft.* (Engineer, Vol. 174, No. 4,530, 6/11/42, pp. 387-388.)
241	5808	G.B.	*Aircraft Protective Treatment.* (W. L. Morse, Aeronautics, Vol. 7, No. 3, Oct., 1942, pp. 44-47.)
242	5809	G.B.	*Electrical Layout on Aircraft.* (G. H. G. Garbett, Aeronautics, Vol. 7, No. 3, Oct., 1942, pp. 52-56.)
243	5837	G.B.	*Messier Hydraulic Control, Type C.* (Aeroplane, Vol. 63, No. 1,640, 30/10/42, pp. 508-509.)
244	5855	U.S.A. ...	*Lockheed Pressure Chamber for Tests of Entire Pressurized System Under Simulated Altitude Conditions.* (F. P. Dillon and others, J. Aeron. Sciences, Vol. 1, No. 6, Sept., 1942, pp. 13-15.)

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245	5856	U.S.A. ...	*De-Icer Servicing and Installation* (*Goodrich*). (J. Aeron. Sciences, Vol. 1, No. 6, Sept., 1942, pp. 17-27.)
246	5896	Germany ...	*Some Notes on Slow Speed Aircraft.* (W.T.M., Vol. 46, No. 9, Sept., 1942, pp. 216-215.)
247	5904	G.B.	*Plastic Bond for Wood Blades.* (Aeroplane, Vol. 63, No. 1,644, 27/11/42, p. 627.)
248	5906	U.S.A. ...	*Manufacture of Curtiss Propellers.* (J. Geschelin, Autom. Ind., Vol. 87, No. 4, 15/8/42, pp. 20-25.)
249	*5912	Germany ...	*New Horten High Altitude Glider of the Flying Wing Type with Parabolic Wings.* (G. Horten, Flugsport, Vol. 34, No. 23, 11/11/42, pp. 341-351.)
250	5913	Germany ...	*Tailless Parasol Monoplane Go.* 147. (Flugsport, Vol. 34, No. 23, 11/11/42, p. 345.)
251	5916	Germany ...	*Boundary Layer Control by Suction or Pressure* (*Pat. Series* 41, *No.* 725,477). (Junkers, Flugsport, Vol. 34, No. 23, 11/11/42, p. 165.)
252	5917	Germany ...	*Aileron or Flap Mechanism Ensuring Smooth Curvature at the Hinges* (*Pat. Series* 41, *No.* 726,323). (D.V.L., Flugsport, Vol. 34, No. 23, 11/11/42, p. 165.)
253	*5918	Germany ...	*Drag Reduction at High Speeds by Inducing Supersonic Vibrations of the Surface* (*Pat. Series* 41, *No.* 726,324). (Messerschmitt, Flugsport, Vol. 34, No. 23, 11/11/42, pp. 165-166.)
254	5920	Germany ...	*Tiltable Wing Nose* (*Pat. Series* 41, *No.* 725,768). (Messerschmitt, Flugsport, Vol. 34, No. 23, 11/11/42, p. 166.)
255	5921	Germany ...	*Adjustable Wing Nose* (*Pat. Series* 41, *No.* 726,206). (D.V.L., Flugsport, Vol. 34, No. 23, 11/11/42, p. 167.)
256	*5922	Germany ...	*Locking Device for Aircraft Control Surfaces* (*Pat. Series* 41, *No.* 726,207). (Fieseler, Flugsport, Vol. 34, No. 23, 11/11/42, p. 167.)
257	5923	Germany ...	*Interconnection of Throttle and High Lift Devices on Aircraft* (*Pat. Series* 41, *No.* 726,325). (Henschel, Flugsport, Vol. 34, No. 23, 11/11/42, pp. 167-168.)
258	5925	Germany ...	*Retractable Undercarriage* (*Pat. Series* 41, *No.* 725,307). (Junkers, Flugsport, Vol. 34, No. 23, 11/11/42, p. 168.)
259	5929	G.B.	*The Aerial Mercantile Marine* (*Flying Boat*). (J. A. Sizer, Flight, Vol. 42, No. 1,769, 19/11/42, pp. 547-551.)
260	5937	Germany ...	*The Calculation of Static Longitudinal Stability in Power Flight.* (R. Schubert, L.F.F., Vol. 19, No. 8, 20/8/42, pp. 271-281.)
261	5946	France ...	*French Commercial Flying Boat.* (Aeroplane, Vol. 63, No. 1,643, 20/11/42, pp. 604-605.)
262	5953	G.B.	*Hydulignum Blades for Airscrew* (*Impregnated Wood, Compressed both Flat and Edgewise*) (Flight, Vol. 42, No. 1,770, 26/11/42, pp. 586-587.)

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263	5957	U.S.A. ...	*Strength Tests on Hulls and Floats.* (K. Matthews, Jahrbuch 1938 der deutschen L.F.F., Vol. 1, pp. 342-347.) (R.T.P. Translation T.M. 1,019.)
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264	5286	G.B.	*Turbine Airscrew Combinations, II.* (G. Geoffrey Smith, Flight, Vol. 42, No. 1,765, 22/10/42.)
265	5303	G.B.	*Bibliography of Published Information (including Translations) on Engine Exhaust (1, Methods of Analysis; 2, Smoke Density; 3, Composition of Exhaust and Mixture Strength; 4, CO Poisoning; 5, Detection of Inflammable Vapours; 6, Flame Traps).* (R.T.P.3, Bibliography No. 71, Oct., 1942.)
266	5308	G.B.	*Bibliography of Published Information (including Translations) on Oil Engines (General).* (R.T.P.3, Bibliography No. 66, Oct., 1942.)
267	5309	G.B.	*Bibliography of Published Information (including Translations) on Oil Engines (Named Types).* (R.T.P.3, Bibliography No. 65, Oct., 1942.)
268	5316	U.S.A. ...	*Solar Power Plants.* (J. A. Sibley, Sci. Am., Vol. 166, No. 6, June, 1942, pp. 284-286.)
269	5326	G.B.	*Gipsy Queen, IV.* (Flight, Vol. 42, No. 1,763, 8/10/42, pp. 395-396.)
270	5353	G.B.	*Bristol Hercules Power Unit.* (Aeroplane, Vol. 63, No. 1,636, 2/10/42, pp. 394-397.)
271	5367	France ...	*Future French Aircraft Engines.* (Flight, Vol. 42, No. 1,762, 1/10/42, p. 371.)
272	5370	G.B.	*Supercharged Version of "Gipsy Queen."* (Aeroplane, Vol. 63, No. 1,637, 9/10/42, p. 413.)
273	5373	Japan ...	*Mitsubishi Kinsei Aero Engine.* (Aeroplane, Vol. 63, No. 1,637, 9/10/42, pp. 420-421.)
274	5379	G.B.	*Railway Bearing Metals.* (J. N. Bradley and H. O'Neill, Engineering, Vol. 154, No. 4,006, 23/10/42, pp. 339-340.)
275	5381	G.B.	*Railway Bearing Metals.* (J. N. Bradley and H. O'Neil, Engineer, Vol. 174, No. 4,528, 23/10/42, pp. 347-348.)
276	5414	G.B.	*Lubrication of Steam Engines.* (F. J. Matthews, Sheet Metal Industries, Vol. 16, No. 186, Oct., 1942, pp. 1497-1498.)
277	5419	G.B.	*Bronze Bearings.* (Sheet Metal Industries, Vol. 16, No. 186, Oct., 1942, p. 1,570.)
278	5426	U.S.A. ...	*Diesel Engine Lubrication.* (P. M. Heldt, Autom. Ind., Vol. 87, No. 3, 1/8/42, pp. 26-28 and 70-72.)
279	5428	U.S.A. ...	*Al.-Bronze for Sleeve Valves.* (Autom. Ind., Vol. 87, No. 3, 1/8/42, p. 39.)
280	5444	Germany ...	*Development of the Aircraft Engine.* (O. Mader, Schriften Akad L.F.F., No. 1, 1/3/38, pp. 35-43.)
281	5450	Germany ...	*Some Dynamic Problems Connected with Piston Engines.* (R. Grammel, Schriften Akad L.F.F., No. 5, 13/1/39, pp. 1-17.)
282	5451	Germany ...	*Vibrations of the Engine Airscrew System.* (L. Lurenbaum, Schriften Akad L.F.F., No. 5, 13/1/39, pp. 19-44.)

