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

Air Power. (H. E. Wimperis, The Engineer, Vol. 174, No. 4,527, pp. 259-260.) (106/1 Great Britain.)

The author examined Major Seversky's claims (Victory through Air Power) that bombing radius of 3,500 miles is already possible and an extension of this radius to 6,000 miles should be attainable in the near future.

From published information, it appears that up to 30 ton-miles per gallon of fuel have been recorded for modern bombers (gliding angle 1 : 15).

The author shows that the ratio of total distance that can be flown to the number of ton miles per gallon is given by the expression

$$700 \log_{10} \{ W/(W-F) \}$$

where W = initial weight of aircraft + fuel.

F = initial weight of fuel.

Assuming that $F = W/2$.

$$\text{Total distance} = 30 \times 700 \log_{10} 2.$$
$$= 6{,}300 \text{ miles.}$$
$$\text{Radius of action} = 3{,}150 \text{ miles.}$$

It should be pointed out that this figure does not include any bombs.

It seems, however, reasonable to suppose that a relatively slight improvement on existing designs should make such a bomb load possible for a radius of action of 3,000 miles (in attack on Japan from Alaska).

As regards Seversky's second prediction of a 6,000 mile radius in the near future, the author shows that this could only be attained by: Increasing air efficiency from 0.80 to 0.85, together with decreasing gliding angle from 1 : 15 to 1 : 20 and decreasing specific fuel consumption from 0.5 to 0.35 lb./b.h.p. hours.

The improvements required are considerable and it is doubtful whether they could be realised on aircraft of the type and weight in use at present.

For this reason Seversky is in favour of much larger aircraft (gross weight 200 to 500,000 lbs.) where conditions, especially as regards weight of structure appear more favourable.

Since however such machines have not yet been built, it is impossible to say how long such development work would take.

The Armament of the Fighter. (C. Rougeron, La Science et la Vie, No. 300, August, 1942, pp. 72-80.) (106/2 France.)

The advent of armour plating in aircraft adopted by the Germans in the summer of 1940 necessitated a change in the type of gun. Up to that time, fire power was purely a question of multiplying the number of small calibre machine guns fitted (7.65 mm.). Now, however, a heavier calibre gun was required, which necessarily led to a reduction in the rate of fire. Ever since the question of the necessary calibre has been discussed. The author is of the opinion, that for aerial combat (as distinct from ground attack) the 15 mm. cannon represents the best all round compromise for some time to come. It is the minimum calibre for which reliable explosive bullets can be manufactured and the higher rate of fire compensates for the slightly greater charge of the 20 mm. shell. It is pointed out that in any case effects due to the explosion of the shell are restricted in calibres of this order and only become marked if much larger calibres (of the order of 40 mm.) are employed. Such sizes, however, appear to be ruled out for the present.

Throughout the author emphasises that contrary to the naval ideal of the biggest possible gun, aerial combat requires the smallest gun capable of perforating the relatively thin armour of the enemy. In view of the short range and multiplicity of guns fitted, it is suggested that a much shorter and lighter gun than the standard could be utilised to advantage.

New Military Types of Aircraft on the German-Russian Front. (P. Belleroche, La Science et la Vie, No. 300, August, 1942, pp. 89-93.) (106/3 France.)

According to this French source, the German development has been mainly towards the provision of heavier dive bombers, for the attack on concrete forts by means of large calibre bombs and aerial mines. The new Russian types, on the other hand, appear to be specially intended for anti-tank warfare. Reference is made to the following aircraft, silhouettes of some of which are given :—

GERMAN.

Fighters	Me. 109F Me. 115	Exhaust heated guns, specially suited for cold weather flying.
Ground attack	Ju. 88 A6	24-cylinder D.B. 606 X engine (2,200 h.p.). Horizontal and dive bombing—twin engines Ju. 211, 11 ton gross weight, cockpit armoured with 8.5 mm. plate. Used in the Crimea.
,,	Do. 217	Horizontal and dive bombing—twin-engined B.M.W. 801, 15 tons gross, armoured as above.
,,	He. 117	Dive bomber, twin-engined D.B. 606, 20 ton gross, armoured as above.

RUSSIAN.

Fighters	MIG. 3	20, 23 and 32 mm. cannon (exhaust heated). Armour plate fitted.

Ground attack	Stormovik (1 : 2)	Single-seat ground attack and dive bomber (mainly intended against tanks). Two 3.2 mm. wing cannon and two 1.3 mm. machine guns. Radiator protected by sliding armour plate during attack. Some models fitted with rocket-propelled bombs.
	SU. 2	Combined fighter and dive bomber (based on Brewster Bermuda).
	SB.RK.	Twin-engined dive bomber.
Light bombers	YAK. 4	Reconnaissance or low level attack.
	PE. 2	Horizontal bombing.

Researches on Supersonic Flow by Hydraulic Analogy (Open Tank). (Revue, Brown Boveri, Vol. 29, No. 1-3, Jan.-March, 1942, pp. 77-78.) (106/4 Switzerland.)

Interesting flow photographs of a blade system in an open water channel at various speeds of the current are shown. In such a channel, the ratio of the surface speed of flow to that of the ground wave corresponds to the Mach number in gas dynamics. A rise in the water level is equivalent to an increase in the density, pressure and temperature of the gas and vice-versa. At low speeds, the absence of waves and changes in level of the water shows that the flow is similar to that of an incompressible gas. At higher Mach numbers, in addition to the bow wave, the photographs show separation of the flow from the upper surface of the blade, the wave pattern or disturbance being limited however to the liquid in fairly close proximity to the blades. As the speed of the current is still further increased, the water level falls progressively along the blade (large drop in density of the corresponding gaseous flow) and a considerable amount of disturbance exists in the wake of the blades.

It is stated that experiments of this type are useful in a qualitative sense for high speed flow investigations on grid systems, the model being easily altered so as to produce minimum interference. In gas turbines, especially, any small gain in blading efficiency is magnified at least four times in the overall efficiency of the plant.

In addition to these qualitative tests, Brown Boveri have carried out extensive researches on the effect of blade pitch and gap losses on the efficiency of the grid system. These tests utilise compressed air on models on the grid system and although mainly covering the subsonic range will shortly be extended to higher Mach numbers.

ABSTRACTOR'S NOTE.—For a very comprehensive treatment of the hydraulic analogy in supersonic investigations, see Pub. Scient. du Ministère de l'Air, No. 144.

The Laws of Free Turbulence. (H. Reichardt, V.D.I. Forschungsheft, No. 414, May-June, 1942, pp. 1-22.) (106/5 Germany.)

Free turbulence is defined as turbulent motion unaffected by the presence of walls. Examples of such motion are the region of contact of two jets moving at different speeds and the so-called turbulent wakes in the lee of obstacles. A freely expanding jet also becomes generally turbulent at some distance from the orifice.

In actual practices, these distinctive types of free turbulence may occur simultaneously. A considerable amount of both experimental and theoretical work has been carried out on these phenomena, and although the Prandtl hypothesis of the mixing path has proved useful in evaluating the results, it is clear that this theory cannot account satisfactorily for all the observations. For this reason, the author has invented the method of treatment in use up to now, *i.e.*, starting with those factors which can be determined experimentally, other factors not directly measurable were calculated by means of the hydrodynamic equations. Thus the mean velocity $\bar{u}$ of the principal motion, *i.e.*, the longitudinal impulse

$\rho \bar{u}^2$ is accurately measurable. The calculated secondary quantities include the lateral oscillations, the steady impulse transfer in the lateral direction, the turbulent impulse transfer (apparent turbulent friction) and the total impulse transfer.

These quantities are expressed as functions of the u impulse, the mixing width b and the co-ordinates x, y. It is assumed that the turbulent impulse transfer divided by the square of the maximum velocity difference in u is independent of x and a function of y/b only. This is equivalent to the basis of Prandtl's mixing path hypothesis without however introducing the concept of the mixing path explicitly, since the latter is known to give an incorrect value for the velocity profile.

In order to establish general relationships, an accurate knowledge of the distribution of the mean velocity. *i.e.*, of the $\bar{u}$ impulse is essential. For this reason, the author carried out a further series of measurements for the principal cases of free turbulence and concludes that the impulse profiles found in practice are to a first approximation solutions of a general impulse equation of a type familiar in heat conduction.

From this he deduces that the total impulse flow in a lateral direction is proportional to the slope of the u impulse in that direction. The proportionality factor F corresponds to an impulse "conductivity" and has the dimensions of a length. In general it depends on x and in the case of free flow takes the simple form :—

$$F = (b/2)\,(db/dx)$$

when $b\ (x)$ is a measure for the width of the mixing zone.

It does not appear that a simple relationship exists for the apparent turbulent friction.

The author shows that his new theories lead to a simple and accurate presentation of the observed increase in width of the mixing zone and the dimension in the u fluctuations with increase in x. At the same time simple expressions for static pressure differences in free turbulence are obtained.

The Transition from Subsonic to Supersonic Flow of a Gas. (H. Gortler, Z.A.M.M., Vol. 20, No. 5, Oct., 1940, pp. 254-262.) (106/7 Germany.)

Methods exist for the satisfactory treatment of steady compressible flow at small Mach numbers, whilst pure supersonic flows can be treated with even greater facility.

Up to now, however, satisfactory methods for dealing with the actual transition from subsonic to supersonic conditions are still lacking. The difficulty is partly due to the fact that compression shocks may arise as soon as the local velocity of sound is exceeded at any one point in the field and this will at once cause any analytical method to break down. Even if, however, the flow behaves perfectly regularly, we shall have the mathematical difficulty of a quasi linear differential equation of the second order (*i.e.*, the equation of the velocity potential) changing from the elliptic to the hyperbolic type when the flow passes through the sonic speed. Moreover, the locality of this point of transition is unknown and has to be determined by the calculation.

So far, exact solutions have only been obtained in a few special cases to which the author adds further examples by considering the case of the gas flowing along a corrugated well. An iteration method is employed, the first approximation being obtained by a linearisation leading to Prandtl's rule. It will be remembered that the method of Raleigh and Janzen starts off with an approximation based on incompressible flow. The author's method has the advantage that compressibility is already considered at low Mach numbers, it being, however, assumed that the flow differs but little from pure translation. The iteration process then consists in improving this first approximation so that it will also apply for larger differences in the type of flow from pure translatory motion.

The method fails when the Mach number of the undisturbed translatory basic flow reaches unity. Up to the point, however, the convergence of the power series is satisfactory.

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.) (106/8 Germany.)

It is well known that the polar diagram (c_L, c_D) of a wing depends on the aspect ratio $\lambda = F/b^2$.

In the case of elliptic lift distribution

$$c_L = \left\{ \frac{2\pi\sigma}{(1+2\lambda\sigma)} \right\} \alpha$$

$$\text{where } \sigma = \left(\frac{1}{2\pi}\right)\left(\frac{dc_L}{d\alpha}\right)_{\lambda} = 0 \quad .$$

In the case of a flat plate, $\sigma = 1$; for profiles σ is generally slightly smaller. Assuming α to be small,

$$c_n = c_L + c_d\alpha \text{ (normal force)}$$

$$c_t = -c_L\alpha + c_d \text{ (tangential force)}$$

Neglecting $c_d\alpha$ in comparison with c_L, we obtain

$$c_n = c_L = \left\{ \frac{2\pi\sigma}{(1+2\lambda\sigma)} \right\} \alpha \quad . \quad . \quad . \quad . \quad (1)$$

Putting $c_D = c_{Di} + c_{DP}$ and remembering that $c_{Di} = \lambda c_L{}^2/\pi$, we obtain

$$c_t = \left\{ \frac{-2\pi\sigma}{(1+2\lambda\sigma)} \right\} \alpha^2 + \left\{ \frac{4\pi\lambda\sigma^2}{(1+2\lambda\sigma)^2} \right\} \alpha^2 + c_{wp} = \left\{ \frac{-2\pi\sigma}{(1+2\lambda\sigma)^2} \right\} \alpha^2 + c_{wp} \qquad (2)$$

Eliminating α from (1) and (2)

$$c_t = -\left(\frac{1}{2\pi\sigma}\right) c_n{}^2 + c_{wp}$$

The connection between $c_t + c_n$ is thus independant of aspect ratio and this is confirmed by replotting experimental results.

This characteristic of normal and tangential forces may be of use in many approximate calculations.

A Simple Method of Applying the Compressibility Correction in the Determination of True Air Speed. (W. C. Schoolfield, J. Aeron. Sci., Vol. 9, No. 12, Oct., 1942, pp. 457-464.) (106/9 U.S.A.)

By reviewing the complete impact pressure equation, which describes the pressure exerted by an air stream upon coming to rest, it is shown that the approximating assumption that is involved in the customary method of determining the true air speed of an aircraft at altitude is no longer satisfactory for high speed aircraft. The compressibility error that is a result of this assumption is isolated, and a method is described whereby the necessary correction may be applied by constructing additional altitude curves of indicated air speed $(V\sqrt{\sigma})$ on the conventional air speed indicator calibration chart. The true air speed at any altitude is then determined by the usual method—from the known value of indicated air speed and atmospheric temperature and pressure. The error that results if the compressibility correction is not applied is shown to be +11 m.p.h. for a 400 m.p.h. aircraft at 25,000 ft. altitude. The method here presented for applying the compressibility correction is less cumbersome than other suggested methods and has the additional advantage of retaining the use of the customary air speed indicator calibration chart. Finally, the possible effect of compressibility on the position error of a pitot static head installation is briefly analysed and discussed, and the difficulties encountered in determining true atmospheric pressure and temperature in high speed flight are mentioned.

Tricycle Landing Gear Design (Part 2). (E. S. Jenkins and A. F. Donovan, J. Aeron. Science, Vol. 9, No. 11, Sept., 1942, pp. 397-410.) (106/10 U.S.A.)

PRINCIPAL CONCLUSIONS.

EFFECTS OF WHEEL BASE.

1. Increase in the distance of the nose wheel forward of the c.g. rapidly reduces the critical design loads on the nose wheel, decreases the probability of pitching oscillations, and increases the resistance of the aeroplane to turning over.

2. The distance of the rear wheels aft of the c.g. must be sufficient so that the c.g. will be forward of the rear wheels with the aeroplane in the tail-down attitude. At the same time, the distance aft of the wing aerodynamic centre should not exceed the maximum value at which the aeroplane will be longitudinally stable when taxying on only the rear wheels at take-off speeds.

3. An increase in the distance of the rear wheels of the c.g. also results in increased directional stability, a small reduction in the resistance to overturning, and a reduced likelihood of pitching oscillations during taxying on all three wheels.

EFFECTS OF TREAD.

Satisfactory ratios between the values of wheel base and tread are best obtained by careful application of the criteria and cannot be arbitrarily defined.

EFFECTS OF CASTER ANGLE.

1. Positive caster angle increases the tendency to shimmy and requires additional damping.

2. Negative caster angles up to about 8 deg. decrease the tendency to shimmy.

3. For zero caster angle the nose wheel neither centres nor turns crosswise when stopped, but remains pointed in the direction in which it was last rolling.

4. From the standpoint of handling characteristics and damping requirements, a zero caster angle is preferable. Structural requirements may, however, necessitate the use of a positive caster angle.

EFFECTS OF TRAIL.

1. The trail must be positive at all times, at all possible angles of yaw of the nose wheel, and at all encounters of the nose wheel with obstructions.

EFFECTS OF TYRE.

All rubber-tyred castering wheels will shimmy unless equipped with a damping device or other means of shimmy prevention.

EFFECTS OF MOMENT OF INERTIA OF CASTERING PARTS.

1. The viscous damping necessary increases with the moment of inertia of the castering parts.

2. The solid friction damping required is independent of the moment of inertia of the castering parts.

EFFECTS OF TYPE OF DAMPING USED TO PREVENT SHIMMY.

1. Solid friction damping makes steering and ground handling too difficult to be satisfactory except on very small aeroplanes.

2. Fluid dampener size is apparently controlled not by the smallest dampener that can prevent shimmy but by the smallest dampener capable of providing

the necessary damping, together with a small enough resistance at low angular velocities to produce satisfactory steering characteristics.

3. The amount of any particular type or combination of types of damping necessary to prevent shimmy in a particular installation may be approximated mathematically.

Aerodynamic Design of Strut Roots and Fairings. (W. Pfenninger, Flugwehr und Technik, Vol. 4, No. 9, Sept., 1942, pp. 237-241.) (106/11 Switzerland.)

Efficient high speed flight requires thin wing sections and it becomes increasingly difficult to ensure sufficient torsional rigidity so as to avoid flutter with increase in size of aircraft. The author is of the opinion that wing struts will have to be fitted to act as additional supports. It is obviously necessary to design such struts to have the minimum aerodynamic resistance and at the same time their installation should be such as to produce some useful lift. The author has developed a type of strut profile with a remarkably low profile drag and which maintains laminar boundary layer flow over a considerable range.

Flow photographs obtained with a hot wire anemometer show that separation of the boundary layer at a lift coefficient of 0.3 only takes place when the flow reaches to within 10 per cent. of the trailing edge (expressed in terms of chord length).

Various types of root attachments to the wing and fuselage were next investigated, the interference effect being reduced by decreasing the thickness of the inner wing profile over a region. Examples of practical application to single and twin-engined cantilever monoplane wings are given and it is concluded that the advantages of this construction are great, especially in aerobatics. In conclusion it is stated that the type of root attachment developed on the basis of minimum interference with the boundary layer can also be usefully applied to propeller roots and turbine blades.

Conversion Tables for Airscrew Coefficients. (F. Weinig, Aerodynamics of the Airscrew.) (Text book.) (106/12 Germany.)

COEFFICIENT.	BRITISH.	U.S.A.	GERMAN.	CONVERSION FACTOR.
Thrust	$k_T = \dfrac{T}{\rho n^2 D^4} =$	C_T	$k_s = \dfrac{S}{(\rho/2)\, u^2 F_s}$	$k_s = .258\, k_T$
Torque	$k_Q = \dfrac{Q}{\rho n^2 D^5} =$	C_Q	$k_d = \dfrac{M_d}{(\rho/2)\, u^2 R F_s}$	$k_d = .516\, k_Q$
Power	$k_P = \dfrac{P}{\rho n^3 D^5} =$	C_P	$k_1 = \dfrac{N}{(\rho/2)\, u^2 \,.\, u \,.\, F_s}$	$k_1 = .082\, k_P$

Note.—$k_d = k_1$

$$k_Q = \frac{1}{2\pi} k_P$$

The units employed are

BRITISH AND U.S.A.		GERMAN.		
T	lb.	S	kg.	Thrust.
Q	lb. ft.	M_d	kg. m.	Torque.
P	ft. lb./sec.	N	kg. m./sec.	Power.
ρ	slugs/cub. foot	ρ	kg. sec.^{2}/m.^{4}	Density.
n	rev./sec.	n		Rev./sec.
D	feet	D		Diameter.
—	$\pi D^2/4$	F_s		Disc area.
R	feet	R		Radius.

At NTP, $\rho = .0025$ slugs/cubic foot
$= .132$ kg. sec.^{2}/m.^{4} ($= \simeq \frac{1}{8}$ at 15°C.).
British and American coefficients are plotted on a V/nD basis
$V/nD = J =$ advance/diameter ratio.
The Germans use the factor $v/u =$ speed ratio $= \lambda$.
$$\lambda = J/\pi.$$

Vector Methods of Flutter Analysis. (W. M. Bleakney, J. D. Hamm, J. Aeron. Sci., Vol. 9, No. 12, Oct., 1942, pp. 439-451.) (106/13 U.S.A.)

The application of vector notation to generalised flutter equations is described, and the advantages of graphic stability solutions are pointed out. The expressions for three-dimensional aerodynamic and mechanical coefficients are given. The use of stability curves in the presentation of data and the interpretation of these curves in terms of flutter characteristics are explained.

For solving the determinantal equation analytically, a convenient method of successive reduction in order is presented. In graphic solutions certain circle relationships have been found useful; when applied to determinantal elements, these relationships form the basis of solutions developed in two and three degrees of freedom.

The analysis of a symmetric flutter mode of a twin-fin tail is outlined to illustrate the methods of solution described. Actual examples of the evaluation of parameters are given and a circle diagram is applied to the solution of the stability equation. The circle diagram and a two-degree-of-freedom M curve are used to determine the effects upon flutter characteristics of variations in parameters.

The simplifying assumptions as applied to different problems vary widely. Likewise, variations in the detailed graphic operations are used, depending upon the nature of the data and the information desired.

In modern high-speed aircraft the effects of compressibility must be considered. Possio has shown that in the case of an oscillating wing compressibility causes large changes in the aerodynamic coefficients, the effects being functions of both speed and frequency. In addition. when local speeds exceed the speed of sound, the shock fronts and accompanying burbles introduce non-linear effects that can best be studied experimentally. The existence of these complex aerodynamic effects at extremely high speeds and our limited knowledge of three-dimensional airflow make it necessary occasionally to supplement theoretic results with wind tunnel tests and flight experience.

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.) (106/14 U.S.A.)

Forces produced by a propeller operating at an angle to the airstream or being subjected to certain displacement velocities with respect to the airstream were calculated by Harris and Glauert in 1918. Recent tests on a propeller of modern plan form has shown that the theory of Harris and Glauert when used *without their empirical constant* predicted only half of the force in yaw as indicated by the tests. A new theory is presented here which has improved the agreement between the predicted and measured values of one of the force derivatives for the propeller tested and is believed to be more desirable for design calculations.

This method is based upon the same assumptions used by Harris and Glauert, but includes the modified lift produced by an aerofoil when operating in an oscillating airstream. The equations are in a different form than given by Harris and Glauert—they depend mainly upon the propeller blade form and clearly indicate that propellers having a wide root chord section will produce a greater side force due to yaw than would be realised with a propeller blade having a narrow root chord. This is an interesting conclusion, since a high altitude pusher type aircraft that will probably require a propeller with a wide root chord will be favoured from the stability point of view in comparison with a similar tractor type aircraft.

The Precision of Motor Fuel Testing. (D. B. Brooks and R. B. Cleaton, S.A.E.J., Vol. 50, No. 9, September, 1942, pp. 393-401.) (106/15 U.S.A.)

This third triennial analysis of the precision of motor fuel testing is based on 6,925 knock ratings on 183 fuels, and inspection data on 109 of these fuels. The analysis shows that the precision of rating by both A.S.T.M. Motor and C.F.R. Research Methods has continued to improve during the last three years, the standard deviations for both methods now being below half octane unit. It appears possible for these deviations to be reduced to half of this value.

The use of the sensitive reference fuel $X-1$ is probably responsible for part of the marked improvement in the rating of cracked fuels.

The humidity control apparatus is shown to have no direct effect on ratings. For the first time, the analysis includes fuel inspection data, and estimates of precision are given for vapour pressure, gravity, and distillation measurements.

Combustion in Diesel Engine. (M. A. Elliott and L. B. Berger, Ind. and Eng. Chem., Vol. 34, No. 9, Sept., 1942, pp. 1065-1071.) (106/16 U.S.A.)

The results furnish evidence indicating that intense combustion in Diesel engines probably occurs only in regions in which local concentration of fuel at least equals a certain minimum value analogous to the lower limit of flammability. Regions in which the concentration of fuel is less than this minimum value are designated as overlean because flammation does not occur in them, although direct oxidation reactions are taking place. The importance of locally overlean regions as the source of carbon monoxide and aldehydes in the exhaust gas at fuel : air ratios less than the chemically correct value is pointed out in discussing the variation of the concentration of these constituents with fuel : air ratio. The analysis of data on the concentration of nitrogen oxides in the exhaust at different operating conditions disclosed the possible relation of certain of the observed effects to the conditions existing in regions of intense combustion.

Most of the information on combustion was made available as a result of seeking explanations for effects observed when natural gas was added to the intake. Accordingly, this suggests the possibility that the addition of combustible gases to the intake air of a Diesel engine might offer a valuable new technique for studying certain aspects of combustion in engines of this type, quite apart from commercial possibilities.

Requirements for Aircraft Oil Servicing Equipment for the War Effort. (C. W. McAllister, S.A.E. Preprint, Oct., 22nd and 23rd, 1942, Meeting.) (106/17 U.S.A.)

Extreme flexibility and versatility in servicing equipment is essential for the efficient handling of aviation oil in aircraft line maintenance work. This is largely due to the many unpredictable situations and conditions that arise, for instance, (1) it is not often possible to schedule oil services evenly over a 24-hour day cycle. This is particularly true of refills or oil changes that must be done after other work has been completed. In many cases, this is a last minute operation that must be done just before the plane is scheduled for departure. (2) Re-filling, replenishing, and complete oil changes are often made on aircraft that are not brought near the hangars for repairs or maintenance. Such aircraft must be serviced where they are parked. To-day, a stagger system of parking is necessary. This means that the oil servicing equipment must be suitable for manœuvring under and about the aircraft and able to go distances from the apron to the planes which are often parked on the grass or even off the airport.

It is essential that a single unit handle completely every phase of this service. (3) The complete oil servicing unit must be able to service efficiently any type of aircraft, whether it be a DC-3, C-46, C-47, C-54, C-87, and other cargo transports, or some visiting amphibian, bomber or pursuit plane.

It is hoped that those firms who have built present-day oil servicing equipment will add their valuable experience in helping to provide a single unit that will handle all phases of aircraft oil servicing for the air cargo transportation war effort.

Maximum Permissible Temperature of Electric Non-Ceramic Insulating Materials Made of Pressed Plastics and other Substances Free from Rubber. (R. Nitsche and E. Dober, E.T.Z., Vol. 63, No. 23-24, 18/6/42, pp. 279-281.) (106/18 Germany.)

The experiments covered insulating materials of the following standard German types :—

Type.	Nature.
2, 3, 4	Synthetic resin or bitumen with asbestos and other inorganic fillers—cold pressed.
6, 7, 8	Hot pressed, bitumen base.
X	Cement or water glass with inorganic filler, cold pressed.
Y	Lead borate and mica.
A	Acetyl cellulose, injection moulded.

The test pieces (rods) were stored for 200 hours at temperatures up to 400°C. (depending on material) and after cooling down for 18 hours, bending and impact strength were determined as well as change in linear dimensions due to storing.

The following storage temperatures for 200 hours appear permissible without leading to marked change in dimensions or deterioration of mechanical properties.

Type.	°C.
Y	300
X	250
2, 3, 4	180
6, 7, 8	80
A	30

Researches on Replacement Materials with Special Reference to Al. Conductors in Electrical Machinery. (K. Sachs and W. G. Noack, Revue Brown Boveri, Vol. 29, No. 1-3, Jan.-March, 1942, pp. 78-83.) (106/19 Switzerland.)

The introduction of Al. wiring in electrical machinery has been delayed, not so much by its reduced conductivity but by difficulties associated with corrosion and soldering or brazing. Extensive practical experience has shown that corrosion difficulties can be overcome by choice of composition of alloy combined if necessary with either anodic treatment or painting.

Soldering or brazing of Al. is perfectly feasible, provided care is taken to remove either chemically or mechanically all traces of oxide. In this connection reference is made to the so-called " rubbing " solders for securing a tin deposit. Messrs. Brown Boveri have developed a method of welding Al. wire electrically without the need or either flux or welding wire. As many as 24 separate wires, each one mm. diameter can be welded together, the joint being stronger than that obtained with any kind of solder. For this reason electric or flame welding should be used whenever possible. Terminal connections on Al. wires are made by means of special copper-clad Al. connectors. A short length of the cladding is removed chemically at one end and the bare Al. welded electrically to the Al. conductor. The other (cladded) end can be soldered normally.

Details of Al. stator windings of a 20,000 kw. alternator are given and it is stated that over 100,000 Al. squirrel cage motors ranging up to 15 kw. have been delivered in the last few years.

In addition to the utilisation of Al. in the electrical industry, the authors briefly review advances made in the welding of high alloy steels, with special reference to turbine blading.

Inspection by Sampling—Effect of Number of Samples to Bulk Number. (R. H. Parsons, Engineering, Vol. 154, No. 4,004, 9/10/42, pp. 294-295.) (106/20 Great Britain.)

The probability that a sample of n articles taken from a bulk of m articles of which p are defective will fail to include any defectives at all can be computed from the formula

$$\left\{\frac{[(m-p)!\,(m-n)!]}{[(m!\,(m-p-n)!]}\right\} \qquad (1)$$

where ! indicates the factorial operation.

The probability that it will comprise exactly a good articles and b bad ones is given by

$$\left\{\frac{[n!\,p!\,(m-p)!\,(m-n)!]}{[a!\,b!\,(m-p-a)!\,(p-b)!\,m!]}\right\} \qquad (2)$$

From (1) it is easy to calculate the size of the sample required for any assigned odds in favour of the sample affording evidence of the bulk falling below some specified standard of quality.

Thus, if a 2 : 1 probability is required that a bulk of a 1,000 articles does not contain more than 45 defectives, the sample must contain at least 24 articles, *i.e.*, we expect a sample of 24 containing no defectives will not be drawn from the bulk more than once in three times.

Similarly a 10/1 assurance would require a sample of 51 articles. If none of these contain any defectives we have the required expectation that the bulk contains less than 45 defectives.

The following table gives the size of samples required to detect the presence of more than 5 per cent. defectives in batches of different numbers for various degrees of assurance:—

Number of articles in batch	20	100	200	300	400	500	1000
Size of sample for even chance of detection*	10	13	14	14	14	14	14
Size of sample for 10/1 chance ...	18	38	42	44	45	45	46

Loading Hatches and Stability of Ships. (G. Buchsbaum, J.d. Schiffbautechn., Gesell., Vol. 39, 1938, pp. 369-388.) (106/21 Germany.)

The loading hatch of a ship is usually provided with a series of transverse steel girders acting as supports for a number of rectangular cover plates made of wood arranged longitudinally. The spacing of the girders and the thickness of the wooden roofing members depends on the dimensions of the hatch and is laid down in specifications. The minimum thickness of wood allowed by the German Lloyd is 65 mm. It is generally admitted that such hatch covers are at least as strong as the surrounding deck mainly because they are isolated from the longitudinal bending moment affecting the deck in rough weather. Failure of the hatch cover is very serious and may lead to the total loss of the ship due to flooding. Such failure is, however, relatively rare and when it occurs, is invariably due to the cover plates being washed away by the waves and not broken. The weakness of the standard hatch cover is thus the method of securing the wooden members in position. This is carried out by a double

* As the sample cannot consist of fractional numbers, the constant size (14) for batches from 200 to 1,000 really corresponds to a probability decreasing from 1.12/1 to 1.06/1.

tarpaulin cover secured round the edges of the hatch by a wire rope and provided with cross straps to prevent the cover from flapping. If properly placed in position, this tarpaulin should withstand the roughest sea and should any trouble arise, a trained crew should always be able to remedy defects at an early stage.

It is admitted, however, that a method of securing the hatch cover direct and retaining the tarpaulin only for water tightness would present certain advantages and the author described examples of such hatch covers as fitted to some modern German vessels. In this case the lateral hatch girders can be dispensed with, since they are incorporated in the cover plate itself, which is now made of steel sections placed transversely across the hatch. Naturally, to ease handling, a number of plates are utilised, each being locked mechanically to the brim of the hatch. Each plate is fitted with a central and two lateral webs spaced at a distance "a," the height of the web being "h" and the width of the bottom flange "b." Webs and flanges are of the same thickness t as the original plate and this determines the dimensions of a and b, h in turn depending on the width of the hatch.

This is shown in the tables below:—

Width of hatch m.	h mm.
3	135
4	185
5	230
6	290
7	365
8	450
9	530

t mm.	a mm.	b mm.
5	350	140
6	450	150
7	550	160
8	650	170

Of course the steel cover comes out considerably heavier than a standard cover with transverse girders and wooden plates, for a hatch 5×7.2 m. weighs about 2.7 ton. The corresponding steel cover will be in four sections, each weighing 1.1 tons.

It should be pointed out that the steel cover will still require a tarpaulin to keep out the wet and that deformation of the plate or the hatch may make the removal or insertion of the plate difficult. On the other hand, it should require no further attention when once in position and possesses (although this is not mentioned in the original article) some advantages during a bombing attack.

The rest of the article deals mainly with question of stability and the influence of deck loads and is of purely nautical interest.

Plastics in Engineering. (J. Prior, Engineering, Vol. 154, No. 4,006, 23/10/42, pp. 324-325.) (106/22 Great Britain.)

Moulded plastics are of two principal types—thermo-setting and thermo-plastic. The former undergo an irreversible chemical change during the hot moulding process, yielding a hard product which cannot subsequently be softened. Thermo-plastics on the other hand (as is indicated by their name), become soft on being heated and this process is reversible.

The chemical reaction producing thermo-setting plastics is usually carried out in two stages—the first at a moderate temperature yielding an intermediate resin by the action of formaldehyde or urea on phenol in the presence of catalyst. This resin is then mixed with a filler and the chemical reaction completed in the final moulding at a higher temperature.