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283	5462	Germany ...	*Experiments with Engine Cylinders of Geometrically Similar Design but Different Sizes with Notes on Future Aero Engine Development.* (W. Kamm, Schriften Akad L.F.F., No. 12, 3/3/39, pp. 1-33.)
284	5464	Germany ...	*Aero Engine Cooling, the Resistance Problem.* (H. Helmbold, Schriften Akad L.F.F., No. 14, 17/5/39, pp. 1-14.)
285	5473	Germany ...	*Limits and Lines of Development of the Aero Engine.* (F. Neugebauer, Schriften Akad L.F.F.. No. 26, 21/1/38, pp. 1-20.)
286	5498	U.S.A. ...	*The Use of Expander Type of Rings to Prevent Excessive Cylinder Reconditioning.* (P. E Friend, S.A.E. Preprints, Transport Meeting New York, Oct. 7-8, 1942.)
287	5526	Germany ...	*Cooling Air Control for Cowling of Radial Engines (Pat. Series 39, No. 723,998).* (B.M.W., Flugsport, Vol. 34, No. 21, 14/10/42, p. 158.)
288	5527	Germany ...	*Cowled Engine Radiator Installation (Pat. Series 39, No. 723,545).* (Henschel, Flugsport, Vol. 34, No. 21, 14/10/42, p. 158.)
289	5528	Germany ...	*Cowled Engine Radiator Installation (Pat. Series 39, No. 724,231).* (D.V.L., Flugsport, Vol. 34, No. 21, 14/10/42, p. 158.)
290	5529	Germany ...	*Hydraulic Gear Control for Supercharger or Airscrew Drives (Pat. Series 39, No. 723,806).* (B.M.W., Flugsport, Vol. 34, No. 21, 14/10/42, pp. 158-159.)
291	5537	France ...	*Gnome-Rhone 17R and 18R Engine (14 and 18-Cylinder Twin-Row Radials, 1,600 and 2,200 h.p. respectively).* (Inter. Avia., No. 839-840, 19/10/42, pp. 21-22.)
292	5555	Germany ...	*High Duty Plastic Bearings (from the German).* (Plastics, Vol. 6, No. 66, Nov., 1942, pp. 395-396.)
293	5562	U.S.A. ...	*Plastic Baffles in American Radial Engines.* (Flight, Vol. 42, No. 1,768, 12/11/42, pp. 518-522.)
294	5573	France ...	*Hispano 122 12-Cylinder Water-Cooled V Engine (1,500 h.p.) and 24-Cylinder H Engine (3,000 h.p.).* (Flugwehr und Technik, Vol. 4, No. 10, Oct., 1942, p. 275.)
295	5578	U.S.A. ...	*Diesel Engine Working Costs (from the U.S.A.).* (Engineering, Vol. 154, No. 4,007, 30/10/42, p. 352.)
296	5602	U.S.A. ...	*Surface Finish of Journals (Effect on Friction Wearing-in and Seizure).* (R. W. Dayton and others, Mech. Eng., Vol. 64, No. 10, Oct., 1942, pp. 718-726.)
297	5630	... ...	*Centrifugal Pumps in Exhaustors.* (F. Kluge, Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, pp. 623-628.)
298	5647	U.S.A. ...	*Duplex Cyclone.* (Aeroplane, Vol. 63, No. 1,642, 13/11/42, p. 155.)
299	5712	G.B.	*De Havilland Gipsy Six 111S (300 h.p. Take-off).* (Inter. Avia., No. 841-842, 31/10/42, p. 22.)

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301	5747	Germany	...	*B.M.W. 801A Engine.* (Aero Digest, Vol. 41, No. 2, Aug., 1942, p. 217.)
302	5781	G.B. ...	...	*Present-Day Design of the Velox Boiler.* (Engineer, Vol. 174, No. 4,529, 30/10/42, pp. 364-366.)
303	5782	G.B. ...	...	*Boilers—Past and Present, I.* (S. J. Thompson, Engineer, Vol. 174, No. 4,529, 30/10/42, pp. 356-357.)
304	5788	G.B. ...	...	*Boilers—Past and Present, II.* (S. J. Thompson, Engineer, Vol. 174, No. 4,530, 6/11/42, pp. 376-378.)
305	5789	G.B. ...	...	*The Origin of the Internal Combustion Engine.* (A. K. Bruce, Engineer, Vol. 174, No. 4,530, 6/11/42, pp. 383-385.)
306	5810	G.B. ...	...	*Supercharged Magneto with Integral Pump (Pat. No.* 545,540). (British Thomson-Houston Co., Aeronautics, Vol. 7, No. 3, Oct., 1942, pp. 58-59.)
307	5812	G.B. ...	...	*Bristol Hercules "Power Egg."* (Aeroplane, Vol. 63, No. 1,641, 6/11/42, p. 529.)
308	5823	Germany	...	*The Dive Bomber Engine (from the German).* (Light Metals, Vol. 5, No. 58, Nov., 1942, pp. 446-447.)
309	5854	U.S.A.	...	*Aircraft Engine Installation.* (E. C. Sulzman, J. Aeron. Sciences, Vol. 1, No. 6, Sept., 1942, pp. 5-11.)
310	5865	G.B. ...	...	*S.V. Carburettor, II (Jets, Needles, Capsules, Testing).* (F. C. Sheffield, Airc. Prod., Vol. 4, No. 48, Oct., 1942, p. 591.)
311	5882	G.B. ...	...	*Hercules Power Plant (Standardised Mounting).* (Flight, Vol. 42, No. 1,767, 5/11/42, pp. 504-507.)
312	5883	Japan	...	*Mitsubishi Kinsei Engine.* (Autom. Ind., Vol. 87, No. 1, 1/7/42, pp. 22-25 and 74-78.)
313	5884	U.S.A.	...	*Excess Air Coefficient and B.M.E.P. for Two and Four-Stroke Engines, with Note on Scavenging Efficiency.* (Autom. Ind., Vol. 87, No. 1, 1/7/42, pp. 26-27.)
314	5914	Germany	...	*Four-Bank Six-Cylinder Radial Engine with Crank Throws in One Plane (Pat. No.* 711,137). (Junkers, Flugsport, Vol. 34, No. 23, 11/11/42, p. 346.)
315	5936	Germany	...	*Friction Heat in Turbo Machinery.* (O. Pabst, L.F.F., Vol. 19, No. 8, 20/8/42, pp. 267-270.)
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316	5410	G.B. ...	...	*Summary of Work for Two Weeks Ending 3rd and 10th October, 1942, Issued by the Fuel Research Intelligence Section.*
317	5411	G.B. ...	...	*Summary of Work for Two Weeks Ending 19th and 26th Sept., 1942, Issued by the Fuel Research Intelligence Section.*
318	5429	G.B. ...	...	*Substitute Fuels in G.B.* (N. Clarke Jones, Autom. Ind., Vol. 87, No. 3, 1/8/42, pp. 40-44 and 76-78.)

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319	5457	Germany ...	*Co-operative Fuel Testing in Germany* (15 *Papers*). (Various authors, Schriften Akad L.F.F., Book 9, 10-11/5/39, pp. 1-377.)
320	5474	G.B.	*Progress and Prospects of Fuels and Lubricants for Aero Engines.* (M. Muller and Conradi, Shriften Akad L.F.F., No. 27, 10/12/37, pp. 1-9.)
321	5575	U.S.A. ...	*Oil Transport in Synthetic Containers.* (Engineering, Vol. 154, No. 4,009, 13/11/42, p. 388.)
322	5608	U.S.A. ...	*Use of Mixtures of Oil and Coal in Boiler Furnaces.* (W. C. Schroeder, A.S.M.E., October Meeting, 1942 (Preprints of Papers).)
323	5657	G.B.	*Fuel Research Intelligence Section.* (Summary for Three Weeks Ending 17th, 24th and 31st, 1942.)
324	5751	Germany ...	*High Grade Motor Spirit from Peat.* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 18, 25/9/42, p. 1,176.)
325	5775	U.S.A. ...	*Future Source of Power (Possible Uses of Photo Chemical Reactions).* (Scientific American, Vol. 167, No. 4, Oct., 1942, p. 166.)
326	5806	G.B.	*Condition of Freshly Burnt Gases.* (A. G. Gaydon, Nature, Vol. 150, No. 3,808, 24/10/42, pp. 481-483.)
327	5935	Germany ...	*Researches on Preliminary Chemical Reactions in Spark Ignition Engines.* (E. Muhlner, L.F.F., Vol. 19, No. 8, 20/8/42, pp. 249-266.)

MATERIALS AND ELASTICITY.

ITEM NO.	R.T.P. REF		TITLE AND JOURNAL.
328	5304	G.B.	*Bibliography of Published Information on Wood and Cellulose Plastics.* (R.T.P3, Bibliography No. 70, Oct., 1942.)
329	5305	G.B.	*Bibliography of Published Information on Synthetic Glues.* (R.T.P.3, Bibliography No. 69 Oct., 1942.)
330	5306	G.B.	*Bibliography of Published Information on Cements.* (R.T.P.3, Bibliography No. 68, Oct., 1942.)
331	5315	U.S.A. ...	*Failure of Root Crops as a Possible Supply o Natural Rubber.* (Sci. Am., Vol. 166, No. 6 June, 1942, pp. 276-277.)
332	5335	U.S.A. ...	*Plastics in Gas Mask Construction.* (Moderr Plastics, Vol. 19, No. 10, June, 1942, pp. 35-43 and 108.)
333	5337	U.S.A. ...	*Vinsol Resin from Pine Wood.* (Modern Plastics Vol. 19, No. 10, June, 1942, pp. 59 and 112.)
334	5338	U.S.A. ...	*Fillers—Swelling Properties and Structure.* (Modern Plastics, Vol. 19, No. 10, June, 1942, pp. 65-69 and 102.)
335	5339	U.S.A. ...	*High Impact Moulding Compounds.* (Modern Plastics, Vol. 19, No. 10, June, 1942, pp. 70-71.)
336	5340	U.S.A. ...	*Delectine—a New Insulating Material.* (Modern Plastics, Vol. 19, No. 10, June, 1942, pp. 72-74.)
337	5341	... ...	*Surface Irregularities of Clear Plastics (Method of Test).* (Modern Plastics, Vol. 19, No. 10, June, 1942, p. 75.)
338	5342	U.S.A. ...	*Plastic Army Helmet Liner (U.S.A.).* (Modern Plastics, Vol. 19, No. 9, May, 1942, pp. 35-38.)