Thermo-plastics may be either truly resinous (vinyls, styrenes, etc.) or require the addition of a plasticiser. A filler is however not generally added. The principal properties of representative plastics of both classes are given in the table below. Engineering uses referred to by the author include: Toothed gears, bearings, control lever knobs, transparent inspection doors and small moulded parts of highly finished condition not requiring any subsequent machining (tolerances of .001 in. are often adhered to).

THE PROPERTIES OF PLASTICS.

	Thermo-Setting.				Thermoplastic.				
	Formaldehydes.						Cellulose Acetate.		
	Phenol, Moulded.	Phenol, Laminated.	Phenol, Cast (No Filler).	Urea, Moulded.	Vinyl Chloride Plasticised.	Styrene Resin.	Sheet.	Moulded.	Casein.
Average ultimate tensile strength, lb. per sq. in.	11,000	18,000	12,000	12,000	Up to 9,000	9,000	9,000	8,000	7,500
Average ultimate compressive strength, lb. per sq. in. ...	36,000	40,000	30,000	35,000	—	13,500	16,000	227,000	—
Elongation, per cent.	—	—	—	—	2 to 500	1.0	20 to 55	8 to 30	—
Specific gravity	1.3	1.38	1.3	1.45	1.2 to 1·6	1.06	1.32	1.32	1.35
Resistance to continuous heat, °F.	350 to 450	212 to 450	160	160	150	—	140 to 180	140 to 180	—
Softening point, °F.	None	None	—	None	—	190 to 250	140 to 230	140 to 260	200
Effect of weak acids	None to slight, depending on acid				None	None	Slight	Slight	Resistant
Effect of strong acids	Decomposed by oxidising acids. Reducing and organic acids, no effect.			Decomposed or surface attack	None	None	Decomposes	Decomposes	Decomposes
Effect of weak alkalis	Slight to marked, depending on alkalinity				None	None	Slight	Slight	Softens
Effect of strong alkalis	Decomposes	Decomposes	Decomposes	Decomposes	None	None	Decomposes	Decomposes	Decomposes
Effect of metal inserts	None	None	None	None	None	None	None	None	None
Clarity	Opaque	Opaque	Opaque	Transparent to opaque	Transparent to opaque	Transparent 90 to 92 per cent. light transmission.	Transparent, translucent or opaque		Translucent, opaque
Colour possibilities	Limited	Limited	Unlimited	Unlimited (pastel shades)	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited
Machining qualities	Fair to good	Fair to excellent	Excellent	Fair	Good	Poor to good	Good	Good	Good

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The Application of Electric Welding in Commercial Shipbuilding. (P. Classen, Jb. der Schiffbautechnischen Gessellschaft, Vol. 40, 1939, pp. 69-109.) 106/23 Germany.)

The article described the application of arc welding to the construction of the holiday cruising ship " Wilhelm Gustloff " of the German Labour Front. This ship was built by the firm of Blohm and Voss in 1936-1937, rivets being replaced by electric welding on a very extensive scale. Thus the whole of the hull plating as well as the double bottom and deck structure are welded. The same applies to all the principal bulkheads, engine foundations, tanks, hatches, etc.

The thickness of plating employed varies between 6 mm. on the upper deck to 20 mm. in the keel. The total saving in weight of steel plate and scantlings by welding amounted to about 1,300 tons, *i.e.*, 14 per cent. of the total weight of the hull. Over $1\frac{1}{2}$ million rivets were no longer needed. About 100 tons of electrodes material was employed. From the discussion it appears that the main difficulty in welding ships is the avoidance of internal stresses during the assembly. This requires a judicious intermingling of riveting and welding processes and it appears that a really satisfactory and economic solution of the problem requires considerable practical experience.

Tension and Compression Stress-Strain Characteristics of Cold Rolled Austenitic Chromium-Nickel and Cr-Mn-Ni Stainless Steel. (R. Franks and W. O. Binder, J. Aeron. Sciences, Vol. 9, No. 11, Sept., 1942, pp. 419-438.) (106/24 U.S.A.)

The paper gives information on the stress-strain properties of the steels in both the longitudinal and transverse directions to rolling and shows the improvement obtained in these properties by application of the low temperature (200° to 300°C.) stress-relieving heat-treatment. It further shows that the 17 per cent. chromium, 7 per cent. nickel steels, and the 17 per cent. chromium, 5.50 per cent. manganese, 4.50 per cent. nickel steels have better tension and compression properties longitudinal to the direction of rolling than do the 18 per cent. chromium, 8 per cent. nickel steels, particularly when the steels are cold-rolled to a tensile strength exceeding about 150,000 lbs. per sq. in. All these steels have better compressive properties transverse to the direction of rolling than longitudinal to the direction of rolling, but this difference is less marked in the 17 per cent. chromium, 7 per cent. nickel steels and the 17 per cent. chromium, 5.50 per cent. manganese, 4.50 per cent. nickel steels than in the 18 per cent. chromium, 8 per cent. nickel steels. An attempt has been made to present the data on the steels so they will be of greatest value to the designer of lightweight high-strength structures.

Plastics for Aircraft Construction. (H. Stener, Flugsport, Vol. 34, No. 21, 14/10/42, pp. 315-320.) (106/25 Germany.)

Of the two main classes of plastics, viz., thermo-plastic and thermo-setting, the latter are of principal interest to the aircraft constructor on account of their better mechanical properties.

In German literature, thermo-setting plastics are known as synthetic resins (Kunstharze) and the author describes the principal methods of moulding such products under pressure. After manufacture, the parent plastic is in the so-called state *A* and contains a considerable amount of moisture some of which is next driven off, the powdered product then being in the so-called sensitive state *B*. This moulding powder is mixed with a filler (usually wood flour) and sprinkled into a metal die kept at about 160°C. The pressure applied and time of contact depend on the shape and size of the required article and vary from 150 to 1.200 atmosphere and 1-6 minutes.

Under these conditions, the resin powder first melts and then resolidifies (irreversible change), passing into the final hard *C* state.

If the finished article has to be machined out of the solid (plate or rod), it is advisable to use a plastic containing a fabric filler. The fabric (linen or flax) is first impregnated with resin in state "A" dissolved in alcohol. Subsequent heating and drying (atmospheric pressure) converts the resin into the sensitive state B. A number of layers of the heated fabric are then superposed and subjected to a pressure of about 100 atmospheres between heated plates (180°C.). Whilst the pressure moulding described previously only occupies a few minutes, the laminated plate is compressed for a period varying between 2 and 28 hours, before the resin has completely passed into the final hard state C.

Rods and tubes can also be manufactured by the continuous extrusion process. In this case, however, a fabric filler is unsuitable and wood flour or paper cuttings must be employed, leading to a reduction in strength.

The thermal coefficient of expansion of plastic material is about twice that of light alloys and four times that of steel. This requires careful consideration in composite structure.

The author gives examples of aircraft fittings made of plastics and employed on a large scale (bushing, bearings, pulley wheels, knobs, handles, lightly loaded gears, etc.).

Experiments are in progress for moulding major structural elements of aircraft (control surfaces, wing surfaces, fuselage shell, etc.), but so far success has only been achieved by the use of plywood as a base. Such structures are thus rather made of treated plywood than of synthetic resin proper. It seems probable that small aircraft can be built profitably in this manner and that the method will be extended to larger sizes after more experience has been gained.

Torsional and Flexural Buckling of Bars of Thin-Walled Open Section Under Compressive and Bending Loads. (J. N. Goodier, J. Appl. Mech., Vol. 9, No. 3, Sept., 1942, pp. 103-107.) (106/28 U.S.A.)

The observed behaviour of torsionally weak columns in buckling by twisting rather than, or as well as, bending is analysed in this paper on the basis of a hypothesis due to Wagner. The theory is simplified and extended to the general section, where results simpler than some already obtained by Kappus are given. It is further extended to bars, restrained by flexible sheets, and bars with constrained axes of rotation. Wagner's hypothesis is applied to the problem of lateral buckling where it yields the accepted theory for symmetrical sections, but indicates results of novel form for unsymmetrical cases. Similar results are obtained in the problem of eccentric thrust, whatever the section.

Distribution of Stress in Built-in Beams of Narrow Rectangular Cross-Section. (F. B. Hildebrand and E. Reissner, J. Appl. Mech., Vol. 9, No. 3, Sept., 1942, pp. 108-116.) (106/29 U.S.A.)

This paper deals with the problem of the distribution of stress in cantilever beams of narrow rectangular flanged cross-section with one end of the beam rigidly built in. Since an exact solution of this plane-stress problem appears difficult to obtain, an approximate solution is derived by applying the principle of least work. Instead of the linear normal stress distribution of the elementary beam theory, a third degree polynomial is assumed, and the spanwise variation of this stress curve is determined by means of the calculus of variations.

Numerical results are obtained with regard to the stresses at the built-in end of the beam, in their dependence upon (a) the span height ratio of the beam, (b) the flange area-web area ratio of the beam, (c) Poisson's ratio of the material, and (d) the distribution of load along the span. It is found that the deviations from the results of the elementary theory may be appreciable when the distance of the centre of gravity of the load curve from the built-in end of the beam is less than twice the height of the cross-section of the beam.

Buckling of Semi-Monocoque Structures Under Compression. (T. K. Wang, J. Appl. Mech., Vol. 9, No. 3, Sept., 1942, pp. 117-121.) (106/30 U.S.A.)

This paper presents an investigation of the strength of a stiffened cylindrical shell under the action of uniform axial compression. It is assumed that the cylindrical structure is a very thin tube of circular cross section; its reinforcements consist essentially of a great number of uniform longitudinal stiffeners and a great number of uniform transverse rings. It is often desirable to know the critical value of the compressive load for the buckling of such a structure.

Some Dynamic Properties of Rubber. (C. O. Harris, J. Appl. Mech., Vol. 9, No. 3, Sept., 1942, pp. 129-135.) (106/31 U.S.A.)

The purpose of the investigation described in the paper was to obtain information concerning the dynamic properties of rubber bonded to metal. Two properties of rubber were measured, (*a*) the internal damping and (*b*) the dynamic modulus of elasticity. Two types of specimens were tested, (*a*) rubber cylinders bonded to steel cylinders at the ends and stressed in compression and (*b*) specimens of rubber bonded to steel and stressed in shear. All specimens were of the same stock, 5140-V-4, manufactured by the U.S. Rubber Company. The hardness, as measured by the durometer, varied from 32 to 40. In the process of bonding to the steel, a $\frac{1}{32}$ in. layer of 60 durometer stock was added adjacent to each piece of steel. This represents standard practice of the U.S. Rubber Company in bonding soft stock to metal. All specimens were cured for 30 mins. at 279°F.

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. 703-717.) (106/32 U.S.A.)

Tests to study surface finish of journals as affecting friction, wearing-in and seizure of bearings were made on an Amsler machine under the conditions given in this paper. Fine finishes were studied, the roughest having a profilometer reading of only 10 micro-inches.

It was found that there was rather good correlation between the seizure results and the product of profilometer readings taken in the axial and circumferential directions. Those surfaces having a higher roughness-product readings had greater seizure tendency. This was approximately true irrespective of the finishing methods employed, which included grinding, sandpapering, loose abrasive lapping and lapping with bonded abrasive wheels, but sandpapered surfaces gave rather better than average seizure resistance. However, a loose abrasive-lapped surface finished by ring lapping and therefore exceptionally free from chatters and other defects gave exceptionally good results when extremely fine abrasive paper was used lightly to finish its surface before testing.

The seizure results of all specimens also correlated well with the appearance of taper sections of the surfaces.

A study by means of taper sections and photomicrographs of the mechanism of wearing-in showed that the surfaces which wore-in most readily had a very fine scale roughness, sometimes referred to as "fuzz." This fuzz is not indicated to be harmful on a journal which has a sufficiently fine surface finish as to have a reasonably high initial seizure resistance.

One effect that takes place during wearing-in was shown to be an extremely minute smoothing of the topmost part of the surface roughnesses, and this produced a large change in the frictional characteristics. The actual area of contact is thus indicated to be only a small percentage of the conventionally calculated area even for the finely finished and accurate surfaces being dealt with in this investigation. Trueness and large scale roughnesses such as waviness, flat spots, and grinding chatter are also probably very important.

High Density Plywood. (M. Finlayson, Preprint from A.S.M.E. October Meeting, pp. 1-21.) (106/33 U.S.A.)

The physical properties of high density plywood produced from tego-bonded birch veneer, the grain direction of all plies parallel, are presented and compared with the corresponding properties of various metals. It is shown that the strength properties are directly related to the specific gravity. Stress-strain curves in tension indicate that this material not only has no normal yield point, but actually shows a decrease in elongation per unit load at high loads. The moduli of elasticity in tension and compression are shown to be greatly different. The behaviour in torsion is discussed, and the effect on the tensile strength of cross laying the veneers is presented. The effect of immersion in water and the effect of various humidity conditions are given.

The greatest progress on the utilisation of high density plywood has been made by the English in their development of this material for aircraft propellers, one of the most highly stressed units in an aircraft. In England several types of high density plywood are in use on fighter and fighter-bomber planes. It is claimed that for propellers for high horse-power engines, high density plywood is much superior to metal. Some of this superiority is due to the ability to get much lighter propellers which satisfactorily withstand the conditions of use. As an example, it is reported that a three-bladed propeller for a 1,750 horse-power engine weighs 300 pounds less in high density plywood than in metal. This saving is of great value not only because of overall weight reduction, but also because metal blades for engines of high horse-power require a high percentage of steel and large hubs to absorb the high stresses, both causing large weight increases. Conversely, on engines of low horse-power, low steel content alloys and small hubs can be used and high density plywood shows very little or no weight advantage.

In addition to the weight saving, the high density plywood shows a superior resistance to the effect of notches and dents and is more easily repairable. It is reported, on the basis of considerable combat experience, that repairability of high density plywood blades is 80 per cent. as compared with 60 per cent. for metal blades. The fatigue resistance of high density plywood is excellent and its energy absorption much greater than that of metal.

Outside the aircraft field, one application has been developed and is now in use. This is the flare base for the M26 parachute flare. This piece was formerly produced from die-cast aluminium, and is required to take the full shock across a very small area, of the sudden stress occasioned by the parachute stopping the rapid descent of the heavy flare. High density plywood withstands this stress very satisfactorily and has proved successful in this application, releasing many thousands of pounds of aluminium for vital aircraft parts.

Elastic Properties of Curved Tubes. (I. Vigness, Preprint from A.S.M.E. October Meeting, pp. 1-13.) (106/34 U.S.A.)

A theory of flexibility of pipe bends perpendicular to the plane of the bend has been established. Experimental results are given in this paper verifying the derived bending equations. Results show the pipes to be more flexible than expected from the application of the "rod" theory. A flexibility factor is obtained which is identical with that found for the bending of pipe in the plane of its bend. The increased flexibility is caused by a distortion of the cross section of the pipe. There is no change in the torsion rigidity of the curved tube as compared with the rod theory. Transverse stresses similar to those caused by bending in the plane of the bend are set up in the pipe wall. Longitudinal stresses are concentrated at their point of maximum value and are of greater magnitude than expected from ordinary theory. The theory of bending of two-dimensional pipe systems in the plane of their bends is given additional experimental verification.

The Effect of Wood Structure on Heat Conductivity. (F. F. Wangaard, Preprint from A.S.M.E. October Meeting, pp. 1-8.) (106/35 U.S.A.)

Shrinkage and swelling, mechanical properties, and working qualities of wood are all related to the orientation of structural units of the cell wall. The effect of fibrillar orientation upon the heat conducting properties of wood indicates a new technique for the selection of various qualities of wood. The differential thermal conductivity of wood in the longitudinal and transverse directions is shown to be due chiefly to the anisotropic character of the fibrils, and derivations from anticipated transverse conductivity values, as well as longitudinal transverse heat conductivity ratios, are closely related to fibrillar orientation. In this paper application of longitudinal transverse conductivity ratios is proposed particularly for the detection of mild compression wood.

Modern Application of Luminescent Substances. (L. Levy and D. W. West, Chemistry and Industry, Vol. 58, 1939, pp. 457-462.) (106/36 Great Britain.)