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339	5344	U.S.A. ...	*Lignin Plastics Development.* (Modern Plastics, Vol. 19, No. 9, May, 1942, pp. 46-47.)
340	5345	U.S.A. ...	*High Density Plywood.* (T. D. Perry, Modern Plastics, Vol. 19, No. 9, May, 1942, pp. 61-63 and 110.)
341	5346	U.S.A. ...	*Viniglidene Chloride Resin Tubing.* (C. B. Branch and D. L. Gibb, Modern Plastics, Vol. 19, No. 9, May, 1942, pp. 64-67.)
342	5354	G.B.	*Stresses on Cylinder Studs.* (Aeroplane, Vol. 63, No. 1,636, 2/10/42, p. 406.)
343	*5356	Germany ...	*Loading Hatches of Ships (Steel V. Wood Covering).* (G. Buchsbaum, J. d. Schiffbantechn. Gesell, Vol. 39, 1938, pp. 369-388.)
344	5365	G.B.	*Plastics on Aircraft, III.* (W. Nicholls, Flight, Vol. 42, No. 1,762, 1/10/42, pp. 368-370.)
345	*5377	G.B.	*Plastics in Engineering.* (J. Prior, Engineering, Vol. 154, No. 4,006, 23/10/42, pp. 324-325.)
346	5385	G.B.	*Phosphorus in Steel (Distribution by Radioactive Particles).* (Mech. World, Vol. 112, No. 2,907, 18/9/42, p. 269.)
347	5386	G.B.	*Hard Soldering of Aluminium.* (Mech. World, Vol. 112, No. 2,907, 18/9/42, p. 274.)
348	5387	... ...	*Corrugated Expansion of Pipes.* (Mech. World, Vol. 112, No. 2,907, 18/9/42, pp. 276-278.)
349	5388	G.B.	*Strength of Steel Wires.* (J. T. McIntyre, Mech. World, Vol. 112, No. 2,907, 18/9/42, pp. 279-281.)
350	5413	G.B.	*Volumetric Determination of C. in Steel.* (Sheet Metal Industries, Vol. 16, No. 186, Oct., 1942, p. 1,488.)
351	5415	G.B.	*Theory and Practise of Polarographic Analysis.* (G. H. Jeffery, Sheet Metal Industries, Vol. 16, No. 186, Oct., 1942, pp. 1,525-1,530 and 1,549.)
352	5416	G.B.	*Rust Proofing of Ferrous Metals (Cementation, Calorising, Cladding, etc.).* (H. Silman, Sheet Metal Industries, Vol. 16, No. 186, Oct., 1942, pp. 1,531-1,536.)
353	5417	G.B.	*Crack Detection by Fluorescent Light.* (Sheet Metal Industries, Vol. 16, No. 186, Oct., 1942, pp. 1,557-1,558.)
354	5418	G.B.	*Spot Welding of Nickel, Monel and Inconel.* (W. F. Hess and A. Muller, Sheet Metal Industries, Vol. 16, No. 186, Oct., 1942, pp. 1,563-1,568 and 1,570.)
355	5421	Germany ...	*Copper Cladding for Steel and Aluminium.* (W.R.H., Vol. 23, No. 16, 15/8/42, pp. 227-228.)
356	5438	G.B.	*The Application of Electricity to the Annealing of Glass Bottles and Containers.* (E. S. Morris, J. Inst. Elect. Engs., Vol. 89, Pt. II, No. 20, Aug., 1942, pp. 355-368.)
357	*5441	Germany ...	*The Application of Electric Welding in Commercial Shipbuilding.* (P. Classen, Jb. der Schiffbautechnischen Gessellschaft, Vol. 40, 1939, pp. 69-109.)

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358	5448	Germany	...	*The Structure of Metals.* (P. Delbye, Schriften, Akad L.F.F., No. 4, 16/12/38, pp. 1-13.)
359	5449	Germany	...	*The Use of Scientific Knowledge in Technical Problems Dealing with Metallurgy.* (G. Masing, Schriften Akad L.F.F., No. 4, 16/12/18, pp. 15-27.)
360	5465	Germany	...	*On the Fatigue Fracture of Metals.* (F. Korber, Schriften Akad L.F.F., No. 15, 31/3/39, pp. 1-53.)
361	5493	U.S.A.	...	*Tension and Compression Stress-Strain Characteristics of Cold Rolled Chromium-Nickel and Cr.-Mn.-Ni. Stainless Steels.* (R. Franks and W. O. Binder, J. Aeron. Sciences, Vol. 9, No. 11, Sept., 1942, pp. 419-438.)
362	5499	U.S.A.	...	*Metal Coating of Automotive Parts.* (H. S. Ingham and J. E. Wakefield, S.A.E. Preprints, Transport Meeting, New York, Oct. 7-8, 1942.)
363	5503	Germany	...	*Welding of Electron and Hydronalium.* (Flugsport, Vol. 34, No. 20, 30/9/42, pp. 303-305.)
364	5504	Germany	...	*Buckling and Ultimate Shearing Stress for Beech Plywood (Diagrams for Rapid Calculation).* (Flugsport, Vol. 34, No. 20, 30/9/42, pp. 303-305 a/b.)
365	5523	Germany	...	*Plastics in Aircraft Construction.* (H. Stener, Flugsport, Vol. 34, No. 21, 14/10/42, pp. 315-320.)
366	5550	Germany	...	*Valves in Polyvinyl Chloride.* (Plastics, Vol. 6, No. 66, Nov., 1942, pp. 380-383.)
367	5551	G.B. ...	...	*Rubber-like Substances from Cellulose.* (Plastics, Vol. 6, Nov., 1942, p. 383.)
368	5552	G.B. ...	...	*Fillers for Plastics.* (E. E. Halls, Plastics, Vol. 6, No. 66, Nov., 1942.)
369	5553	Italy ...	...	*Italian Shell Container Made of Plastics.* (Plastics, Vol. 6, No. 66, Nov., 1942, p. 394.)
370	5554	Germany	...	*Permissible Working Temperatures of Plastics.* (Plastics, Vol. 6, No. 66, Nov., 1942, p. 395.)
371	5556	Japan	...	*Weathering Tests on Cellulose Acetate and Cellulose Nitrate Films (from the Japanese).* (Plastics, Vol. 6, No. 66, Nov., 1942, p. 396.)
372	5557	Germany	...	*Welding of Polyvinyl Plastics (from the German).* (Plastics, Vol. 6, No. 66, Nov., 1942, pp. 396-397.)
373	5558	G.B. ...	...	*Electro-Chemical Aspect of High Polymeric Systems.* (B. T. Brajnikoff, Plastics, Vol. 6, No. 66, Nov., 1942, pp. 411-420.)
374	5568	U.S.A.	...	*Contribution to the Design of Plywood Shells.* (S. Blumrich, L.F.F., Vol. 18, No. 9, 20/9/41.) (R.T.P. Translation 1,454 and T.M. 1,031.)
375	5579	G.B. ...	...	*Formation of Hair-Line Cracks in Steel.* (J. H. Andrews and others, Engineering, Vol. 154, No. 1,007, 30/10/42, p. 357.)

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376	5580	Germany	...	*New Developments in Permanent Magnet Steels (Annealing in a Magnetic Field).* (Stahl und Eisen, Vol. 62, No. 43, 22/10/42, pp. 906-907.)
377	5581	U.S.A.	...	*Effect of Cr. on the Scaling Resistance of Cast Iron (from the U.S.A.).* (Stahl und Eisen, Vol. 62, No. 43, 22/10/42, p. 908.)
378	5582	Germany	...	*Modern Heat Treatment for Steel, with Special Reference to Replacement Steels.* (Stahl und Eisen, Vol. 62, No. 43, 22/10/42, p. 911.)
379	5583	Germany	...	*German Al. Alloy Specifications (Identification No., Composition, Uses).* (Aluminium, Vol. 24, No. 10, Oct., 1942, pp. 333-336.)
380	5585	Germany	...	*The Intermediate Annealing of Thin Al. or Al Alloy Strips (Cold Rolled).* (H. Wolf and others, Aluminium, Vol. 24, No. 10, Oct., 1942, pp. 341-347.)
381	5586	Germany	...	*Brinell Hardness of Al. Alloys (Minimum Thickness of Material, Distance Between Impressions and Trim of Application of Load).* (E. V. Rajakovics and H. O. Maier, Aluminium, Vol. 24, No. 10, Oct., 1942, pp. 341-347.)
382	5587	Germany	...	*Corrosion of Al. Alloy in Presence of SO_2 (Effect of Surface Measurement).* (L. Koch and E. Fenner, Aluminium, Vol. 24, No. 10, Oct., 1942, pp. 354-357.)
386	5592	Germany	...	*Shear Strength of Light Alloy Sheet.* (H. Guth, Aluminium, Vol. 24, No. 10, Oct., 1942, pp. 257-358.)
387	*5593	U.S.A.	...	*Torsional and Flexural Buckling of Bars of Thin-Walled Open Section Under Compressive and Bending Loads.* (J. N. Goodier, J. App. Mech., Vol. 9, No. 3, Sept., 1942, pp. 103-107.)
388	5594	U.S.A.	...	*Distribution of Stress in Built-in Beams of Narrow Rectangular Cross-Section.* (F. B. Hildebrand and E. Reissner, J. App. Mech., Vol. 9, No. 3, Sept., 1942, pp. 108-116.)
389	*5595	U.S.A.	...	*Buckling of Semi-Monocoque Structures Under Compression.* (T. R. Wang, J. App. Mech., Vol. 9, No. 3, Sept., 1942, pp. 117-121.)
390	5596	U.S.A.	...	*Graphical Analysis of Impact of Elastic Bars.* (K. J. De Juhasz, J. App. Mech., Vol. 9, No. 3, Sept., 1942, pp. 122-128.)
391	*5597	U.S.A.	...	*Some Dynamic Properties of Rubber.* (C. O. Harris, J. App. Mech., Vol. 9, No. 3, Sept., 1942, pp. 129-135.)
392	5599	U.S.A.	...	*Solution of Problems of Elasticity by the Framework Method (Discussion).* (J. App. Mech., Vol. 9, No. 3, Sept., 1942, pp. 144-145.)
393	5600	U.S.A.	...	*The Technical Cohesive Strength of Metals (Discussion).* (J. App. Mech., Vol. 9, No. 3, Sept., 1942, pp. 145-146.)

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394	5601	U.S.A.	..	*Sand Heap Analogy for Plastic Torsion Problems (Discussion).* (J. App. Mech., Vol. 9, No. 3, Sept., 1942, pp. 146-147.)
395	*5604	U.S.A.	...	*High Density Plywood.* (M. Finlayson, A.S.M.E., October Meeting, 1942, Preprints of Papers, pp. 1-21.)
396	*5605	U.S.A.	...	*Elastic Properties of Curved Tubes.* (I. Vigness, A.S.M.E., October Meeting, 1942, Preprints of Papers.)
397	5610	Germany	...	*Second Order Elastic Theory (with Examples).* (M. A. Biot, Z.A.A.M., Vol. 20, No. 2, April, 1940, pp. 89-90.)
398	5611	Germany	...	*Note on theBending of Thin Uniform Loaded Plate Bounded by Cardioids, Lemniscates and Certain Other Quarter Curves.* (B. Sen, Z.A.A.M., Vol. 20, No. 2, April, 1940, pp. 99-103.)
399	5613	Germany	...	*The Transformation of Certain Elastic Problems with Rotary Symmetry into the Corresponding Two-Dimensional Form and vice-versa.* (C. Weber, Z.A.A.M., Vol. 20, No. 2, April, 1940, pp. 117-118.)
400	5614	Germany	...	*First Variation of the Work of Deformation of Flat Plates Undergoing Buckling.* (W. Willers, Z.A.A.M., Vol. 20, No. 2, April, 1940, pp. 118-121.)
401	5618	Germany	...	*Stress Distribution in a Semiplane Fitted with Notch Bounded by a Circular Arc.* (C. Weber, Z.A.M.M., Vol. 20, No. 5, Oct., 1940, pp. 262-270.)
402	5619	Japan	...	*Stress Distribution in a Semi-Infinite Domain having a Plane Boundary and Compressed by a Rigid Body.* (H. Okubo, Z.A.M.M., Vol. 20, No. 5, Oct., 1940, pp. 271-276.)
403	5629	Germany	...	*Conversion Table for Brinell, Vickers and Rockwell Hardness Factors with Allowance for Experimental Scatter.* (Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, pp. 621-622.)
404	5631	Germany	...	*Replacement of Rubber by Plastic (Polyvinyl Chloride) for Electric Cable Insulations.* (H. Beck, Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, pp. 629-632.)
405	5633	Germany	...	*Natural Frequency of Elastically Mounted Mechanisms.* (K. Gruben, Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, pp. 633-637.)
406	5634	Germany	...	*The Strength of Gear Wheels Made of Laminated Plastics.* (Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, p. 638.)
407	5641	U.S.A.	...	*A Practical Method of Allowance for Shear Lag.* (J. S. Coutinho, J. Aeron. Sci., Vol. 9, No. 12, Oct.,1942, pp. 471-477.)
408	5650	G.B. ...	...	*Stresses on Studs.* (W. Ker Wilson, Aeroplane, Vol. 63, No. 1,642, 13/11/42, p. 577.)

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409	5653	G.B. ...	...	*Hardening of High Speed Tool Steel.* (S. F. Barclay, Engineer, Vol. 174, No. 4,531, 13/11/42, pp. 400-401.)
410	5663	G.B. ...	...	*Plastics (Abstracts of Literature issued by Controller of Chemical Research).* (Nos. 29-36 inclusive, Jan.-Aug., 1942.)
411	5664	G.B. ...	...	*Plastics (Abstracts of Literature issued by Controller of Chemical Research).* (No. 38, October, 1942.)
412	5698	G.B. ...	...	*The Practice of Powder Metallurgy (Pressing).* (H. W. Greenwood, Metal Industry, Vol. 61, No. 17, 23/10/42, pp. 265-267.)
413	5699	G.B. ...	...	*Industrial Uses of Selenium and Tellurium.* (G. R. Waitkins and others, Metal Industry, Vol. 61, No. 17, 23/10/42, pp. 267-268.)
414	5700	G.B. ...	...	*The Detection of Flaws (Eddy Current Pattern).* (Metal Industry, Vol. 61, No. 17, 23/10/42, p. 268.)
415	5706	G.B. ...	...	*Industrial Diamond Wire-Drawing Die.* (B. P. Dudding and others, Metal Industry, Vol. 61, No. 19, 6/11/42, pp. 290-293.)
416	5724	G.B. ...	...	*Protective Measures for Al. Equipment.* (H. J. Faheney and R. B. Mears, Metal Industry, Vol. 61, No. 19, 6/11/42.)
417	5725	U.S.A.	...	*The "Cherry" Blind Spot Rivet.* (Metal Industry, Vol. 61, No. 19, 6/11/42, p. 298.)
418	5732	U.S.A.	...	*Strength Characteristics of Plastic Bonded Plywood.* (G. B. Parsons, Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 140 and 218.)
419	5733	U.S.A.	...	*Northern Tropical America as a Source for Rubber.* (S. S. Kogut, Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 147-150 and 340-343.)
420	5739	G.B. ...	...	*Precision Pipe Bending (from the British).* Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 162-167 and 185.)
421	5741	U.S.A.	...	*Low Temperature Welding with Eutectic Alloys.* (Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 182 and 217.)
422	5752	Germany	...	*Processing Igelit Resin.* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 18, 25/9/42, p. 1,176.)
423	5756	G.B. ...	...	*Elastic Wave and Vibration of Thin Rods.* (S. Prescott, Phil. Mag., Vol. 33, No. 225, Oct., 1942, pp. 703-754.)
424	5749	G.B. ...	...	*Natural and Synthetic Rubber.* (W. C. Geer, Chem. and Ind., Vol. 61, No. 44, 31/10/42, pp. 445-447.)
425	5760	G.B. ...	...	*Forging of Al. Alloys.* (H. Chase, Machinist, Vol. 86, No. 26, 10/10/42, pp. 644-647.)
426	5762	G.B. ...	...	*Beryllium Copper Springs.* (Metal Industry, Vol. 61, No. 18, 30/10/42, p. 278.)
427	5771	U.S.A.	...	*Hard Form of Synthetic Rubber (Ameripol).* (Scientific American, Vol. 167, No. 4, Oct., 1942, p. 155.)
428	5777	U.S.A.	...	*Glass Made without Silica.* (Scientific American, Vol. 167, No. 4, Oct., 1942, p. 169.)

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429	5778	U.S.A. ...	*Collapsible Barrel (Plywood Staves).* (Scientific American, Vol. 167, No. 4, Oct., 1942, p. 172.)
430	5786	G.B.	*Mechanical Gearing for Ships.* (Engineering, Vol. 154, No. 4,008, 6/11/42, pp. 378-380.)
431	5787	G.B.	*Evaluation of Corrosion Damage by Fatigue Tests.* (Engineering, Vol. 154, No. 4,008, 6/11/42, p. 380.)
432	5790	G.B.	*Flame Hardening.* (Engineer, Vol. 174, No. 4,530, 6/11/42, p. 385.)
433	5794	G.B.	*Stresses in Gear Tooth Fillets (Photo-Elastic Studies).* (Mech. World, Vol. 112, No. 2,912, 23/10/42, pp. 385-386.)
434	5795	G.B.	*Design of Volute Springs.* (Mech. World, Vol. 112, No. 2,912, 23/10/42, pp. 392-393.)
435	5797	Germany ...	*The Influence of Subsequent Treatment on the Properties of Steel Wire (Tempering and Timing).* (W. Pungel, Stahl und Eisen, Vol. 62, No. 42, 15/10/42, pp. 876-881.)
436	5799	G.B.	*Junctions in Al. Cables.* (Light Metals, Vol. 5, No. 57, Oct., 1942, pp. 388-395.)
437	5800	G.B.	*Design and Construction of Light Alloy Taps.* (Light Metals, Vol. 5, No. 57, Oct., 1942, pp. 400-402.)
438	5801	G.B.	*Intercrystalline Corrosion Controlled by Quenching Rate.* Light Metals, Vol. 5, No. 57, Oct., 1942, pp. 402-405.)
439	5802	G.B.	*Dies for Al. Sheet Metal Work.* (Light Metals, Vol. 5, No. 57, Oct., 1942, pp. 412-420.)
440	5803	G.B.	*Comparison of Al. Sheet and Tinplate for Canning.* (Light Metals, Vol. 5, No. 57, Oct., 1942, pp. 426-436.)
441	5820	G.B.	*The Ideal Inert Atmosphere (Helium and Argon).* (Light Metals, Vol. 5, No. 58, Nov., 1942, p. 439.)
442	5822	Switzerland ...	*Swiss Al. Industry Wartime Basis.* (Light Metals, Vol. 5, No. 58, Nov., 1942, pp. 443-445.)
443	5824	G.B.	*The Development of Light Alloy Gas Cylinders.* (Light Metals, Vol. 5, No. 58, Nov., 1942, pp. 448-455.)
444	5825	G.B.	*Light Alloy Arc Welding in Helium Atmospheres.* (Light Metals, Vol. 5, No. 58, Nov., 1942, pp. 456-459.)
445	5826	U.S.S.R. ...	*Melting Magnesium Under Hydrogen (from the Russian).* (Light Metals, Vol. 5, No. 58, Nov., 1942, pp. 460-463.)
446	5828	G.B.	*Alumina from Clay.* (Light Metals, Vol. 5, No. 58, Nov., 1942, p. 468.)
447	5830	G.B.	*Thermal Reduction of Magnesia.* (Light Metals, Vol. 5, No. 58, Nov., 1942, p. 469.)
448	5831	G.B.	*Al. in the Canning Industry.* (Light Metals, Vol. 5, No. 58, November, 1942, pp. 470-488.)
449	5861	G.B.	*Recent Plastic Developments (Bonding Metals).* (Flight, Vol. 42, No. 1,766, 29/10/42, pp. 475-477.)