The main applications discussed refer to X-ray and cathode ray screens. Reference is also made to radio-active luminous compounds. The luminescence of such compounds is almost entirely due to α radiation causing excitation of a special zinc sulphide phosphor. Early types of such phosphors were relatively inefficient and required the addition of as much as 0.4 mg. of radium bromide per gm. in order to produce sufficient luminosity for instrument dials and gun sights. This high radium content has the disadvantage (apart from cost) of causing a rapid deterioration of luminosity. Modern zinc sulphides only require about 0.2 mgm. of radio-active material per gm. usually in the form of a mesothorium salt. Apart from its lower cost, this latter compound has the advantage that its α activity increases over the first four years of its life and this compensates the gradual drop in response of the zinc sulphide. As a result, the luminescence of this new radio-active product is practically constant and according to luminosity curves obtained at the N.P.L. actually increases from 0.04 to 0.08 during the first year of its life. The same concentration of radium bromide (0.2 mgm. per gm.), on the other hand, whilst of greater initial luminosity (0.15) diminishes to 0.09 in 100 days and at the end of the first year is slightly below the mesothorium product.

Electrical Extensometers. (O. Stettler, Flugwehr und Technik, Vol. 4, No. 8, August, 1942, pp. 212-214.) (106/37 Switzerland.)

The extensometer described is of the resistance type and was developed by the Philips Electric Co., of Zurich. It consists of a thin strip of insulating material, the ends of which are silver plated and serve as connections for the current leads. By means of a drawing pen holding very fine carbon powder in liquid suspension a line about 1 mm. diameter is drawn on the strip connecting the silvered ends. On subsequent drying, a carbon resistance element of about 10,000 ohm is obtained which is cemented on to the specimen undergoing test, and covered with cellulose varnish. Changes in dimension of the test piece produce corresponding changes in resistance which can be measured on an alternating current bridge using a pentode valve as tuning and indicator (electric eye). This method is applicable for example to the steady conditions underlying the normal tensile test. Alternately, periodic phenomena can be investigated by supplying a steady voltage to the strip and recording the change in voltage drop by means of a cathode ray oscillograph.

Thus records can be obtained of the damped vibrations of a bar under torsion or of the stressing in the main bearing bolts of an engine under load.

It is stated that these resistance strips maintain their calibration over prolonged period and have practically a linear connection between extension and resistance change for specific extensions up to 0.05 per cent.

Stress Determinations and Investigations of Mechanical Vibration by Means of Electric Resistance Gauges of Strip or Ring Form. (A. Theis, Zeitschr. für Techn. Phys., No. 11, 1941, pp. 273-280.) (106/38 Germany.)

The well known carbon resistance strain gauge suffers from several defects which complicates the direct evaluation of the records. Thus a change in temperature of as little as 10°C. of the gauge produces a change in resistance of the order of 1 per cent., equivalent to that produced by an extension of 0.5 per cent., *i.e.*, of the same order of magnitude as the strains to be measured.

Moreover, the material of the gauge (powdered graphite with an organic binder) is not homogeneous like a metallic conductor and its resistance does not only depend on its linear dimensions but also on its past history. After a period of rest, the first switching on of the current is accompanied by changes in state leading to a rapid decrease in resistance of the order of 2 per cent., a steady state being only reached after about two hours. Thus accurate experiments can only be carried out after a preliminary baking over this period. Even then redetermination of the zero of the instrument is not always possible, as it implies unloading of the gauge. For this reason, the author recommends wherever possible the utilisation of such gauges in pairs, arranged in adjacent arms of the bridge, as this leads to an automatic compensation of most of the errors enumerated above. Such a mounting is easily carried out in the case of bending stress by attaching the gauges on either side of the neutral fibre. A most ingenious extension of this method applicable to all changes in length is the recalled ring gauge suggested by the author.

If an elastic ring is compressed or extended along a diameter, four equal zones of stress are formed separated by nodes. By mounting four gauge strips inside the ring and using the nodes for connection, the strips can be incorporated in a bridge circuit so that the potential difference corresponding to the change in resistance of each strip are added up whilst effects of temperature and creep are automatically compensated. Provided that the ring is stressed within the elastic range and the wall thickness of the ring is small compared with the radius, the author shows that the sensitivity of the gauge, *i.e.*, change in total resistance for unit change in diameter is given by $K\,(Eh/r^2)$, where

R = constant.
E = elastic modulus.

The scale is thus linear and the sensitivity of the ring gauge can be altered over wide limits by suitable choice of E, h and r. Such gauges can be made of less than 2 cm. diameter and are as easily attached to the surface of the test body as the original strip gauge. Larger gauges of 10 cm. diameter are suitable for measuring extensions up to 1 cm.

It is interesting to note that although the ring gauge introduces a mechanical link into the vibration system, the interconnection of the electrical resistances along the inner wall leads to the automatic suppression in the record of all the higher harmonies of the ring. Thus only the fundamental vibration is recorded and as a natural frequency of the ring is quite high (several thousand/sec.) this particular type of gauge is very suitable for vibration research.

Determination of Oxygen Concentration by Physical Means. (H. Rein, Schriften Akad, L.F.F., Proceedings of the German Academy of Aeronautical Research, Part 11, 1/6/39, pp. 1-7.) (106/39 Germany.)

The new method evolved by the author depends on the decrease of thermal conductivity of a paramagnetic gas when exposed to a strong magnetic field. Since the magnetic susceptibility of pure oxygen is about five times that of air, quite small change in oxygen concentration lead to important changes in conductivity.

The apparatus consists essentially of two similar tubes in parallel through which the gas under examination passes. Each tube contains an iridium heating wire, 3 cm. long and 0.01 mm. diameter forming the arms of a Wheatstone bridge. These elements are exactly similar and the bridge can thus be balanced for any given oxygen-nitrogen mixture. One of the tubes is now exposed to a magnetic field of 2,000 gauss. If the gas contains oxygen, the reduction in thermal conductivity causes the wire in the magnetic field to become hotter than its counterpart and the galvanometer shows a deflection.

It is obvious that the method can be employed to measure either the reduction in the oxygen concentration of normal air (zero calibration with air) or the absolute concentration of the oxygen can be determined (zero calibration with nitrogen). The connection between galvanometer deflection and oxygen concentration is practically linear and in the apparatus described amounts to 120 mm. for the change from normal air to pure nitrogen (normal atmospheric pressure). Changes in concentration of the order of 1 per cent. are thus easily recorded and the circuit obviously lends itself to automatic control. It is pointed out that the sensitivity is increased considerably if the measurements are carried out under reduced pressure.

Apart from physiological research, the author stresses the importance of such an instrument for pressure cabins and submarines.

Process Lags in Automatic Control Circuits. (J. G. Ziegler, N. B. Nichols, Preprint from A.S.M.E October Meeting, pp. 1-8.) (106/40 U.S.A.)

In the application of automatic controllers, it is important to realise that controller and process form a unit; credit or discredit for results obtained are attributable to one as much as the other.

The chronology in process design is often wrong. Generally an engineer first designs his equipment so that it will be capable of performing its intended function at the normal through put rate plus a factor of safety. The control engineer or instrument man is then told to put on a controller capable of maintaining the static equilibrium for which the apparatus was designed. A long expensive process of " cut and try " is often necessary in order to make the equipment work. Both engineers realise that some factor in equipment design was neglected but generally they can neither identify the missing ingredient nor correct it in future design.

The missing characteristic can be called " controllability," the ability of the process to achieve and maintain the desired equilibrium value. Design for steady state conditions is not enough if exact maintenance of variables is necessary. Control action consists of continuous correction of process changes, tending to destroy equilibrium at the desired value and, as such, its study involves not steady state but transient characteristics of the process and controller.

Methods are given for quantitative determination of time lags in automatically controlled processes. The area under recovery curves is taken as a direct measure of process difficulty, and this area is shown to vary as the second power of the time lag. A " recovery factor " term, part of a complete expression for controllability, is introduced which makes possible a classification of processes in dimensions of the process itself, regardless of controller or valve mechanism used. Values of this recovery factor from various industrial applications are given in tabular form. Several processes are examined for the time lag, and means of reducing this unfavourable characteristic are demonstrated. It is felt that this paper will be useful to engineers who are interested in improving the controllability of the processes which they design.

The Measurement of Large Radii of Curvature (Very Flat Curves). (K. Katterbach, Z.A.M.M., Vol. 20. No. 5, Oct., 1940, pp. 284-290.) (106/41 Germany.)

It is often convenient to estimate the forces acting on a moving body by an examination of a photographic record of its space time co-ordinates, since the curvature of the path is a direct measure of the normal force. Unfortunately, graphical differentiation becomes very inaccurate when the radius of curvature becomes large and for very flat curves the method is useless. It has been suggested to estimate the radius of curvature indirectly by measuring the bending moment required to make a flat steel strip conform to the photographic trace of the path. This method was investigated by the author and found satisfactory provided the curvature is almost constant.

In other cases, however, the accuracy was found to be insufficient, mainly due to frictional effect at the contacts.

For this reason the author suggests an alternative method, in which the steel strip is still retained, but the curvature measured optically, one side of the spring being polished for this purpose.

The experimental layout is described in detail and the precautions necessary are discussed.

Provided the strip follows the contour accurately, the optical method will give the required curvature of very flat curves, to within 3 per cent., the time required being no more than for the usual graphical differentiation. A modified form of the apparatus giving both the curvature and its first differential coefficient is undergoing development.

Aircraft Radio Communications. (H. K. Morgan. J. Aeron. Sciences, Vol. 1, No. 5, August, 1942, pp. 19-23.) (106/42 U.S.A.)

Radio communication from aircraft is discussed, showing its uses and capabilities. Two-way communications, en route navigation, and instrument landing equipment are included. The antenna situation is discussed, as well as provisions for mounting the equipment. Sufficient data are supplied to assist the aeronautical engineer confronted with the problem of making provisions in the aeroplane for radio equipment.

A table has been provided showing all of the weights involved. This also includes antenna provisions for each type of equipment.

The information affecting equipment to be added in the future should be useful, as little of this material has been published in aeronautical journals to date.

Aircraft Antennæ. (C. L. Haller, Procs. I.R.E., Vol. 30, No. 8, August, 1942, pp. 357-362.) (106/43 Great Britain.)

This paper is a review of the general problem of aircraft antennæ used for communication in the frequency range of 2 to 20 megacycles. Fixed antennæ, shunt-fed wing antennæ, and trailing-wire antennæ are discussed and several typical curves of resistance and reactance are included. The icing problem is considered. The characteristics of several types of wire suitable for aircraft antenna are compared. Also included is a description of the army model aeroplane set up for measuring radiating characteristics of various types of antennas under flight conditions.

These patterns which it has been possible to obtain from an actual aeroplane check with those obtained from the models, and the model patterns give information which it is impractical to obtain from the full-size aeroplane.

New Research Facilities of the N.A.C.A. (Autom. Ind., Vol. 87, No. 2, 15/7/42, pp. 24-27 and 64.) (106/44 U.S.A.)

Six major research facilities are to be provided at the Cleveland Laboratory, comprising an engine research building, an engine research wind tunnel, a fuels and lubricants building, an engine propeller research building, a flight research hangar, and an ice tunnel. The unit already opened is the one devoted to fuels and lubricants research and, incidentally, to engine cooling problems.

The engine research building will be equipped for investigations on both single and multi-cylinder engines. To-day there is an urgent demand for more effective superchargers, and the building will contain facilities for conducting research with the object of increasing supercharger efficiency and range. Investigations will be carried on in this building to determine the possibilities of recovering waste heat from the engines. There also will be facilities in this building for carrying out tests on carburettors, ignition systems, fuel injection systems, etc., and special investigations of stresses on engine parts will be made there.

In the engine research wind tunnel it will be possible to test engines under conditions simulating altitudes of up to 50,000 ft., the air temperatures running as low as 67 deg. Fahr. below zero. The air speed in the tunnel will exceed the maximum cruising speeds of any aeroplanes so far designed. It will be possible to test engines of up to 3,000 h.p.

To obtain higher outputs from the engines it will be necessary to increase the cylinder charge, and to make this possible without trouble from excessive detonation, higher octane fuels will have to be used. Studies of safety fuels also will be made in this building, which will include work with fuel injection systems. Facilities will be provided for the synthesis and investigation of new and better fuels and new and better lubricants for aircraft engines.

After data on the single-cylinder and other units of the engine have been obtained, the complete engine with propeller is tested on the torque stand. Two such torque stands, which will accommodate engines of up to 4,000 h.p. are provided in the engine propeller research building. These torque stands will be used for lubricating oil research in full-scale engines, to correlate the data which are obtained in single-cylinder tests throughout the country, under a co-operative programme. The torque stands also will be used to determine some of the ground conditions affecting supercharging, cooling and vibration of aircraft engines. Studies will be made of the stresses in various engine parts. Such research is of the highest importance at the present time when the object is to obtain greatly increased outputs from engines of a given size. This will be possible only if excessive stresses are eliminated and materials are developed which will withstand higher stresses.

All results obtained in Single-cylinder and multi-cylinder engine tests must be finally checked in flight. In the flight research hangar aeroplanes will be equipped with instruments and special flight testing equipment for flight investigations to check laboratory data.

The ice tunnel will be a refrigerated wind tunnel in which investigations of ice formation on windscreens, propeller blades, cooling ducts, carburettor intake manifolds, wings, and various other parts of the aeroplane will be made. Extremely low temperatures will be obtainable in this tunnel, which will make use of the powerful refrigerating equipment of the engine research wind tunnel

During the past year seven new wind tunnels and a structures research laboratory were placed in operation by the N.A.C.A. and all are now engaged on problems connected with the war programme. The new wind tunnels at Langley Field include a 20 ft. free-spinning tunnel, a tow dimensional tunnel, a stability tunnel with two interchangeable throats that are used to simulate either straight or curved flow conditions, and a 16 ft. high-speed tunnel. Already in operation at Moffett Field at the time the report was issued were a 16 ft. high speed tunnel and two 7 by 10 ft. high-speed tunnels, while a low turbulence high-speed tunnel, a supersonic tunnel, and a full-scale tunnel were still under construction. Langley Field's new projects include a second seaplane towing tank, a seaplane impact basin and extensions to the flight research laboratory.

LIST OF SELECTED TRANSLATIONS.

No. 50.

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

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

AERO AND HYDRODYNAMICS.

TRANSLATION NUMBER AND AUTHOR.		TITLE AND REFERENCE.
1568	Spannhake ...	... *The Three-Dimensional Theory of Turbines and Pumps for Compressible Fluid.* (Forschung, Vol. 8, No. 1, Jan.-Feb., 1937, pp. 29-34.)
1572	Schmidt, H. ... Schroder, K. ...	*Laminar Boundary Layer, Part I.* (L.F.F., Vol. 19, No. 3, 26/4/42, pp. 65-97.)
1573	Sauer, R. ...	... *Supersonic Flow About Projectile Heads of Arbitrary Shape at Small Incidence.* (L.F.F., Vol. 19, No. 4, 6/5/42, pp. 148-152.)
1581	Hermann, R.	... *Condensation Shock Waves in Supersonic Wing Tunnel Nozzles.* (L.F.F., Vol. 19, No. 6, 20/6/42, pp. 201-209.)
1588	Gortler, H. ...	... *Instability of Laminar Boundary Layers on Concave Walls Against Certain Three-Dimensional Disturbances.* (Z.A.M.M., Vol. 21, No. 4, August, 1941, pp. 250-252.)

ENGINES, FUELS AND ACCESSORIES.

1570	Ochmichen, M.	... *Vapour Pressure and Combustible Mixture Range of 87 Octane Petrol at Temperatures Between +40°C. and 50°C.* (A.T.Z., Vol. 44, No. 3, 10/12/41, pp. 54-62.)
1574	Wille, R. ...	... *New Research on Scavenging of Port-Controlled Two-Stroke Engines.* (A.T.Z., Vol. 44, No. 5, 10/3/41, pp. 112-121.)
1575	Schmidt, U....	... *The Scavenging Process in Mixture Scavenged Two-Stroke Engines as Effected by Internal and External Pressure Vibrations.* (A.T.Z., Vol. 44, No. 5, 10/3/41, pp. 121-124.)
1583	Pauling, N.... ... Fadinger, W. ...	*Experiments on Increased Performance and Efficiency of Four-Stroke Spark Ignition Supercharged Engines with and without Clearance Volume Scavenging.* (Jahrbuch d. deutsche L.F.F., 1938, Part 2, pp. 30-32.)

MATERIALS AND ELASTICITY.

TRANSLATION NUMBER AND AUTHOR.		TITLE AND REFERENCE.
1569	Meyer, J. ... ... Neubert, H. ...	*Investigations on Oscillations in Turbine Blades.* (M.T.Z., Vol. 1, No. 6, Dec., 1939, pp. 190-193.)
1580	Margaretha, H. ... Mark, H.	*Surface Structure of Fibres.* (Milliard Textilberichte, Vol. 18, No. 19, Oct., 1937, pp. 817-822.)
1587	Rybak, B. I. ...	*Method of Preparation of a Grease for Protecting Iron Articles from Corrosion.* (U.S.S.R., Patent No. 33,242, 18/7/34.)
1589	Rogowin, S. ... Guth, E.	*Mechanical Properties of Cellulose Fibres.* (Ber. Akad. Wiss., Vienna, Section IIa, Vol. 145, No. 7-8, 1936, pp. 531-547.)

WIRELESS AND ELECTRICITY.

1576	Gorshunoff, V. N....	*Non-Stationary Process in a Co-Axial Cable.* (Elektrosvyaz, Vol. 9, No. 3, March, 1941, pp. 45-48.)
1577	Shevtchuk	*An Electric Magnetic Voltage Stabiliser.* (Elektrosvyaz, Vol. 9, No. 3, March, 1941, pp. 7-14.)
1579	Orlov, S. S. ... Pirogov, A. A. ...	*A Valve Voltmeter Relay of Extreme Sensitivity.* (Elektrosvyaz, Vol. 9, No. 4, April, 1941, pp. 16-22.)
1584	Fingeranko, A. M....	*The Interaction Between Two Parallel Lines when the Loads are not Matched.* (Elektrosvyaz, Vol. 9, No. 3, March, 1941, pp. 69-70.)
1585	Gnesutta, E. ...	*Radio in War Time.* (Radio Industria, Vol. 8, No. 86, Dec., 1941, pp. 74-78.)

MISCELLANEOUS.

1578	——	*Device for Testing Stereoscopic Vision of A.F. Range Finding Personnel.* (Flugwehr und Technik, Vol. 4, No. 1, Jan., 1942, pp. 12-17.)
1582	Pistor, J.	*Improvements in Aircraft Construction (Abstract).* (Flugwehr und Technik, Vol. 4, No. 2, Feb., 1942, pp. 41-43.)

No. 51.

WARFARE.

TRANSLATION NUMBER AND AUTHOR.		TITLE AND REFERENCE.
1592	——	*The Effectiveness of Salts in Water Solution as a Means of Fire Fighting.* (Gasschutz and Luftschutz, 1936, No. 6, pp. 260-266.) (Translated by D.S.I.R.)
1602	Cavicchioli, N. ... Guiliano, R. ...	*Relative Ballistics During Dive Bombing.* (L'Aerotecnica, Vol. 21, No. 12, Dec., 1941, pp. 798-806.)

TRANSLATION NUMBER AND AUTHOR.		TITLE AND JOURNAL.
1606	Weber, T. ...	... *Aerial Attacks on Warships.* (Flugwehr und Technik, Vol. 3, No. 9, Sept., 1941, pp. 204-208.)

AERO AND HYDRODYNAMICS.

1591	Busemann, A.	... *Flow Research and Flight Technique.* (Luftwissen, Vol. 9, No. 6, June, 1942, pp. 173-176.)
1594	Eckert, E. ... Drewitz, O....	... *Calculation of the Temperature Field in the Laminar Boundary Layer of an Unheated Body in a High Speed Flow.* (L.F.F., Vol. 19, No. 6, 20/6/42, pp. 189-196.)
1598	Busemann, A.	... *Conical Supersonic Flow with Axial Symmetry.* (L.F.F., Vol. 9, No. 4, 6/5/42, pp. 137-144.)
1609	Ringleb, F. ...	... *Exact Solutions of the Differential Equations of an Adiabatic Gas Flow.* (Z.A.M.M., Vol. 20, No. 4, August, 1940, pp. 185-198.)
1610	Tollmien, W.	... *Limit Lines in Adiabatic Potential Flows.* (Z.A.M.M., Vol. 21, No. 3, June, 1941, pp. 140-152.)

AIRCRAFT AND ACCESSORIES.

1612	Gsell, R. ...	... *Measurement of Tow-Rope Forces in Gliders.* (Aero-Revue, Vol. 17, No. 1, Jan., 1942 (Supplement).)
1613	——	... *Device for the Locking of Two or More Aircraft Control Surfaces, with Special Reference to the Elevator and Rudder.* (German Patent 719,859.) (Flugsport, Vol. 34, No. 12, 10/6/42, p. 122.)

ENGINE AND ACCESSORIES.

1593	Gautier, M....	... *The Gas Turbine, the Heat Engine of the Future.* (La Science et la Vie, Vol. 60, No. 287, July, 1941, pp. 48-56.)

MATERIAL AND ELASTICITY.

1590	Jacobini, A. ...	... *Surface Protection of Duralumin in Aircraft.* (Atti di Guidonia, No. 45, 46, 47, March, 1941, pp. 53-112.)
1600	Zhibitsky, J. I.	... *Plastics and Their Application to Aircraft Construction.* (Aviation Industry, U.S.S.R., Vol. 4, Jan., 1941, pp. 2-5.)
1603	Poppinga, R.	... *The Present State of German Research on Wear, with Special Reference to the Wear of Cylinders and Piston Rings.* (A.T.Z., Vol. 44, No. 11, 10/6/41, pp. 272-279.)
1607	Pomp, A. ... Krish, A. ...	... *The Creep Strength of Heat Resistant Steel at 600°, 700°, 800°.* (Mitt. aus dem Kaiser-Wilhelm Institut fur Eisenforschung, Vol. 22, No. 9, 1940, pp. 137-148.) (Translated by the British Non-Ferrous Metals Research Assn.) (Edited by R.T.P.3.)

TRANSLATION NUMBER AND AUTHOR.			TITLE AND JOURNAL.
1608	Santangelo, G.	...	*On the Stressing of Elastic Systems (so-called Geodetic), consisting of a Surface Rendered Rigid by Means of a Plane and Surved System of Ribs or Consisting Solely of such a Rib System.* (L'Aerotecnica, Vol. 21, No. 7-8, July, Aug., 1941, pp. 185-198.)
1611	Hengmuhle, W.	...	*Hardness Testing of Steel. Comparison of Methods, Conversion of Scales and Range of Errors.* (Stahl and Eisen, Vol. 62, No. 16, 1942, pp. 321-328.)

WIRELESS.

1595	Grosskopf, J.	...	*The Propagation of Surface Waves Over Stratified and Uneven Ground.* (H.F.T., Vol. 58, Dec., 1941, pp. 163-171.)
1596	Holsten, K. G. Schatzel, W.	... ...	*Goniometer for Short and Ultra-Short Waves (German Patent* 704,176). (H.F.T., Vol. 58, October, 1941, p. 40.)
1597	Kramer. E. ...	...	*Wireless Position Finding by the Phase-Measurement Method.* (H.F.T., Vol. 58, Nov., 1941, pp. 128-133.)

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

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

THEORY AND PRACTICE OF WARFARE.

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
1	4587	U.S.A. ...	*Kaiser and Hughes Transport Plane Projects (Duramold Process).* (Inter. Avia., No. 832, 1/9/42, pp. 1-5.)
2	4588	Germany ...	*Liaison Plane Siebel Si* 204 (*Photograph*). (Inter. Avia., No. 832, 1/9/42, p. I.)
3	4589	G.B.	*Avro Lancaster.* (Inter. Avia., No. 832, 1/9/42, pp. 8-9.)
4	4590	U.S.A. ...	*Martin* 187 *Baltimore Fitted with Boulton and Paul Turret.* (Inter. Avia., No. 832, 1/9/42, pp. 9-10.)
5	4592	U.S.A. ...	*Large Flying Boat Projects in the U.S.A.* (Inter. Avia., No. 832, 1/9/42, pp. 10-11.)
6	4593	Germany ...	*Dornier Do.* 217. (Inter. Avia., No. 832, 1/9/42, pp. 19-20.)
7	4594	Italy ...	*Repair Shop Train of the Italian Air Force.* (Inter. Avia., No. 832, 1/9/42, p. 15.)
8	4595	Germany ...	*Focke Wulf F.W.* 190 (*Photograph*). (Inter. Avia., No. 832, 1/9/42, pp. 17-18.)
9	4596	U.S.A. ...	*Boeing B-17E Wing Assembly Line* (*Photograph*). (Inter. Avia., No. 832, 1/9/42, p. I.)

* Abstract available.