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450	5866	G.B.	*Surface Protection of Al. Alloys* (*R.T.P. Translation No.* 1,463). (Airc. Prod., Vol. 4, No. 48 Oct., 1942, pp. 604-607.)
451	5877	U.S.A. ...	*Welding of Electron by the Heliarc Process (Shielding by Inert Helium).* (Flight, Vol. 42, No. 1,767, 5/11/42, p. 492.)
452	5907	U.S.A. ...	*New Developments in Synthetic Rubber.* (Autom. Ind., Vol. 87, No. 4, 15/8/42, pp. 26-29 and 74.)
453	5934	Germany ...	*The Wear of Plastic Gear Wheels.* (Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, p. 638.)

INSTRUMENTS.

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
454	*5300	Germany ...	*Stress Determinations and Investigations of Mechanical Vibration by Means of Electric Resistance Gauges of Strip or Ring Form.* (A. Theis, Zeitschr. and Techn. Phys., No. 11, 1941, pp. 273-280.)
455	5310	G.B.	*Bibliography of Published Information (including Translations) on Altimeters.* (R.T.P.3, Bibliography No. 64, Sept., 1942.)
456	5311	G.B.	*Bibliography of Published Information (including Translations) on Compasses* (1, *Radio Compass;* 2, *Magnetic Compass;* 3, *Gyroscopic Compass;* 4, *Solar Compass;* 5, *Compass Errors*). (R.T.P.3, Bibliography No. 63, Sept., 1942.)
457	5314	U.S.A. ...	*Portable Acoustic Plane Detector.* (Sci. Am., Vol. 166, No. 6, June, 1942, p. 271.)
458	5318	U.S.A. ...	*X-Ray Photographs of Armour-Piercing Bullets in Flight.* (Sci. Am., Vol. 166, No. 6, June, 1942, pp. 293-294.)
459	5343	U.S.A. ...	*Plastics in Sextant Construction.* (Modern Plastics, Vol. 19, No. 9, May, 1942, p. 39.)
460	5383	G.B.	*X-Ray Analysis (Defractions).* (Mech. World, Vol. 112, No. 2,907, 18/9/42, p. 265.)
461	5432	U.S.A. ...	*Portable X-Ray Unit for Field Tests (Photo).* (Autom. Ind., Vol. 87, No. 3, 1/8/42, p. 58.)
462	5433	U.S.A. ...	*Vibration Indicator Vibrometer (Electric Recording).* (Autom. Ind., Vol. 87, No. 3, 1/8/42, p. 90.)
463	5452	Germany ...	*Short Report on Publications on Measuring Instruments, with Special Reference to Practical Requirements.* (F. Neugebauer, Schriften Akad L.F.F., No. 5, 13/1/39, pp. 19-44.)
464	5458	Germany ...	*Acoustic Altimeter (Notes on Physical Design).* (H. Hecht, Schriften Akad L.F.F., Book 10, 10/2/39, pp. 1-26.)
465	5467	Germany ...	*Principles of Design and Performance of Variometers.* (A. Bestelmeyer, Schriften Akad L.F.F., No. 17, 7/7/39, pp. 1-29.)
466	5530	Germany ...	*Control Device for A.C. Generators for Aircraft Gyro Instruments (Pat. Series 39, No. 723,830).* (Ausschutz, Flugsport, Vol. 34, No. 21, 14/10/42, p. 159.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
467	5570	Switzerland ...	*The Nature and Determination of Errors in Stereoscopic Range Finders.* (H. Donatsch, Flugwehr und Technik, Vol. 4, No. 10, Oct., 1942, pp. 262-268.)
468	5574	G.B.	*Testing Machine for Aeroplane Automatic Pilot.* (Engineering, Vol. 154, No. 4,009, 13/11/42, pp. 385-386.)
469	*5622	Germany ...	*The Measurement of Large Radii of Curvature (Very Flat Curves).* (K. Katterbach, Z.A.M.M., Vol. 20, No. 5, Oct., 1940, pp. 287-290.)
470	5625	Switzerland ...	*Nature and Determination of Errors when Evaluating Distances with the Stereoscopic Range Finder.* (H. Donatsch, Flugwehr und Technik, Vol. 4, No. 9, Sept., 1942, pp. 230-235.)
471	5638	U.S.A. ...	*Note on the Photographic Space-Time Recorder.* (E. S. Jenkins, J. Aeron. Sci., Vol. 9, No. 12, Oct., 1942, p. 456.)
472	5645	U.S.A. ...	*Present State of the Art and Science of Mechanism (Discussion).* (Mech. Eng., Vol. 64, No. 10, Oct., 1942, pp. 744-751.)
473	5754	G.B.	*Clock Controlled Governor for Close Speed Control (Discussion).* (J. Inst. Elect. Engs., Vol. 89, Pt. II, No. 11, Oct., 1942, p. 520.)
474	5755	U.S.A. ...	*A New System of Celestial Navigation.* (A. D'Aura, J. Aeron. Sci. (Rev. Sect.), Vol. 1, No. 7, Oct., 1942, pp. 11-15.)
475	5757	G.B.	*Electric Determination of Film Volume and Film Density.* (H. Lowy, Phil. Mag., Vol. 33, No. 225, Oct., 1942, pp. 772-774.)
476	5761	G.B.	*A Clock Controlled Governor for Close Speed Regulation.* (J. C. Prescott and M. N. Karaosman, J. Inst. Elect. Engs., Vol. 89, Part I, No. 21, Sept., 1942, pp. 440-441.)
477	5770	U.S.A. ...	*Instrument Bearings Made of Glass.* (Scientific American, Vol. 167, No. 4, Oct., 1942, p. 155.)
478	5785	G.B.	*Hot Air Hand Drier.* (Engineering, Vol. 154, No. 4,008, 6/11/42, p. 370.)
479	5798	Germany ...	*Balance for the Rapid Determination of the Degree of Magnetic Saturation of Ferro Magnetic Materials.* (H. Franssen, Stahl und Eisen, Vol. 62, No. 42, 15/10/42, pp. 887-888.)
480	5841	G.B.	*Square Ruled Paper Projection.* (C. V. Boys, J. Scientific Instruments, Vol. 19, No. 5, May, 1942, pp. 65-71.)
481	5842	G.B.	*The Point Discharge Recording Micro-Ammeter.* (J. L. Candler, J. Scientific Instruments, Vol. 19, No. 5, May, 1942, pp. 75-78.)
482	5843	G.B.	*A Device for Winding Small Toroidal Inductances.* (C. A. A. Wass, J. Scientific Instruments, Vol. 19, No. 5, May, 1942, pp. 78-79.)
483	5844	G.B.	*Cleaning Fine Copper Wire.* (D. Bell, J. Scientific Instruments, Vol. 19, No. 5, May, 1942, p. 79.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
484	5845	G.B. ...	... *A Device for the Continuous Indication of Oxygen Saturation of Circulating Blood in Man.* (E. A. G. Goldie, J. Scientific Instruments, Vol. 19, No. 2, Feb., 1942, pp. 23-25.)
485	5846	G.B. ...	... *A Geared Photometer Turntable Suitable for Surfaces of Low Gloss.* (W. F. Barkas, J. Scientific Instruments, Vol. 19, No. 2, Feb., 1942, pp. 26-29.)
486	5852	G.B. ...	... *A Rapid Method of Accurately Measuring Small Elongations of Tensile Test Bars.* (G. J. Thomas, J. Scientific Instruments, Vol. 19, No. 3, March, 1942, p. 45.)
487	5853	G.B. ...	... *Flux for Soldering Phosphor Bronze Hair Springs.* (C. E. Homer and H. A. Watkins, J. Scientific Instruments, Vol. 19, No. 3, March, 1942, p. 45.)
			PRODUCTION.
488	5301	G.B. ...	... *Bibliography of Published Information (including Translations) on Cutting Tools, with Special Reference to Cemented Carbide Tools.* (R.T.P.3, Bibliography No. 73. Oct., 1942.)
489	5302	G.B. ...	... *Bibliography of Published Information on Cutting Fluids and Cutting Oils.* (R.T.P.3, Bibliography No. 72, Oct., 1942.)
490	5317	U.S.A.	... *Cellophane Bags for Storing Spares.* (Sci. Am., Vol. 166, No. 6, June, 1942, pp. 289-290.)
491	5319	U.S.A.	... *Sheet Metal Assembly Under Tension (Lindsay Structure).* (Sci. Am., Vol. 166, No. 6, June, 1942, p. 294.)
492	5378	G.B. ...	... *The Physicist in the Factory.* (Engineering, Vol. 154, No. 4,006, 23/10/42, p. 332.)
493	5384	U.S.A.	... *Assembly of Boeing Flying Fortress.* (Mech. World, Vol. 112, No. 2,907, 18/9/42, pp. 266-267.)
494	5389	Germany	... *Foreign Labour in Germany.* (P. Osthold, W.T.M., No. 46, No. 8, Aug., 1942, pp. 181-184.)
495	5390	Germany	... *The Mass Production of Armament.* (I. Brommer, W.T.M., Vol. 46, No. 8, Aug., 1942, pp. 185-191.)
496	5468	Germany	... *Material Testing—the Concept of the Normal Sample with Note on Statistics.* (H. Daeves, Schriften Akad L.F.F., No. 19, 21/6/40, pp. 1-21.)
497	5500	Germany	... *Junkers Rivet Sorting Machine.* (Flugsport, Vol. 34, No. 20, 30/9/42, p. 303.)
498	5501	Germany	... *Some Examples of Dornier Test Apparatus (Spring Dynamometer, Extensometer, Torque Recording Spanner, etc.).* (Flugsport, Vol. 34, No. 20, 30/9/42, pp. 303-305.)
499	5521	Canada	... *Work of Ministry of Aircraft Production (Organisation, British Aircraft, American Aircraft, Engine Production, Armament Research and Development, Salvage).* (Various authors, Flying and Popular Aviation, Vol. 31, No. 3, Sept., 1942. pp. 157-169 and 172.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
500	5541	Germany	...	*Reorganisation of German Armament Industry.* (Inter. Avia., No. 839-840, 19/10/42, p. 23.)
501	5584	Germany	...	*Periodic Rise in Al. Foundry Rejects Traced to Accumulation of Remelted Metal.* (P. Schwerber, Aluminium, Vol. 24 ,No. 10, Oct., 1942, pp. 337-341.)
502	5607	U.S.A.	...	*What Can be Done to Train Women for Engineering Jobs.* (R. H. Baker and O. S. Reinold, A.S.M.E., October Meeting, 1942, Preprints of Papers.)
503	5628	Germany	...	*The Role of the Designer for Increased Production.* (F. Resselring and I Sihler, Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, pp. 617-621.)
504	5632	Germany	...	*Speeding Up Production by Rapid Methods of Supplying and Withdrawing Goods to the Machine Tools.* (Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, p. 632.)
505	5643	U.S.A.	...	*Development of Standards for Army Ordnance Finishes.* (M. R. Norton, Mech. Eng., Vol. 64, No. 10, Oct., 1942, pp. 703-717.)
506	5646	G.B. ...	...	*Weight per Foot Run of Circular and Hexagon Wires.* (Hutte, Vol. 1, p. 815.)
507	5665	U.S.A.	...	*The Effects of Exposure to Toluene in Industry.* (L. Greenburg and others, J. Amer. Med. Ass., Vol. 118, No. 8, Feb. 21, 1942, pp. 573-578. Abstract, Bulletin of War Medicine, Vol. 3, No. 2, Oct., 1942, p. 111.)
508	5666	U.S.A.	...	*The Toxicity and Potential Dangers of Toluene. Preliminary Report.* (W. F. von Oettingen and others, J. Amer. Med. Ass., Vol. 118, No. 8, Feb. 21, 1942, pp. 579-584. Abstract, Bulletin of War Medicine, Vol. 3, No. 2, Oct., 1942, pp. 111-112.)
509	5667	G.B. ...	...	*Porphyrinuria in Trinitrotoluene Poisoning.* (A. M. Kennedy and J. Ingham, Brit. Med. J., April 18, 1942, pp. 490-492. Abstract, Bulletin of War Medicine, Vol. 3, No. 2, Oct., 1942, p. 112.)
510	5668	Canada	...	*New Kind of Gas Gangrene if Magnesium Enters Wounds.* (Bulletin, Brit. Columbia Board of Health, March, 1942, Vol. 12, No. 3, pp. 33-34. Abstract, Bulletin of War Medicine, Vol. 3, No. 2, Oct., 1942, p. 112.)
511	5673	G.B. ...	...	*Health of the War Worker.* (Labour Research Dept., A Handbook prepared in co-operation with the Socialist Medical Association, 40 pp., April, 1942. London, 6, High Holborn, price 6d.) (Abstract, Bulletin of War Medicine, Vol. 3, No. 2, Oct., 1942, p. 111.)
512	5678	Australia	...	*Industrial Fatigue.* (H. M. L. Murray, Med. J., Australia, Oct. 18th, 1941, Vol. 2, No. 16, pp. 437-441. Abstract in Bulletin of War Medicine, Vol. 3, No. 1, Sept., 1942, p. 51.)
513	5679	Australia	...	*Industrial Fatigue and Australia's War Effort.* (Med. J., Australia, Oct. 18th, 1941, Vol. 2, No. 16, pp. 455-456. Abstract in Bulletin of War Medicine, Vol. 3, No. 1, Sept., 1942, p. 51.)