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
10	4621	Germany ...	*German Military Aircraft (Silhouettes).* (Aviation, Vol. 41, No. 4, April, 1942, pp. 57-59.)
11	4624	U.S.A. ...	*Barrage Balloons.* (Aviation, Vol. 41, No. 4, April, 1942, pp. 157, 214, 217 and 220.)
12	4632	U.S.A. ...	*Training of Maintenance Personnel.* (W C. Erb, Aviation, Vol. 41, No. 4, April, 1942, pp. 153-155 and 223.)
13	4635	U.S.A. ...	*Lockheed Constellation (Photograph).* (Aviation, Vol. 41, No. 4, April, 1942, p. 177.)
14	4636	U.S.A. ...	*Beach AT* 10 *(Duramold Process).* (Inter. Avia., No. 833, 8/9/42, pp. 6-7 and I.)
15	4637	U.S.A. ...	*Boeing AT-*15 *(Steel, Fabric Plywood).* (Inter. Avia., No. 833, 8/9/42, pp. 7 and I.)
16	4638	U.S.A. ...	*Organisation of U.S. Army Air Force in G.B.* (Inter. Avia., No. 833, 8/9/42, pp. 13-14.)
17	4640	G.B.	*Air Transport Fleet of Great Britain.* (Inter. Avia., No. 833, 8/9/42, pp. 14-15.)
18	4641	G.B.	*War Research in Great Britain.* (Inter. Avia., No. 833, 8/9/42, pp. 9-10.)
19	4642	France ...	*Bloch* 161 *Transport.* (Inter. Avia., No. 833, 8/9/42, p. I.)
20	4644	U.S.A. ...	*Curtiss Wright C-*46 *Transport* (" *Commando* "). (Inter. Avia., No. 833, 8/9/42, p. I.)
21	4645	France ...	*Beach AT* 10 *(Duramold Process).* (Inter. Avia., 200, *Latécoère* 631, *Maréchal Petain).* (Inter. Avia., No. 833, 8/9/42, p. 11.)
22	4646	Germany ...	*History of the Me.* 109. (Inter. Avia., No. 833, 8/9/42, p. 11.)
23	4647	U.S.S.R. ...	*Russian Fighter Types I-*18, *I-*19 *or* 21, *I-*20, *I-*26. (Inter. Avia., No. 833, 8/9/42, pp. 11-12.)
24	4692	Italy ...	*Caproni Ca.* 311 *Medium Bomber.* (Flugsport, Vol. 34, No. 14, 8/7/42, pp. 216-218.)
25	4700	Germany ...	*Sectional View of German Aircraft (Me.* 109, *Me.* 110, *Do.* 172, *He.* 111, *Ju.* 88). (J. Aeron. Sci., Vol. 1, No. 4, July, 1942, pp. 39-41.)
26	4701	Germany ...	*Silhouettes (Ju.* 88*I*, *Ju.* 87*B*, *Hs.* 123, *He.* 113, *Me.* 109*F*-1, *He.* 112, *He.* 11*K (N.R.V.A.)*, *Ju.* 68*K*, *F.W.* 187, *F.W.* 200*K*, *Hs.* 126). (J. Aeron. Sci., Vol. 1, No. 4, July, 1942, pp. 43, 45, 51, 57, 59, 63, 67, 69, 75, 89.)
27	4702	U.S.A. ...	*Boeing AT.* 15 *Crew Trainer (Photo).* (J. Aeron. Sci., Vol. 1, No. 4, July, 1942, p. 81.)
28	4706	U.S.A. ...	*Military Aircraft Types (Identification Numbers).* (Aviation, Vol. 41, No. 2, Feb., 1942, p. 91.)
29	4709	U.S.A. ...	*Structural Plastics in Aviation.* (J. B. Johnson, Aviation, Vol. 41, No. 2, Feb., 1942, pp. 103-104, and 314-317.)
30	4710	U.S.A. ...	*Bell P-*39 *Airacobra (Sectional Drawing).* (Aviation, Vol. 41, No. 2, Feb., 1942, p. 117.)
31	4715	U.S.A. ...	*Aircraft Specifications (Military).* (Aviation, Vol. 41, No. 2, Feb., 1942, pp. 160-183 and 207.)
32	4717	U.S.A. ...	*Foreign Aeroplane Specification (Tables).* (Aviation, Vol. 41, No. 2, Feb., 1942, p. 214.)
33	4719	Italy ...	*Italian Aircraft (Silhouette).* (Aviation, Vol. 41, No. 6, June, 1942, pp. 78-79.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
34	4730	U.S.A.	...	*Flying Tank Busters.* (J. I. Waddington, Aviation, Vol. 41, No. 6, June, 1942, pp. 191 and 250.)
35	4736	U.S.A.	...	*Fuel Feed at High Altitudes.* (W. H. Curtis and R. R. Curtis, S.A.E.J., Vol. 50, No. 8, Aug., 1942, pp. 321-337.)
36	4738	U.S.A.	...	*Crash Proof Fuel Tanks (Digest).* (S.A.E.J., Vol. 50, No. 8, Aug., 1942, p. 345.)
37	4739	U.S.A.	...	*Light Aircraft Design and Development.* (S.A.E.J., Vol. 50, No. 8, Aug., 1942, pp. 371-372.)
38	4769	G.B. ...	...	*Tactics and Unorthodox Aircraft.* (O. Stewart, Aviation, Vol. 41, No. 6, June, 1942, pp. 76-77.)
39	4779	Germany	...	*Heinkel He. 177 Heavy Bomber.* (Aeroplane, Vol. 63, No. 1,633, 11/9/42, p. 297.)
40	4780	U.S.S.R.	...	*Russian Long Range Bomber T.B. 7 (A.N.T. 14s).* (Aeroplane, Vol. 63, No. 1,633, 11/9/42, p. 297.)
41	4781	G.B. ...	...	*Short Stirling I.* (F. D. Bradbrooke, Aeroplane, Vol. 63, No. 1,633, 11/9/42, pp. 305-310.)
42	4782	Germany	...	*Focke Wulf F.W. 190 A3, Identification Details.* (Aeroplane, Vol. 63, No. 1,633, 11/9/42, pp. 316-317.)
43	4783	G.B. ...	...	*Miles Master III (Identification Details).* (Aeroplane, Vol. 63, No. 1,633, 11/9/42, pp. 316-317.)
44	4784	U.S.S.R.	...	*Air Scenes in Russia (Photograph).* (Flight, Vol. 41, No. 1,757, 27/8/42, p. 223.)
45	4785	U.S.A.	...	*Stall Warning Device.* (Flight, Vol. 41, No. 1,757, 27/8/42, p. 217.)
46	4786	U.S.A.	...	*Douglas S.B.D.-3 "Dauntless" Dive Bomber (Photograph).* (Flight, Vol. 41, No. 1,757, 27/8/42, p. 220.)
47	4787	Germany	...	*Henschel Hs. 129.* (Flight, Vol. 41, No. 1,757, 27/8/42, p. 233.)
48	4788	Germany	...	*Focke-Wulf F.W. 190.* (Flight, Vol. 41, No. 1,757, 27/8/42, pp. 224-225.)
49	4789	Germany	...	*Messerschmitt Me. 210.* (Flight, Vol. 41, No. 1,757, 27/8/42, p. 233.)
50	4790	G.B. ...	...	*Incendiary Bomb Packing on Aircraft (Photographs).* (Flight, Vol. 41, No. 1,757, 27/8/42, p. 226.)
51	4791	Sweden	...	*Swedish Air Force.* (V. L. Gruberg, Flight, Vol. 41, No. 1,757, 27/8/42, pp. 234-237.)
52	4793	U.S.A.	...	*Non-Photographic Heat-Reflecting Paint for Camouflage.* (Flight, Vol. 41, No. 1,757, 28/7/42, p. 232.)
53	4794	Germany	...	*F.W. 200 Condor (Identification Details).* (Flight, Vol. 41, No. 1,757, 27/8/42, p. a.)
54	4795	U.S.A.	...	*Liberator II (Identification Details).* (Flight, Vol. 41, No. 1,757, 27/8/42, p. b.)
55	4796	U.S.A.	...	*Development of the Sperry Gyropilot.* (J. V. Holman, Flight, Vol. 41, No. 1,757, p. 238.)
56	4798	U.S.A.	...	*Bomb Rack on Flying Fortress (Photograph).* (Flight, Vol. 41, No. 1,757, 27/8/42, p. 242.)
57	4799	U.S.A.	...	*Type Designations of American Service Aircraft, including Service Names.* (Inter. Avia.,No. 834, 17/9/42, pp. 1-10.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
58	4800	U.S.A. ...	*Requirements of American and Japanese Aircraft in the S.W. Pacific.* (Inter. Avia., No. 834, 17/9/42, pp. 18-19.)
59	4802	G.B.	*Westland Whirlwind.* (Inter. Avia., No. 834, 17/9/42, p. 12.)
60	4803	G.B.	*Hurricane Fleet Fighter.* (Inter. Avia., No. 834, 17/9/42, pp. 12-13.)
61	4804	G.B.	*Hotspur II Glider.* (Inter. Avia., No. 834, 17/9/42, p. 13.)
62	4805	Germany ...	*Heinkel He.* 177. (Inter. Avia., No. 834, 17/9/42, p. 13.)
63	4806	G.B.	*Mosquito (Long Range Reconnaissance).* (Inter. Avia., No. 834, 17/9/42, p. 14.)
64	4807	Germany ...	*Gotha 242 Transport Glider.* (Inter. Avia., No. 834, 17/9/42, p. 14.)
65	4808	U.S.S.R. ...	*Four-Engined Russian Bomber.* (Inter. Avia., No. 834, 17/9/42, pp. 15-16.)
66	4811	U.S.A. ...	*Curtiss SOBC-I Seagull Scout Observation.* (Inter. Avia., No. 834, 17/9/42, pp. 16-17.)
67	4812	G.B.	*Great Britain and U.S.A. Air Force Co-operation.* (Inter. Avia., No. 834, 17/9/42, pp. 20-21.)
68	4813	U.S.A. ...	*U.S. Army Glider (Photos).* (Inter. Avia., No. 834, 17/9/42, p. I.)
69	4814	U.S.A. ...	*Grumman Torpedo Bomber T.B.F.-1 " Avenger " (Photo).* (Inter. Avia., No. 834, 17/9/40, p. I.)
70	4815	U.S.A. ...	*Fortress II Gun Mounting (Photo).* (Inter. Avia., No. 834, 17/9/42, p. I.)
71	4816	U.S.A. ...	*Boeing XPBB-1 Flying Boat " Searanger " (Photo).* (Inter. Avia., No. 834, 17/9/42, p. I.)
72	4817	France ...	*Bloch 161 Transport Plane (Photograph).* (Inter. Avia., No. 834, 17/9/42, p. I.)
73	4830	Italy ...	*British Tank Captured at Dieppe (Photo).* (l'Auto Italiana, Vol. 23, No. 24, 30/8/42, p. 12.)
74	4831	Italy ...	*Transport Difficulties at the Front (Illustrated).* (l'Auto Italiana, Vol. 23, No. 24, 30/8/42, pp. 13-17.)
75	4834	G.B.	*Air Power.* (H. E. Wimperis, The Engineer, Vol. 174, No. 4,524, 25/9/42, pp. 259-260.)
76	4864	G.B.	*Notes on Enemy Bombsights.* (F. Postlethwaite, Airc. Eng., Vol. 14, No. 163, Sept., 1942, pp. 244-247 and 250.)
77	4872	Germany ...	*Tail Brake in Do. 217 (Photograph).* (Der Adler, No. 15, 28/7/42, p. 453.)
78	4873	Germany ...	*Emergency Equipment for Stukas Operating in the Desert (Photographs).* (Luftwelt, Vol. 9, No. 15, 1/8/42, pp. 294-295.)
79	4874	Germany ...	*Management of the New Training School " Ith " for Sailing Flight.* (Luftwelt, Vol. 9, No. 15, 1/8/42, pp. 298-299.)
80	4888	U.S.A. ...	*Boeing " Searanger " (Photo).* (J. Aeron. Sciences, Vol. 1, No. 5, Aug., 1942, p. 67, Review Section.)
81	4891	U.S.A. ...	*Curtiss " Commando " Cargo Plane C. 46 (Photo).* (Am. Av., Vol. 6, No. 5, 1/8/42, p. 4.)
82	4892	U.S.A. ...	*U.S. Army Glider (Photo).* (Am. Av., Vol. 6, No. 5, 1/8/42, p. 15.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
83	4893	U.S.A.	...	*Boeing XPBB-1 Flying Boat "Sea Ranger" (Photo).* (Am. Av., Vol. 6, No. 5, 1/8/42, p. 37.)
84	4927	G.B. ...	...	*Plastic Goggle for Night Vision (Polaroid).* (British Plastics, Vol. 14, No. 160, Sept., 1942, p. 192.)
85	4948	Germany	...	*A.A. Fire—Definition of Fighting Elements (with Diagrams).* (Luftwelt, Vol. 9, No. 16, 15/8/42, p. 309.)
86	4949	Germany	...	*Balloon Barrage.* (M. Elben, Luftwelt, Vol. 9, No. 16, 15/8/42, pp. 310-311.)
87	4962	Germany	...	*B.V. 141B. Unsymmetrical Aircraft (Photo).* Aeroplane, Vol. 63, No. 1,638, 16/10/42, p. 445.)
88	4963	Germany	...	*F.W. 189 Reconnaissance Aircraft (Photo).* (Aeroplane, Vol. 63, No. 1,638, 16/10/42, p. 446.)
89	4964	Japan	...	*Japan in the Air (Historical Survey).* (Aeroplane, Vol. 63, No. 1,658, 16/10/42, pp. 451-454.)
90	4966	Germany	...	*Leaders of the Luftwaffe, VI.* (Aeroplane, Vol. 63, No. 1,638, 16/10/42, p. 456.)
91	4970	Germany	...	*Dornier Do. 217 E2.* (Flight, Vol. 42, No. 1,724, 15/10/42, pp. 412-414.)
92	4971	U.S.A.	...	*Television for Fog Flying (U.S. Pat. 22,888,717.* (Flight, Vol. 42, No. 1,764, 15/10/42, p. 415.)
93	4973	U.S.A.	...	*Grumman Avenger (Recognition Details).* (Flight, Vol. 42, No. 1,764, 15/10/42, p. a.)
94	4974	U.S.A.	...	*Douglas "Devastator" (Recognition Details).* (Flight, Vol. 42, No. 1,724, 15/10/42, p. b.)
95	4976	G.B. ...	...	*Halifax Maintenance (Photographs).* (Flight, Vol. 42, No. 1,764, 15/10/42, pp. 424-427.)
96	5015	U.S.A.	...	*Ryan Plastic Trainer.* (Am. Av., Vol. 6, No. 7, 1/9/42, p. 61.)
97	5022	Italy	...	*Italian Air Force Equipment.* (Aeroplane, Vol. 63, No. 1,634, 18/9/42, pp. 326 and 333.)
98	5023	G.B. ...	...	*Dive Bombing.* (C. S. Parsons, Aeroplane, Vol. 63, No. 1,634, 18/9/42, pp. 334-335.)
99	5024	Germany	...	*German Aeroplanes in Service, XXVIII (Arado, Blohm and Voss, Dornier, Focke-Wulf, Heinkel).* (Aeroplane, Vol. 63, No. 1,634, 18/9/42, pp. 340-341.)
100	5025	G.B. ...	...	*Oxford V Advanced Trainer.* (Aeroplane, Vol. 63, No. 1,634, 18/9/42, p. 327.)
101	5026	Germany	...	*Leaders of the Luftwaffe—II.* (Aeroplane, Vol. 63, No. 1,634, 18/9/42, p. 347.)
102	5027	G.B. ...	...	*Hawker Hurricane II B, Tropical Version (Photo).* (Aeroplane, Vol. 63, No. 1,635, 25/9/42, p. 354.)
103	5028	Germany	...	*Me. 109G High Altitude Fighter.* (Aeroplane, Vol. 63, No. 1,635, 25/9/42, p. 356.)
104	5029	Germany	...	*Ju. 49 (Pressure Cabin of the year 1928).* (Aeroplane, Vol. 63, No. 1,635, 25/9/42, p. 357.)
105	5030	Italy	...	*Savoia Marchetti S.M. 75 (Photo).* (Aeroplane, Vol. 63, No. 1,635, 25/9/42, p. 378.)
106	5031	U.S.A.	...	*Boeing "Searanger" Flying Boat (Photo).* (Aeroplane, Vol. 63, No. 1,635, 25/9/42, p. 360.)
107	5032	Germany	...	*Leaders of the Luftwaffe, III.* (Aeroplane, Vol. 63, No. 1,635, 25/9/42, p. 365.)
108	5033	G.B. ...	...	*Bomber Developments (Representative Types).* (Aeroplane, Vol. 63, No. 1,635, 25/9/42, pp. 364-367.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
109	5034	U.S.A. ...	*Consolidated "Liberator" (Recognition Details).* (Aeroplane, Vol. 63, No. 1,635, 25/9/42, p. 369.)
110	5035	G.B.	*Avro Lancaster (Recognition Details).* (Aeroplane, Vol. 63, No. 1,635, 25/9/42, p. 369.)
111	5036	Germany ...	*German Aeroplanes in Service* (30) (*Henschel* 129, *Junkers* 86*P and P*2, *Messerschmitt* 110, 208, 210). (Aeroplane, Vol. 63, No. 1,635, 25/9/42, p. 370.)
112	5037	Japan ...	*Mitsubishi OO Fighter (Drawing).* (Flight, Vol. 41, No. 1,758, 3/9/42, p. 254.)
113	5038	U.S.A. ...	*Vultee Vengeance (Recognition Details).* (Flight, Vol. 41, No. 1,758, 3/9/42, p. a.)
114	5039	G.B.	*Thunderbolt (P 47B) (Recognition Details).* (Flight, Vol. 41, No. 1,758, 3/9/42, p. b.)
115	5040	U.S.A. ...	*American Views on Air Transport.* (Flight, Vol. 41, No. 1,758, 3/9/42, pp. 257-260 and 263.)
116	5042	Italy ...	*Manœuvrability of Italian C.R. 42 Fighter.* (Flight, Vol. 41, No. 1,758, 3/9/42, p. 266.)
117	5084	G.B.	*Notes on Enemy Bombsights, II.* (F. Postlethwaite, Airc. Eng., Vol. 14, No. 164, Oct., 1942, pp. 276-280.)
118	5087	G.B.	*The Avro Lancaster.* (Airc. Eng., Vol. 14, No. 164, Oct., 1942, pp. 285 and 289.)
119	*5091	France ...	*The Armament of the Fighter.* (C. Rougeron, La Science et la Vie, No. 300, August, 1942, pp. 72-80.)
120	5092	France ...	*New Military Types of Aircraft on the German-Russian Front.* (P. Belleroche, La Science et la Vie, No. 300, Aug., 1942, pp. 89-93.)
121	5093	Germany ...	*Aircraft Gun Turret (Gun and Gunner's Seat Attached to Ring Mounting) (Pat. Series* 35, *No.* 722,841). (Siemens, Flugsport, Vol. 34, No. 17, 19/8/42, p. 142.)
122	5098	Germany ...	*New German Directorate of Research Controlled by the Air Ministry and the Head of the Luftwaffe.* (Flugsport, Vol. 34, No. 17, 19/8/42, pp. 261-262.)
123	5099	Germany ...	*Aircraft Mounting for Automatic Guns (Pat. Series* 35, *No.* 722,840). (Oerlikon, Flugsport, Vol. 34, No. 17, 19/8/42, p. 142.)
124	5103	Germany ...	*Gun Post in Trailing Edge of Wing (Pat. Series No.* 35, *No.* 722,201). (Messerschmitt, Flugsport, Vol. 34, No. 17, 19/8/42, p. 142.)
125	5116	Germany ...	*Compensation of Air Pressure on Ring Mounted Aircraft Guns by Symmetrical Dummy (Pat. Series* 37, *No.* 724,016). (Caproni, Flugsport, Vol. 34, No. 19, 16/9/42, p. 152.)
126	5120	Germany ...	*Development in Rubber Dinghies (Photographs).* (Flugsport, Vol. 34, No. 16, 5/8/42, pp. 248-249.)
127	5128	Germany ...	*Diving Brakes on Ju.* 87 *and Method of Operation.* (Flugsport, Vol. 34, No. 14, 8/7/42, pp. 218-220.)
128	5130	Germany ...	*Diving Brake for Gliders (Pat. Series* 32, *No.* 718,322). (D.F.A.S., Flugsport, Vol. 34, No. 14, 8/7/42, p. 129.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
129	5134	Germany	...	*Bomb Release Gear (Pat. Series 32, No.* 720,604). (Heinkel, Flugsport, Vol. 34, No. 14, 8/7/42, p. 130.)
130	5135	Germany	...	*Automatic Release of a Series of Vertically Stowed Bombs (Pat. Series* 32, *No.* 721,107). (M. W. Nembrandenberg, Flugsport, Vol. 34, No. 14, 8/7/42, p. 130.)
131	5136	Germany	...	*Damping of Parachute Shock on Opening (Pat. Series* 32, *No.* 720,541). (Schroder, Flugsport, Vol. 34, No. 14, 8/7/42, p. 131.)
132	5137	Germany	...	*Searchlight Wing Mounting (Pat. Series* 32, *No.* 720,541). (Zeiss, Flugsport, Vol. 34, No. 14, 8/7/42, p. 132.)
133	5139	Germany	...	*Bomb Container for Horizontal Stowage (Pat. Series* 32, *No.* 720,605). L. F. G. Hackenfelde, Flugsport, Vol. 34, No. 14, 8/7/42, p. 130.)
134	5147	Germany	...	*Dornier Do.* 217*E*. (M. W. Bourdon, Autom. Ind., Vol. 87, No. 2, 15/7/42, pp. 18-22.)
135	5148	U.S.A.	...	*Packing System for Army Replacement Parts.* (E. L. Warner, Jr., Autom. Ind., Vol. 87, No. 2, 15/7/42, pp. 43 and 80-82.)
136	5154	G.B. ...	...	*Short Stirling Heavy Bomber (Design Details).* (Autom. Ind., Vol. 87, No. 2, 15/7/42, pp. 30-33.)
137	5156	U.S.A.	...	*Inspection of Martin Bombers (Illustrated).* (Autom. Ind., Vol. 87, No. 2, 15/7/42,pp. 34-35.)
138	5189	U.S.A.	...	*North America N.A.-*40*B (B-*25*C) Mitchell (Recog. Details).* (Flight, Vol. 42, No. 1,760, 17/9/42, p. a.)
139	5190	G.B. ...	...	*Fiat C.R.* 42 *Performance.* (Flight, Vol. 42, No. 1,760, 17/9/42, p. 320.)
140	5191	G.B. ...	...	*Avro Manchester (Recog. Details).* (Flight, Vol. 42, No. 1,760, p. b.)
141	5192	G.B. ...	...	*The Torpedo Bomber.* (G. A. Chamberlain, Flight, Vol. 42, No. 1,760, 17/9/42, pp. 309-310.)
142	5193	U.S.A.	...	*Fortress Armament.* (Flight, Vol. 42, No. 1,760, 17/9/42, pp. 311-312 and 320.)
143	5194	Germany	...	*German Stratosphere Bomber Ju.* 86*P*. (Flight, Vol. 42, No. 1,760, 17/9/42, p. 298.)
144	5195	Germany	...	*Siebel Si.* 204 *(Communication Duties).* (Flight, Vol. 42, No. 1,760, 17/9/42, p. 312.)
145	5198	Germany	...	*Lifting Tackle for Stowing Bombs* (721,764), *Pat. Series* 36. (Heinkel, Flugsport, Vol. 34, No. 14, 2/9/42, p. 147.)
146	5199	Germany	...	*Bomb Suspension Gear (Pat.* 723,260), *Pat. Series* 36. (M. W. Neubrandenburg, Flugsport, Vol. 34, No. 18, 2/9/42, p. 147.)
147	5200	Germany	...	*Device for the Automatic Opening of Containers Dropped by Parachute (Pat.* 723,155), *Series* 36. (H. Ertel, Flugsport, Vol. 34, No. 18, 2/9/42, p. 148.)
148	5201	Germany	...	*Catapult Slide for Flying Boats or Central Float Seaplanes (Pat.* 722,487) *(Pat. Series* 36). (P. W. Kiel, Flugsport, Vol. 34, No. 18, 2/9/42, p. 148.)