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514	5680	Germany	...	*Symposium on Fatigue and Measures of Combating Fatigue.* (Various authors, Abstract, Bulletin of War Medicine, Vol. 3, No. 1, Sept., 1942.)
515	5681	G.B. ...	...	*Lighting Large Factory Areas with Fluorescent Lamps.* (C. J. Taylor, Illuminating Engineering, Dec., 1941, Vol. 36, No. 10, pp. 1,414-1,436. Abstract, Bulletin of War Medicine, Vol. 3, No. Sept., 1942, p. 51.)
516	5695	G.B. ...	...	*Dry Machining of Mg. Alloys.* (H. M. Garner, Metal Industry, Vol. 61, No. 17, 23/10/42, pp. 258-259.)
517	5696	G.B. ...	...	*Limits of Composition and Impurities.* (J. N. Bradley and H. O'Neill, Metal Industry, Vol. 61, No. 17, 23/10/41, pp. 260-261.)
518	5697	G.B. ...	...	*"Purging" Controlled Atmosphere Furnaces* (F. B. Leslie, Metal Industry, Vol. 61, No. 17, 23/10/42, pp. 262-264.)
519	*5723	G.B. ...	...	*Rapid Identification of Non-Ferrous Scrap.* (Metal Industry, Vol. 61, No. 19, 6/11/42, pp. 294-295.)
520	5728	U.S.A.	...	*Fighting Incendiary Fires in Aircraft Plants.* (Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 102-104 and 241-242.)
521	5731	U.S.A.	...	*Method of Development for Tapered Wings.* (P. Antry, Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 136-139.)
522	5736	U.S.A.	...	*Carbide Cutters on Large Machine Tools.* (F. W. Lucht, Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 156 and 191.)
523	5737	U.S.A.	...	*Plant Production Aided by Interchanges of Plant Personnel and Facilities.* (Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 78 and 247-248.)
524	5742	U.S.A.	...	*Cleaning and Repacking Ball and Roller Bearings.* (P. Montgomery, Aero Digest, Vol. 41, No. 2, pp. 186-187.)
525	5745	U.S.A.	...	*Handling Equipment for Speeding Aircraft Production.* (L. V. Spenser, Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 197-198 and 201-213 and 335-339.)
526	5750	U.S.A.	...	*Technique and Application of Industrial Microradiography.* (G. L. Clark and S. T. Gross, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 8, 17/8/42, pp. 676-683.)
527	5763	G.B. ...	...	*Scrap Salvage Problems.* (H. W. Greenwood, Vol. 61, No. 18, 30/10/42, pp. 379-381.)
528	5769	U.S.A.	...	*U.S.A. War Factories Built of Wood and Concrete.* (Scientific American, Vol. 167, No. 4, Oct., 1942, p. 154.)
529	5772	U.S.A.	...	*Increased Use of Silver in Electrical Equipment.* (Scientific American, Vol. 167, No. 4, Oct., 1942, p. 155.)
530	5773	U.S.A.	...	*Freezing of Machine Tool Parts and Sub-Zero Tempering of Tool Steels.* (Scientific American, Vol. 167, No. 4, Oct., 1942, p. 156.)

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531	5779	G.B. ...	...	*The Minister of Production on a New Policy.* (Engineer, Vol. 174, No. 4,529, 30/10/42, pp. 354-355.)
532	5783	G.B. ...	...	*Stitching Machine for Metals.* (Engineering, Vol. 154, No. 4,008, 6/11/42, p. 366.)
533	5792	G.B. ...	...	*Electric Arc Furnace.* (A. G. Robiette, Engineer, Vol. 174, No. 4,530, 6/11/42, p. 381.)
534	5793	G.B. ...	...	*Statistical Quality Control.* (B. P. Dudding and W. J. Jennet, Mech. World, Vol. 112, No. 2,912, 23/10/42, p. 383.)
535	5796	U.S.A.	...	*Conveyor Assembly of Aircraft Parts (Douglas Co.).* (Mech. World, Vol. 112, No. 2,912, 23/10/42, p. 399.)
536	5821	G.B. ...	...	*Storage of Light Alloys.* (Light Metals, Vol. 5, No. 58, Nov., 1942, pp. 440-442.)
537	5827	Germany	...	*Mass Production of Aircraft in the Junkers Concern (from the German).* (Light Metals, Vol. 5, No. 58, Nov., 1942, pp. 464-466.)
538	5829	G.B. ...	...	*Machining Mg. Alloys.* (Light Metals, Vol. 5, No. 58, Nov., 1942, p. 469.)
539	5850	G.B. ...	...	*Physics and Protection Against Industrial Dust.* (K. L. Goodall, J. Scientific Instruments, Vol. 19, No. 3, March, 1942, pp. 33-40.)
540	5862	G.B. ...	...	*Daylight in Factories (Removable Black-Out).* (Airc. Production, Vol. 4, No. 48, Oct., 1942, pp. 583-585.)
541	5863	U.S.A.	...	*Line Assembly of Liberators.* (Airc. Prod., Vol. 4, No. 48, Oct., 1942, pp. 586-590.)
542	5863	G.B. ...	...	*Welding Developments (Goggles, Air-Cooled Torch, Rotary Work Tables).* (Airc. Prod., Vol. 4, No. 48, Oct., 1942, p. 591.)
543	5867	U.S.A.	...	*Inspection Methods of the Lockheed Aircraft Co.* (Airc. Prod., Vol. 4, No. 48, Oct., 1942, p. 607.)
544	5868	G.B. ...	...	*Taylor-Hobson Optical Sections Projector for the Examination of Gears, Splines, etc.).* (Airc. Prod., Vol. 4, No. 48, Oct., 1942, pp. 610-611.)
545	5869	U.S.A.	...	*Weight Prediction and Control in American Practice.* (Airc. Prod., Vol. 4, No. 48, Oct., 1942, pp. 624-662.)
546	5870	G.B. ...	...	*Fluorescent Crack Detection.* (Airc. Prod., Vol. 4, No. 48, Oct., 1942, p. 611.)
547	5871	G.B. ...	...	*Wire Stitching for Non-Structional Parts.* (Airc. Prod., Vol. 4, No. 48, Oct., 1942, pp. 612-613.)
548	5872	G.B. ...	...	*A New Template Emulsion for Application to Metal, Wood or Fabric.* (Airc. Prod., Vol. 4, No. 48, Oct., 1942, p. 615.)
549	5873	G.B. ...	...	*Machining Cylinder Barrels (British, German and American Practice).* (Airc. Prod., Vol. 4, No. 48, Oct., 1942, p. 626.)
550	5874	G.B. ...	...	*Photographic Equipment for Transferring Loft Layouts (Glenn Martin).* (Airc. Prod., Vol. 4, No. 48, Oct., 1942, pp. 629-630.)
551	5886	U.S.A.	...	*Plastic Drill Jigs and Forming Dies for Aircraft Tooling.* (Autom. Ind., Vol. 87, No. 1, 1/7/42, pp. 36-41 and 72.)

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552	5887	U.S.A. ...	*Influence of Automotive Mass Production Methods in the Manufacture of War Material.* (J. Geschelin, Vol. 87, No. 1, 1/7/42, pp. 30-35 and 84-85.)
553	5909	U.S.A. ...	*Tooling for Plastic Bonded Aircraft.* (W. D. Lewis, Autom. Ind., Vol. 87, No. 4, 15/8/42, pp. 32-34 and 68-70.)
554	5919	Germany ...	*Jigs for Aircraft Assembly Lines (Pat. Series 41, No. 725,524).* (Junkers, Flugsport, Vol. 34, No. 23, 11/11/42, p. 166.)
555	5926	U.S.S.R. ...	*Mineral Resources of the U.S.S.R.* (D. Williams, Nature, Vol. 150, No. 3,810, 7/11/42, pp. 539-541.)

Motor Transport and Tanks.

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
556	5425	U.S.A. ...	*Acetylene Generators for Motor Car (Used in Conjunction with Methyl Alcohol or Ammonia).* (Autom. Ind., Vol. 87, No. 3, 1/8/42, pp. 20 and 72.)
557	5430	U.S.A. ...	*M-4 All-Welded Tanks.* (Autom. Ind., Vol. 87, No. 3, 1/8/42, pp. 46-47.)
558	5497	U.S.A. ...	*Truck Maintenance as a High Road to Victory.* (W. J. Cumming, S.A.E. Preprints, Transport Meeting, New York, Oct. 7-8, 1942.)
559	5652	G.B.	*Practical Road Transport Operation with Producer Gas.* (J. E. Birchall, Engineer, Vol. 174, No. 4,531, 13/11/42, pp. 392-394.)
560	5774	U.S.A. ...	*Welding V. Riveting in Armoured Vehicles.* (Scientific American, Vol. 167, No. 4, Oct., 1942, p. 156.)
561	5885	U.S.S.R. ...	*Russian Mechanised Units on the Eastern Front (German Photograph).* (Autom. Ind., Vol. 87, No. 1, 1/7/42, pp. 28-29.)
562	5894	U.S.S.R. ...	*Russian Tanks.* (W.T.M., Vol. 46, No. 9, Sept., 1942, pp. 205-211.)
563	5895	Italy	*Notes on Italian Tanks.* (H. Bougartz, W.T.M., Vol. 46, No. 9, Sept., 1942, pp. 211-215.)

Sound, Light and Heat.

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
564	5347	U.S.A. ...	*Diffusion of Light by Plastics (Methods of Testing).* (Modern Plastics, Vol. 19, No. 9, May, 1942, pp. 68-69, and 102.)
565	5447	Germany ...	*The Lowest Temperatures Reached To-day.* (P. Debye, Schriften Akad L.F.F., No. 3, 18/2/38, pp. 1-7.)
566	5456	Germany ...	*Some New Experiments in Optics.* (R. W. Pohl, Schriften Akad L.F.F., No. 8, 18/2/38, pp. 1-14.)
567	5459	Germany ...	*Short Report on Acoustics Research.* (R. W. Pohl, Schriften Akad L.F.F., No. 10, 10/2/39, pp 27-31.)
568	5460	Germany ...	*New Optical Methods for Investigation of the Radiation Field of Acoustic Generators.* (E. Hiedmann, Schriften Akad L.F.F., No. 10, 10/2/39, pp. 33-38.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
569	5598	U.S.A. ...	*Two Problems of Thermal Stress in the Infinite Solid.* (N. O. Myklestad, J. App. Mech., Vol. 9, No. 3, Sept., 1942, pp. 136-143.)
570	5606	U.S.A. ...	*Effects of Wood Structure upon Heat Conductivity.* (F. F. Wangaard, A.S.M.E., October Meeting, 1942, Preprints of Papers.)
571	5644	U.S.A. ...	*Twenty Years Progress in Domestic Oil Heating.* (R. J. Bender, Mech. Eng., Vol. 64, No. 10, Oct., 1942, pp. 731-740.)
572	5753	G.B.	*Fluorescent Lamps (with Discussion).* (L. J. Davies and others, J. Inst. Elect. Engs., Vol. 89, Pt. 2, No. 11, Oct., 1942, pp. 447-472.)
573	5654	G.B.	*Recent Developments in Refrigeration.* (D. Gordon, Engineer, Vol. 174, No. 4,531, 13/11/42, pp. 402-405.)
574	5765	U.S.A. ...	*Infra Red Radiant Heating.* (F. M. Tiller and H. J. Garber, Ind. and Eng. Chem. (Ind. Chem.), Vol. 34, No. 7, July, 1942, pp. 773-781.)
575	5767	U.S.A. ...	*Equations for the Specific Heats of Gases.* (J. C. Smallwood, Ind. and Eng. Chem. Ind. Ed.), Vol. 34, No. 7, July, 1942, p. 863.)
576	5768	U.S.A. ...	*Temperatures in Solids During Heating and Cooling of Standard Shapes (Tables for Numerical Solutions for a Number of Standard Shapes).* (F. C. W. Olson and O. T. Schultz, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 7, July, 1942, pp. 874-877.)
577	5776	... ...	*Fluorescent Lighting.* (A. C. Lescâboura, Scientific American, Vol. 167, No. 4, Oct., 1942, pp. 167-169.)

WIRELESS AND ELECTRICITY.

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
578	5312	G.B.	*Theory of X-Ray Diffraction.* (P. P. Ewald, Nature, Vol. 150, No. 3,807, 17/10/42, pp. 450-451.)
579	5313	G.B.	*Determination of Equilibrium Diagrams by X-Ray Methods.* (Nature, Vol. 150, No. 3,807, 17/10/42, pp. 465-467.)
580	5382	G.B.	*Overheating in Electric Motors.* (Mech. World, Vol. 112, No. 2,907, 18/9/42, pp. 263-265.)
581	5434	G.B.	*The Electric Spark in Air.* (J. M. Meek, J. Inst. Elec. Engs., Vol. 89, Pt. 1, No. 20, Aug., 1942, pp. 335-356.)
582	5435	G.B.	*Discussion on Metal Rectifiers.* (J. Inst. Elect. Eng., Vol. 89, Pt. 1, No. 20, Aug., 1942, pp. 357-362.)
583	5436	G.B.	*The Technique of Frequency Measurement and its Application to Telecommunication.* (J. E. Thwaites and F. J. M. Laver, J. Inst. Elect. Engs., Vol. 89, Pt. 1, No. 20, Aug., 1942, pp. 370-372.)
584	5437	... ...	*Field Measurements of Insulation.* (E. A. Burton and others, J. Inst. Elect. Engs., Vol. 89, Pt. II, No. 10, Aug., 1942, pp. 288-316.)