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ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
149	5202	Germany	...	*Compressed Air Catapults—Automatic Control of Low Pressure Air (Pat. 722,530, Pat. Series 36).* (D. W. Kiel, Flugsport, Vol. 34, No. 18, 2/9/42, p. 148.)
150	5203	Germany	...	*Tail Brake of Do. 217 (Photograph).* (Flugsport, Vol. 34, No. 18, 2/9/42, p. 276.)
151	5209	U.S.A.	...	*Vought Sikorsky "Excalibur" (Photo).* (Aeronautics, Vol. 6, No. 5, June, 1942, p. 33.)
152	5211	Japan	...	*Japan as an Air Power.* (E. Speye, Aeronautics, Vol. 6, No. 5, June, 1942, pp. 40-42.)
153	5212	G.B. ...	...	*History and Utilisation of the Parachute.* (J. C. Trewin, Aeronautics, Vol. 6, No. 5, June, 1942, pp. 50-55.)
154	5214	G.B. ...	...	*Bombs for Low Level Attack.* (W. E. Hick, Aeronautics, Vol. 6, No. 3, April, 1942, pp. 20-21.)
155	5215	G.B. ...	...	*Boulton Paul "Defiant" (Construction Details).* (Aeronautics, Vol. 6, No. 3, April, 1942, pp. 43-46.)
156	5216	G.B. ...	...	*Turret Fighter.* (J. Russell, Aeronautics, Vol. 6, No. 3, April, 1942, pp. 48-49.)
157	5219	G.B. ...	...	*Impact Speed of Bombs.* (Aeronautics, Vol. 6, No. 2, March, 1942, p. 26.)
158	5220	G.B. ...	...	*Barrage Balloons.* (J. C. Trewin, Aeronautics, Vol. 6, No. 2, March, 1942, pp. 28-30.)
159	5221	G.B. ...	...	*Recognition Proficiency Proposals.* (R. A. Saville-Sneath, Aeronautics, Vol. 6, No. 2, March, 1942, pp. 32-34.)
160	5222	G.B. ...	...	*Airfield Defences.* (Aeronautics, Vol. 6, No. 2, March, 1942, pp. 38-40.)
161	5224	G.B. ...	...	*Flying Boats and Submarines.* (Aeronautics, Vol. 6, No. 2, March, 1942, pp. 48-53.)
162	5228	U.S.A.	...	*American Aircraft Carrier Design.* (F. E. McMurtrie, Aeronautics, Vol. 6, No. 6, July, 1942, p. 45.)
163	5229	G.B. ...	...	*Torpedo Aircraft.* (J. C. Brooke, Aeronautics, Vol. 6, No. 6, July, 1942, p. 45.)
164	5231	U.S.A.	...	*Blister Gun Mounting on "Catalina" (Photo).* (Aeronautics, Vol. 6, No. 4, May, 1942, p. 24.)
165	5234	G.B. ...	...	*Look-Out for Aircraft.* (A. Falorde, Aeronautics, Vol. 6, No. 4, May, 1942, pp. 58-59.)
166	5235	G.B. ...	...	*Boulton Paul "Defiant" (Construction Details).* (Aeronautics, Vol. 6, No. 4, May, 1942, pp. 89-90.)
167	5236	Germany	...	*Dornier 217E.* (Aeronautics, Vol. 7, No. 2, May, 1942, pp. 28-31.)
168	5237	G.B. ...	...	*Basic Theory of the Dive Bomber.* (Aeronautics, Vol. 7, No. 2, Sept., 1942, pp. 36-38.)
169	5238	G.B. ...	...	*Military Uses of Gliders.* (Aeronautics, Vol. 7, No. 2, Sept., 1942, pp. 50-55.)
170	5242	G.B. ...	...	*Bristol Beaufighter (Recognition Details).* (Flight, Vol. 42, No. 176, 24/9/42, p. a.)
171	5243	U.S.A.	...	*Lockheed Lightning (Recognition Details).* (Flight, Vol. 42, No. 1,761, 24/9/42, p. b.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
172	5244	Japan ...	*Mitsubishi OO Fighter (Silhouette).* (Flight, Vol. 42, No. 1,761, 24/9/42, p. 341.)
173	5259	U.S.A. ...	*Plans for American Air Transport Systems.* (Inter. Avia., No. 835-836, 28/9/42, pp. 1-9.)
174	5260	G.B. ...	*Miles Martinet I Trainer (Target and Glider Towing).* (Inter. Avia., No. 835-836, 28/9/42, p. 9.)
175	5261	G.B. ...	*De Havilland "Mosquito."* (Inter. Avia., No. 835-836, 28/9/42, pp. 9-10.)
176	5263	U.S.A. ...	*U.S.A. Transport Gliders.* (Inter. Avia., No. 835-836, 28/9/36, 28/9/ 42, pp. 10-12.)
177	5264	U.S.A. ...	*Douglas D.B. 7 Versions.* (Inter. Avia., No. 835-836, 28/9/42, pp. 11-12.)
178	5265	U.S.A. ...	*Consolidated 28-5 Catalina III.* (Inter. Avia., No. 835-836, 28/9/42, p. 12.)
179	5267	U.S.S.R. ...	*T.B. 7 Long Range Bomber.* (Inter. Avia., No. 835-836, 28/9/42, p. 18.)
180	5270	U.S.A. ...	*Martin B. 26 "Marauder" (Photo).* (Inter. Avia., No. 835-836, 28/9/42, p. I.)
181	5271	U.S.A. ...	*Curtiss Wright C-46 Transport "Commando" (Photo).* (Inter. Avia., No. 835-836, 28/9/42, p. I.)
182	5272	U.S.A. ...	*Consolidated P.B. 27 "Coronado" (Silhouette).* (Inter. Avia., No. 835-836, 28/9/42, p. I.)
183	5273	G.B. ...	*Hurricane Catapult Fighter on Merchant Ship (Photograph).* (Inter. Avia., No. 835-836, 28/9/42, p. I and 10.)
184	5274	G.B. ...	*Catapulting Aircraft.* (Engineer, Vol. 174, No. 4,527, 16/10/42, p. 320.)

AERODYNAMICS AND HYDRODYNAMICS.

185	*4652	Germany ...	*Exact Solution of the Differential Equation of an Adiabatic Gas Flow.* (F. Ringleb, Z.A.M.M., Vol. 20, No. 4, Aug., 1942, pp. 185-198.)
186	4659	U.S.A. ...	*Impulse and Momentum in an Infinite Fluid.* (F. Theodorsen, Kármán Anniversary Vol. of Applied Mechanics, 1941, pp. 49-58.)
187	4660	U.S.A. ...	*Coriolis and the Energy Principle in Hydraulics.* (B. A. Bakhmeteff, Kármán Anniversary Volume of Applied Mechanics, 1941, pp. 59-65.)
188	4661	U.S.A. ...	*The Influence of Bottom Topography on Ocean Currents.* (H. U. Sverdrup, Kármán Anniversary Volume of Applied Mechanics, 1941, pp. 66-75.)
189	4662	U.S.A. ...	*Ionization as a Factor in Fluid Mechanics.* (F. W. Durand, Kármán Anniversary Volume of Applied Mechanics, 1941, pp. 74-84.)
190	4663	U.S.A. ...	*Isotropic Turbulence in Theory and Experiment.* (H. L. Dryden, Kármán Anniversary Volume of Applied Mechanics, 1941, pp. 85-102.)
191	4666	U.S.A. ...	*Hydrodynamics and the Structure of Stellar Systems.* (F. Zwicky, Kármán Anniversary Volume of Applied Mechanics, 1941, pp. 137-153.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
192	4673	U.S.A. ...	*A Note on the Effect of the Wind Tunnel Size on Pitching Moments.* (M. Troller, Kármán Anniversary Volume of Applied Mechanics, 1941, pp. 231-236.)
193	4676	U.S.A. ...	*The Theory of Flow Through Centrifugal Pumps.* (W. Bollay, Kármán Anniversary Volume of Applied Mechanics, 1941, pp. 273-284.)
194	4677	U.S.A. ...	*The Ideal Performance of Curved Lattice Fans.* (F. L. Wattendorf, Kármán Anniversary Volume of Applied Mechanics, 1941, pp. 285-292.)
195	4679	U.S.A. ...	*On Lubrication Flow with Periodic Distribution Between Prescribed Boundaries.* (H. Reissner, Kármán Anniversary Volume of Applied Mechanics, 1941, pp. 310-316.)
196	4680	U.S.A. ...	*Some Remarks on the Laws of Turbulent Motion in Tubes.* (R. v. Mises, Kármán Anniversary Volume of Applied Mechanics, 1941, pp. 317-327.)
197	4734	U.S.A. ...	*New Approach to Three Dimensional Wing Theory (Digest).* (R. E. v. Mises, Aviation, Vol. 41, No. 6, June, 1942, p. 121.)
198	4754	Germany ...	*Prediction of Downward and Dynamic Pressure at the Tail from the Free-Flight Measurements.* (E. Eugen, L.F.F., Vol. 18, No. 10, 27/10/41.) (R.T.P. Trans. No. 1,545 and TM. 1,021, July, 1942.)
199	4823	G.B.	*The Damping of the Heaving and Pitching of a Ship.* (T. H. Havelock, Phil. Mag., Vol. 33, No. 224, Sept., 1942, pp. 666-673.)
200	4930	G.B.	*The Hull and its Screw Propeller.* (E. A. Stevens, J. Am. Soc. Nav. Engs., Vol. 52, No. 3, Aug., 1942, pp. 372-406.)
201	*5021	Germany ...	*The Laws of Free Turbulence.* (H. Reichardt, V.D.I. Forshungsheft, Vol. 13, No. 44, May-June, 1942, pp. 1-22.)
202	5155	U.S.A. ...	*New Wind Tunnel (North American Aviation Co.) (Photo).* (Autom. Ind., Vol. 87, No. 2, 15/7/42, p. 56.)
203	5185	Germany ...	*The One Dimensional Unsteady Flow of a gas by the Method of Characteristics (Wave Propagation).* (R. Sauer, Ing. Archiv., Vol. 62, No. 2, April, 1942, pp. 79-89.)
204	5225	G.B.	*Wright Field Wind Tunnel.* (M. Lorant, Aeronautics, Vol. 6, No. 2, March, 1942, pp. 52-58.)
205	5232	G.B.	*Wind Tunnel Tests.* (L. Leahy, Aeronautics, Vol. 6, No. 4, May, 1942, pp. 52-57.)

Aircraft and Airscrews.

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
206	4622	U.S.A. ...	*Plexiglass Installation.* (D. S. Frederick, Aviation, Vol. 41, No. 4, April, 1942, pp. 62-68.)
207	4625	U.S.A. ...	*Designing Propellers to Meet Performance Requirements.* (H. H. Warden, Aviation, Vol. 41, No. 4, April, 1942, pp. 70-73 and 202.)
208	4630	Switzerland ...	*Escher Wyss V.P. Propeller.* (C. Keller. Aviation, Vol. 41, No. 4, April, 1942, pp. 100, 209-210.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
209	4633	U.S.A. ...	*Air Liner Air Conditioning.* (J. A. Ferries, Aviation, Vol. 41, April, 1942, pp. 160-161 and 223.)
210	4634	U.S.A. ...	*Wood Frame Hangars.* (Aviation, Vol. 41, No. 4, April, 1942, p. 163.)
211	4657	U.S.A. ...	*On the Geometry of Streamlining (Aircraft Design).* (M. M. Munk, Kármán Anniversary Volume of Applied Mechanics, 1941, pp. 8-20.)
212	4683	Germany ...	*Propeller Blade Stresses Caused by the Periodic Displacement of the Propeller Shaft.* (J. Meyer, L.F.F., Vol. 18, No. 11, 20/11/41, pp. 385-386.) (R.T.P. Translation No. TM. 1,016.)
213	4684	U.S.A. ...	*Experimental Researches on Aircraft Icing.* (E. Brin, B.S.T., French Av. Pub., No. 98, 1941.)
214	4699	U.S.A. ...	*Flying the Figure Eight.* (A. S. Otis, J. Aeron. Sci., Vol. 1, No. 4, July, 1942, pp. 29-33.)
215	4708	U.S.A. ...	*Baynes Speed Range Indicator (Stalling Speed Depending on $\sqrt{g}$).* (Aviation, Vol. 41, No. 2, Feb., 1942, pp. 114, 327-328.)
216	4712	G.B. ...	*D.H. 95 Flamingo (Sectional Drawing).* (Aviation, Vol. 41, No. 2, Feb., 1942, p. 124.)
217	4714	U.S.A. ...	*Aircraft Specifications, Civil 1-3 Seats, 4-5 Seats, 6 and More.* (Aviation, Vol. 41, No. 2, Feb., 1942, pp. 136-137 and 203, 152-155 and 205, 156-157 and 205.)
218	4727	G.B. ...	*Testing for Hydraulic Equipment.* (Aviation, Vol. 41, No. 6, June, 1942, p. 132.)
219	4731	U.S.A. ...	*Instrument Landing Systems.* (A. C. Preil, Aviation, Vol. 41, No. 6, June, 1942, pp. 197-199.)
220	4732	U.S.A. ...	*Theory of Wing Flutter (Digest).* (T. Theodorsen, Aviation, Vol. 41 No. 6, June, 1942, p. 121.)
221	4741	U.S.A. ...	*Controllable Pitch Propeller for Light Aircraft (Digest).* (S.A.E.J., Vol. 50, No. 8, Aug., 1942, p. 357.)
222	4801	France ...	*Bloch 800 High Speed Mail Plane.* (Inter. Avia., No. 834, 17/8/42, pp. I and 12.)
223	4810	U.S.A. ...	*American Cargo Plane Project.* (Inter. Avia., No. 834, 17/9/42, p. 16.)
224	4818	G.B. ...	*Aeroplane Hangar with Collapsible Doors.* (Engineering, Vol. 154, No. 4,002, 25/9/42, pp. 247-248 and 250.)
225	4870	G.B. ...	*Servicing and Maintenance of Civil Aircraft.* (Airc. Eng., Vol. 14, No. 163, Sept., 1942, pp. 269-270.)
226	4884	U.S.A. ...	*Economic Advantage of Certain Al. Alloys for Aircraft Construction.* (F. F. Thornton, J. Aeron. Sciences, Vol. 1, No. 5, Aug., 1942, pp. 5-11, Review Section.)
227	4890	U.S.A. ...	*Rigid Airships for Cargo.* (Am. Av., Vol. 6, No. 5, 1/8/42, p. 8.)
228	4897	Germany ...	*Airscrew Performance as Affected by Body Interference (including Tandem Airscrews).* (E. Pistolesi, l'Aeronautica, Vol. 22, No. 6, June, 1942, pp. 255-287.)
229	4941	G.B. ...	*High Altitude Flying.* (Engineer, Vol. 174, No. 4,525, 2/10/42, p. 278.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
230	4955	Germany	...	*German Aircraft Sheds.* (Mech. World, Vol. 112, No. 2,906, 11/9/42, pp. 254-257.)
231	4968	Germany	...	*Nailed Lattice Girders Made of Wood for Hangars.* (F. Geiger, Flughafen, Vol. 10, No. 4, April, 1942, pp. 1-9.)
232	4972	Italy	...	*Cant Z1012 Civil and Trainer Aircraft.* (Flight, Vol. 42, No. 1,764, 15/10/42, p. 416.)
233	4986	Germany	...	*Problems of the Seaplane (Lilienthal Lecture).* (H. Ebner, W.R.H., Vol. 23, No. 15, 1/8/42, pp. 205-211.)
234	5003	U.S.A.	...	*Propeller Blades of Seamless Steel Tubing (Photo).* (Mech. Eng., Vol. 67, No. 7, July, 1942, p. 558.)
235	5009	U.S.A.	...	*Recent Progress in Ocean Air Transport (Digest).* (H. W. Peterson, S.A.E.J., Vol. 50, No. 9, Sept., 1942, p. 416.)
236	5010	G.B. ...	...	*Plastics and Wood Plane.* (British Plastics, Vol. 14, No. 161, Oct., 1942, pp. 248-250.)
237	5011	G.B. ...	...	*Aeroplane Pilot Seats Made of Plastics.* (British Plastics, Vol. 14, No. 161, Oct., 1942, pp. 264-265.)
238	5064	G.B. ...	...	*Ad Astra (Wilbur Wright Memorial Lecture).* (Brabazon of Tara, J.R. Aeron. Soc., Vol. 46, No. 382, Oct., 1942, pp. 247-259.)
239	5085	G.B. ...	...	*Retractable Undercarriage (Geometrical Problems).* (A. A. Perriches, Airc. Eng., Vol. 14, No. 164, Oct., 1942, pp. 281-284.)
240	5090	G.B. ...	...	*Air Line Engineering Maintenance, III.* (I. Lusty, Airc. Eng., Vol. 14, No. 164, Oct., 1942, pp. 286-289.)
241	5094	Germany	...	*Hand Spring for Emergency Operation of Hydraulic Systems (Pat. Series 35, No. 721,980).* (Heinkel, Flugsport, Vol. 34, No. 17, 19/8/42, pp. 143-144.)
242	5095	Germany	...	*Aircraft Spring Leg (Pat. Series 35, No. 722,026).* (Electron, Flugsport, Vol. 34, No. 17, 19/8/42, p. 144.)
243	5096	Germany	...	*Aircraft Wheel Brake (Pat. Series 35, No. 721,875).* (Electron, Flugsport, Vol. 34, No. 17, 19/8/42, p. 144.)
244	5097	Germany	...	*Prevention of Icing Up of Aircraft Control Hinges (Felt or Flexible Metal Packing) (Pat. Series 35, No. 722,752).* (Sauthof, Flugsport, Vol. 34, No 17, 19/8/42, p. 144.)
245	5100	Germany	...	*Hydraulic Locking of Aircraft Controls (Pat. Series 35, No. 722,366).* (A. Teves, Flugsport, Vol. 34, No. 17, 19/8/42, p. 141.)
246	5101	Germany	...	*Combined Single Lever Control for Aircraft Training Devices (Pat. Series No. 35, No. 722,390).* (Blohm and Voss, Flugsport, Vol. 34, No. 17, 19/8/42, p. 141.)
247	5102	Germany	...	*Control and Indicator for Setting Trimming Tabs (Electric or Hydraulic) (Pat. Series 35, No. 722,714).* (Henschel, Flugsport, Vol. 34, No. 17, 19/8/42, p. 142.)
248	5104	Germany	...	*Arno-Vogel Oscillating Wing Aircraft—Recent Full-Scale Experiments with a Glider.* (Flugsport, Vol. 34, No. 19, 16/9/42, pp. 286-288.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
249	5105	Germany ...	*Pressure Cabin Design* (*Pat. Series* 37, *No.* 723,032). (Henschel, Flugsport, Vol. 34, No. 19, 16/9/42, p. 149.)
250	5106	Germany ...	*Rotating Wind Screen Operated by Relative Wind* (*Pat. Series* 37, *No.* 723,896). (Blohm and Voss, Flugsport, Vol. 34, No. 19, 16/9/42, p. 149.)
251	5107	Germany ...	*Rotable Seat for Narrow Fuselages* (*Pat. Series* 37, *No.* 723,972). (Junkers, Flugsport, Vol. 34, No. 19, 16/9/42, pp. 149-150.)
252	5108	Germany ...	*Slotted Flap and Diving Brake* (*Pat. Series* 37, *No.* 723,748). (Focke-Wulf, Flugsport, Vol. 34, No. 19, 16/9/42, p. 150.)
253	5109	Germany ...	*Boundary Layer Control by Compressed Air* (*Pat. Series* 37, *No.* 723,570). (Junkers, Flugsport, Vol. 34, No. 19, 16/9/42, p. 150.)
254	5110	Germany ...	*Control of Tip Vortices by Wing Tip Design* (*Increased Lift*). (Fieseler, Flugsport, Vol. 34, No. 19, 16/9/42, pp. 150-151.)
255	5111	Germany ...	*Early Pressure Cabin Aircraft—The Ju. of* 1927-28. (Flugsport, Vol. 34, No. 16, 5/8/42, pp. 243-244.)
256	5112	Germany ...	*Twin Split Flap* (*Pat. Series* 37, *No.* 723,259). (Fieseler, Flugsport, Vol. 34, No. 19, 16/9/42, p. 151.)
257	5113	Germany ...	*Automatic Longitudinal and Velocity Controls for Aircraft* (*Pat. Series* 37, *No.* 723,153). (Siemens, Flugsport, Vol. 34, No. 19, 16/9/42, pp. 151-152.)
258	5114	Germany ...	*Control Surface for Tailless Aircraft* (*Pat. Series* 37, *No.* 723,033). (Messerschmitt, Flugsport, Vol. 34, No. 19, 16/9/42, p. 152.)
259	5115	Germany ...	*Control Surface Operation by Means of a Variable Gear Affected by Dynamic Heads* (*Pat. Series No.* 37, *No.* 723,154). (Arado, Flugsport, Vol. 34, No. 19, 16/9/42, p. 152.)
260	5121	Germany ...	*Aircraft Landing of Adjustable Width* (*Tyre Cross-Section*) (*Pat. Series* 34, *No.* 721,904). (Flugsport, Vol. 34, No. 16, 5/8/42, p. 137.)
261	5122	Germany ...	*Spring Legs for Aircraft* (*Pat. Series* 34, *No.* 720,921). (Fieseler, Flugsport, Vol. 34, No. 16, 5/8/42, pp. 137-138.)
262	5123	Germany ...	*Retractable Undercarriage* (*Pat. Series* 34, *No.* 720,453). (Heinkel, Flugsport, Vol. 34, No. 16, 5/8/12, pp. 138-139.)
263	5124	Germany ...	*Hydraulic Operation of Retractable Undercarriages* (*Pat. Series* 34, *No.* 720,715). (Faudi, Flugsport, Vol. 34, No. 16, 5/8/42, p. 139.)
264	5125	Germany ...	*Retractable Undercarriage Mechanism* (*Pat. Series* 34, *No.* 720,922). (Messerschmitt, Flugsport, Vol. 34, No. 16, 5/8/42, p. 139.)
265	5126	Germany ...	*Control Linkage for Retractable Undercarriages* (*Pat. Series* 34, *No.* 721,104). (V.D.M., Flugsport, Vol. 34, No. 16, 5/8/42, pp. 139-140.)
266	5127	Germany ...	*Device for the Operation of Retractable Undercarriages or Wing Flaps* (*Pat. Series* 34, *No.* 721,105). (V.D.M., Flugsport, Vol. 34, No. 16, 5/8/42, p. 140.)