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585	5439	G.B. ...	... *Characteristics and Application of the Selenium Rectifier.* (J. Inst. Elect. Engs., Vol. 89, Pt. II, No. 20, Aug., 1942, pp. 371-372.)
586	5454	Germany	... *The Aims and Results of Several Years' Research on the Ionosphere.* (H. Plendl, Schriften Akad L.F.F., No. 6, 27/1/39, pp. 29-91.)
587	5496	G.B. ...	... *Abstracts and References Issued by the Wireless Engineer.* (Nov., 1942.)
588	5588	Germany	... *Electrical Contact Resistance Between Copper and Cladded Aluminium.* (H. Raabe, Aluminium, Vol. 24, No. 10, Oct., 1942, pp. 358-360.)
589	5692	Germany	... *Mechanised Design of German Army Wireless Components.* (D. Gifford Hull, Electronic Engineering, Vol. 14, No. 177, Nov., 1942, pp. 238-240.)
590	5693	G.B. ...	... *Some Data on Recent R.C.A. Valves.* (Electronic Engineering, Vol. 14, No. 177, Nov., 1942, pp. 254-255.)
591	5694	G.B. ...	... *The Magic Eye Resonance Indicator.* (J. M. A. Lenthan, Electronic Engineering, Vol. 14, No. 177, Nov., 1942, p. 260.)
592	5752	G.B. ...	... *Magnetic Properties and Uses of Iron Alloys.* (R. D. Haigh, J. Inst. Elect. Engs., Vol. 89, Pt. 1, No. 22, Oct., 1942, pp. 473-475.)
593	5764	G.B. ...	... *Recent Development in Metal Rectifiers.* (D. Ashby, Metal Industry, Vol. 61, No. 18, 30/10/42, pp. 282-284.)
594	5804	G.B. ...	... *Radiation Energy and Earth Absorption for Dipole Antennæ.* (A. Sommerfeld and F. Renner, Wireless Engineer, Vol. 19, No. 229, Oct., 1942, pp. 457-462.)
595	5805	G.B. ...	... *Velocity of Radio Frequency Waves.* (R. L. Smith-Rose, Nature, Vol. 150, No. 3,808, 24/10/42, pp. 477-479.)
596	5847	G.B. ...	... *Electrical Contacts for Instruments.* (J. C. Chaston, J. Scientific Instruments, Vol. 19, No. 4, April, 1942, pp. 50-53.)
597	5848	G.B. ...	... *The Measurement of Capacity and Inductance of Concentric Cables at High Frequencies.* (F. Jones, J. Scientific Instruments, Vol. 19, No. 4, April, 1942, pp. 53-58.)
598	5849	G.B. ...	... *A Note on the Stability of Liquid High Resistances.* (J. D. Craggs, J. Scientific Instruments, Vol. 19, No. 4, April, 1942, p. 62.)
599	5851	G.B. ...	... *Note on the Preparation and Properties of Metal-Coated Mica Condensers.* (J. D. Craggs, J. Scientific Instruments, Vol. 19, No. 3, March, 1942, pp. 40-43.)
600	5875	G.B. ...	... *The Technique of Frequency Measurement and its Application to Telecommunications.* (J. E. Thwaites and F. J. M. Laver, J. Inst. Elect. Engs., Vol. 89, Part III, No. 7, Sept., 1942, pp. 139-167.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
601	5876	G.B. ...	... *The Characteristics and Applications of the Selenium Rectifier (Discussion).* (J. Inst. Elect. Engs., Vol. 89, Part III, No. 7, Sept., 1942, pp. 176-177.)

METEOROLOGY AND PHYSIOLOGY.

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
602	5327	G.B. ...	... *Exhaust Contamination of Cockpit.* (D. C. Greenwood, Flight, Vol. 42, No. 1,763, 8/10/42, pp. 397-399.)
603	5348	G.B. ...	... *Vapour Trails of Beaufighter at 300 m.p.h. (Photo).* (Aeroplane, Vol. 63, No. 1,636, 2/10/42, pp. 382 and 408.)
604	5461	Germany	... *Determination of Oxygen by a Physical Method (Magnetic Susceptibilities).* (H. Rein, Schriften Akad L.F.F., No. 11, 1/6/39, pp. 1-7.)
605	5463	Germany	... *Biological Problems of High Speed Flight.* (S. Ruff, Schriften Akad L.F.F., No. 13, 28/4/39, pp. 1-21.)
606	5469	Germany	... *Meteorology Applied to Navigation.* (H. Seilkopf, Schriften Akad L.F.F., No. 21, 30/8/40, pp. 1-40.)
607	5475	Germany	... *On the Present State of Research on High Altitude Breathing.* (H. Rein, Schriften Akad L.F.F., No. 28, 20/5/38, pp. 1-19.)
608	5476	Germany	... *Photographic Evidence of Physiological Height Effects on Pilots (Cinema Film).* (H. Strughold, Schriften Akad L.F.F., No. 28, 20/5/38, pp. 21-24.)
609	5477	Germany	... *Some High Altitude Flying Accidents of Recent Years Caused by Failure of the Human Organism.*
610	5483	Germany	... *The Importance of Carbon Dioxide Breathing at High Altitudes.* (H. Rein, Schriften Akad L.F.F., No. 32, 17/1/41, pp. 3-10.)
611	5484	...	... *Altitude Sickness Caused by Drop in Pressure.* (T. Benzinger and W. Hornberger, Schriften Akad L.F.F., No. 34, 25/4/41, pp. 1-42.)
612	5486	Germany	... *Pilot Balloon of High Rate of Ascent and Recording Thermometer of Small Lag.* (E. Regener, Schriften Akad L.F.F., No. 37, 17/1/41, pp. 5-13.)
613	5487	Germany	... *Experiments on Condensation and Sublimation of Water Vapour at Low Temperatures.* (E. Regener, Schriften Akad L.F.F., No. 37, 17/1/41, pp. 17-24.)
614	5489	Germany	... *Scientific Basis of Testing Ultimate Altitude Resistance of Pilot by Noting His Reactions when Breathing Specified Gas Mixtures.* (T. Benzinger, Schriften Akad L.F.F., No. 43, 1/4/40, pp. 1-28.)
615	5519	Canada	... *Aviation Medicine (R.A.F.).* (H. F. Whittringham, Flying and Popular Aviation, Vol. 31, No. 3, Sept., 1942, pp. 149-151 and 188-196.)
616	5561	G.B. ...	... *Decompression Chambers Used by the R.A.F.* (Flight, Vol. 42, No. 1,768, 12/11/42, pp. 518-522.)

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618	5642	U.S.A. ...	*Auditory Sensitivity Under Conditions of Anoxia. A Study of Speech Intelligibility.* (C. P. Seitz and G. M. Smith, J. Aeron. Sci., Vol. 9, No. 12, Oct., 1942, pp. 478-480.)
619	5669	G.B.	*Rehabilitation in the Royal Air Force.* (R. Jones Watson, Brit. Med. J., March 28th, 1942, pp. 403-407. Abstract, Bulletin of War Medicine, Vol. 3, No. 2, Oct., 1942, pp. 108-109.)
620	5670	Canada ...	*The Electro-Cardiographic Records of 2,000 R.C.A.F. Aircrew.* (G. E. Hall and others, Canadian Med. Ass. J., 1942, March, Vol. 46, No. 3, pp. 226-230. Abstract, Bulletin of War Medicine, Vol. 3, No. 2, Oct., 1942, p. 110.)
621	5671	U.S.A. ...	*Relation Between the Electro-Encephalogram and Flying Ability.* (M. Thorner and others, War Medicine, Chicago, March, 1942, Vol. 2, No. 2, pp. 255-262. Abstract in Bulletin of War Medicine, Vol. 3, No. 2, Oct., 1942, p. 110.)
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623	5674	U.S.A. ...	*Toxicology of Acrylonitrile (Vinyl Cyanide). 1, A Study of the Acute Toxicity.* (H. C. Dudley and P. A. Neal, J. Indust. Hyg. and Toxicol., Feb., 1942, Vol. 24, No. 2, pp. 27-36. Abstract, Bulletin of War Medicine, Vol. 3, No. 1, Sept., 1942, pp. 53-54.)
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629	5684	Germany	...	*Effects of Highly Concentrated Oxygen on the Organism.* (H. Becker-Freyseng, Verhandl. d. deut. Gesellsch. f. Kreislaufforsch., 1940, Vol. 13, pp. 83-85. Abstract in Bulletin of War Medicine, Vol. 3, No. 1, Sept., 1942, p. 46.)
630	5685	U.S.A.	...	*Some Effects of Hyperventilation, with Special Reference to Aviation Medicine.* (F. R. Rushmer, Proc. Staff Meetings, Mayo Clinic, Dec. 17th, 1941, Vol. 16, No. 51, pp. 801-808. Abstract in Bulletin of War Medicine, Vol. 3, No. 1, Sept., 1942, pp. 46-47.)
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642	*5701	U.S.A.	...	*Characteristics of Wide Angle Aircraft Camera Lenses* (*R.P.* 1,498). (F. E. Washer, J. Res. Bur. Stands., Vol. 29, No. 3, Sept., 1942, pp. 233-246.)
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643	5612	Germany	...	*The Numerical Integration of Ordinary Differential Equations of the Second and Higher Orders.* (R. Zurmühl, Z.A.A.M., Vol. 20, No. 2, April, 1940, pp. 104-116.)
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649	5397	G.B. ...	...	*Rotol Digest.* (Vol. 3, No. 39, 30/9/42.)
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653	5401	G.B. ...	...	*Austin Technical News.* (Vol. 1, No. 10, 30/9/42.)
654	5402	G.B. ...	...	*Austin Technical News.* (Vol. 1, No. 11, 7/10/42.)
655	5403	G.B. ...	...	*Austin Technical News.* (Vol. 1, No. 12, 14/10/42.)
656	5404	G.B. ...	...	*Austin Technical News.* (Vol. 1, No. 13, 21/10/42.)
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659	5407	G.B. ...	...	*Technical Abstracts Issued by the Aero Engine Dept., Bristol Aeroplane Co.* (Vol. 7, No. 16, 15/10/42.)
660	5408	G.B. ...	...	*Technical Abstracts Issued by the Aero Engine Dept., Bristol Aeroplane Co.* (Vol. 7, No. 17, 22/10/42.)
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668	5539	G.B. ...	...	*Austin Technical News.* (Vol. 1, No. 16, 11/11/42.)
669	5576	G.B. ...	...	*International System and Standards.* (Engineering, Vol. 154, No. 4,009, 13/11/42, p. 392.)
670	5577	G.B....	...	*Universal Decimal Classification.* (Engineering, Vol. 154, No. 4,009, 13/11/42, p. 393.)
671	5627	Germany	...	*Lilienthal Prize Competition, 1942—List of Subjects.* (Flugwehr und Technik, Vol. 4, No. 9, Sept., 1942, p. 241.)
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679	5891	G.B. ...	...	*Austin Technical News.* (Vol. 1, No. 19, 26/11/42.)
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