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ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
267	5131	Germany ...	*De-icing of Wing Nose by Endless Belt Dipping in De-icing Fluid* (*Pat. Series* 32, *No.* 720,670). (Santhof, Flugsport, Vol. 34, No. 14, 8/7/42, p. 129.)
268	5132	Germany ...	*Counterbalanced Variable Pitch Single-Bladed Airscrew* (*Pat. Series* 32, *No.* 720,195). (Schwarz, Flugsport, Vol. 34, No. 14, 8/7/42, pp. 129-130.)
269	5152	U.S.A. ...	*Plywood Plane* (*Vidal Process*). (P. M. Heldt, Autom. Ind., Vol. 87, No. 2, 15/7/42, pp. 28-29 and 68.)
270	5196	G.B.	*Plastics and Aircraft.* (W. Nichols, Flight, Vol. 42, No. 1,760, 17/9/42, pp. 313-315.)
271	5197	Germany ...	*Utilisation of Exhaust for Cabin Heating Purposes* (*No.* 721,470) (*Pat. Series* 36). (Junkers, Flugsport, Vol. 34, No. 18, 2/9/42, p. 147.)
272	5204	Germany ...	*Edge Protection of Wooden Airscrew Blades by Means of Metallic Strips* (*Method of Fastening*) (*Pat. Series* 36, *No.* 722,092). (G. Scharz, Flugsport, Vol. 34, No. 18, 2/9/42, p. 145.)
273	5205	Germany ...	*Variable Pitch Propeller* (*Pat. Series* 36, *No.* 680,450). (Argus Motors, Flugsport, Vol. 34, No. 18, 2/9/42, p. 145.)
274	5207	Germany ...	*Combined Cooler Radiator Flap and Diving Brake* (*Pat.* 36, *No.* 721,585). (Messerschmitt, Flugsport, Vol. 34, No. 18, 2/9/42, p. 147.)
275	5208	Germany ...	*Propeller Spring Drive for Avoiding Torsional Resonance* (*Pat. Series* 36, *No.* 721,781). (D.V.L., Flugsport, Vol. 34, No. 18, 2/9/42, p. 146.)
276	5226	G.B.	*A Note on Airscrew History.* (Aeronautics, Vol. 6, No. 2, March, 1942, pp. 62-64.)
277	5239	G.B.	*Slots and Flaps.* (L. Leahy, Aeronautics, Vol. 7, No. 2, Sept., 1942, pp. 50-55.)
278	5241	U.S.A. ...	*American Criticism of Kaiser's Cargo Plane Proposals.* (Flight, Vol. 42, No. 176, 24/9/42, p. 334.)
279	5245	G.B.	*Plastics and Aircraft, II.* (W. Nicholls, Flight, Vol. 42, No. 176, 24/9/42, pp. 342-344.)
280	5249	G.B.	*Plastics in Aircraft Construction.* (G. W. De Bell, Engineer, Vol. 174, No. 4,523, 18/10/42, pp. 242-244.)
281	5250	G.B.	*British Airscrew Developments.* (Engineer, Vol. 174, No. 4,526, 9/10/42, pp. 304-306.)
282	5252	G.B.	*Testing Machine and Transport Stand for Variable Pitch Airscrews.* (Engineering, Vol. 154, No. 4,004, 9/10/42, pp. 285 and 290.)
283	5262	Germany and U.S.A. ...	*German and American Cargo Aircraft.* (Inter. Avia., No. 835-836, 28/9/42, pp. 9-10.)
284	5266	U.S.A. ...	*Airscrew Balancing for Commercial Air Lines.* (Inter. Avia., No. 835-836, 28/9/42, pp. 12-13.)
285	5269	U.S.A. ...	*Flight Strips* (*Emergency Landing Grounds*). (Inter. Avia., No. 835-836, 28/9/42, p. 23.)

ENGINES AND ACCESSORIES.

286	4591	Germany ...	*B.M.W.* 801. (Inter. Avia., No. 832, 1/9/42, pp. 18-19.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL
287	4628	U.S.A. ...	*Salvaging Power in Engine Testing.* (G. E. Cassidy, Aviation, Vol. 41, No. 4, April, 1942, pp. 88-89.)
288	4639	U.S.A. ...	*Forged Cylinder Heads for Wright Engines.* (Inter. Avia., No. 833, 8/9/42, p. 7.)
289	4711	G.B.	*Rolls Royce Merlin (Sectional Drawing).* (Aviation, Vol. 41, No. 2, Feb., 1942, p. 122.)
290	4713	Italy ...	*Campini Jet Propulsion.* (Aviation, Vol. 41, No. 2, Feb., 1942, p. 128.)
291	4716	U.S.A. ...	*American Aircraft Engine Specifications.* (Aviation, Vol. 41, No. 2, Feb., 1942, pp. 184-192.)
292	4718	U.S.A. ...	*Foreign Engine Specifications.* (Aviation, Vol. 41, No. 2, Feb., 1942, p. 216.)
293	4724	U.S.A. ...	*Forged Cylinder Heads for Wright Engine.* (Aviation, Vol. 41, No. 6, June, 1942, pp. 167 and 263.)
294	4729	U.S.A. ...	*Service Problems of Aircraft Engine Exhaust Systems.* (T. C. Zippwald, Aviation, Vol. 41, No. 6, June, 1942, pp. 175-180.)
295	4733	G.B.	*Merlin XX Aero Engine.* (Aviation, Vol. 41, No. 6, June, 1942, pp. 207 and 255.)
296	*4735	U.S.A. ...	*Some Results of Valve Gear Research as Applied to Diesel Engines.* (C. Voorhies, S.A.E.J., Vol. 50, No. 8, Aug., 1942, pp. 358-371.)
297	4747	U.S.A. ...	*Heat Conditions in Bearings.* (M. D. Hersey, Trans. A.S.M.E., Vol. 64, No. 5, June, 1942, pp. 445-455.)
298	4748	U.S.A. ...	*The Effect of Diametral Clearance on the Load Capacity of a Journal Bearing.* (J. T. Burwell, Trans. A.S.M.E., Vol. 64, No. 5, June, 1942, pp. 457-461.)
299	4750	U.S.A. ...	*Heat Dissipation in Self-Contained Bearings.* (G. B. Karelitz, Trans. A.S.M.E., Vol. 64, No. 5, June, 1942, pp. 463-464.)
300	4753	U.S.A. ...	*Theory of Heat Transfer and Hydraulic Resistance of Oil Radiators.* (N. B. Mariamov, C.A.H.I.; No. 444, Moscow, 1939. R.T.P. Trans. TM. 1,020, July, 1942.)
301	4758	U.S.A. ...	*Calculation of Critical Speeds of an Oil Well Pumping System.* (C. R. Freberg and E. N. Kemler, Trans. A.S.M.E., Vol. 64, No. 3, April, 1942, pp. 209-218.)
302	4759	U.S.A. ...	*Experiences with Air Heaters for Boilers.* (E. L. Hopping and D. F. Schick, Trans. A.S.M.E., Vol. 64, No. 3, April, 1942, pp. 219-225.)
303	4761	U.S.A. ...	*Analysis of Steam-Turbine Regenerative Cycle.* (J. K. Salisbury, Trans. A.S.M.E., Vol. 64, No. 3, April, 1942, pp. 231-245.)
304	4894	Germany ...	*The Direct Drive of Synchro-Generators by Wind Power Plants.* (M. Kloss, E.T.Z., Vol. 63, No. 31-32, 13/8/42, pp. 362-367.)
305	4905	G.B.	*Erren Combustion Cycle (Criticism).* (Autom. Eng., Vol. 32, No. 427, Sept., 1942, p. 338.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
306	4907	G.B. ...	...	*Pre-Ignition Due to Incandescent Carbon Particles.* (Autom. Eng., Vol. 32, No. 427, Sept., 1942, p. 345.)
307	4909	G.B. ...	...	*Engine Cooling.* (Autom. Eng., Vol. 32, No. 427, Sept., 1942, pp. 371-372.)
308	4915	G.B. ...	...	*Piston Rings for Oil Engines.* (Autom. Eng., Vol. 32, No. 427, Sept., 1942, pp. 369-370.)
309	4917	G.B. ...	...	*Possible Improvements in Thermal and Volumetric Efficiency.* (Autom. Eng., Vol. 32, No. 427, Sept., 1942, pp. 365-366.)
310	4931	G.B. ...	...	*Bearings and Lubrication.* (R. J. S. Pigott, J. Am. Soc. Nav. Engs., Vol. 54, No. 3, Aug., 1942, pp. 408-426.)
311	4934	G.B. ...	...	*End Losses in Turbine Blades.* (A. Meldahl, J. Am. Soc. Nav. Engs., Vol. 54, No. 3, Aug., 1942, pp. 454-466.)
312	4938	G.B. ...	...	*The Running-In of Internal Combustion Engine.* (Engineering, Vol. 154, No. 4,003, 2/10/42, p. 276.)
313	4942	G.B. ...	...	*Magnetic Filter for Oil Circuits.* (Engineer, Vol. 174, No. 4,525, 2/10/42, p. 284.)
314	4952	Germany	...	*Direct Drive of Synchro-Generators by Wind Power Plants, II.* (M. Kloss, E.T.Z., Vol. 63, No. 33-34, 28/7/42, pp. 388-392.)
315	4960	Germany	...	*B.M.W. 801 Aero Engine.* (W.T.M., Vol. 46, No. 7, July, 1942, pp. 173-178.)
316	4965	G.B. ...	...	*The Gipsy Series of Aero Engine.* (Aeroplane, Vol. 63, No. 1,638, 16/10/42, p. 455.)
317	4975	U.S.A.	...	*Aircraft Propulsion Systems (Combustion Gas Turbine in Conjunction with Airscrews).* (G. Geoffrey Smith, Flight, Vol. 42, No. 1,764, 15/10/42, pp. 417-421.)
318	4998	U.S.A.	...	*Laminated Plastic Marine Bearings.* (H. C. Irvin, Modern Plastics, Vol. 19, No. 8, April, 1942, pp. 33-34 and 120.)
319	5005	U.S.A.	...	*The Role of Lubrication in Gear Design.* (J. O. Almen, S.A.E.J., Vol. 50, No. 9, Sept., 1942, pp. 373-380.)
320	5053	Germany	...	*Undercutting on Jumo 211B Crankshaft.* (Autom. Eng., Vol. 32, No. 428, Oct., 1942, p. 402.)
321	5073	U.S.A.	...	*Horse-Power Diagram for Hydraulic Turbines.* (F. B. Miller, Mech. Eng., Vol. 64, No. 8, Aug., 1942, p. 612.)
322	5080	Germany	...	*Effect of Structure on Operation and Wear of Cast Iron Piston Rings in Cast Iron Liners.* (C. Englisch, A.T.Z., Vol. 45, No. 12, 25/6/42, pp. 326-334.)
323	5086	G.B. ...	...	*Mixture Control for Aero-Engines by Exhaust Gas Analysis and Servo-Relay Mechanism.* (G. Fitzpatrick, Airc. Eng., Vol. 14, No. 164, Oct., 1942, p. 284.)
324	5145	Germany	...	*Tolerance to Ensure Exchangeability of Spur Gear Wheels with Volute Teeth.* (A. Jotzoff, Z.V.D.I., Vol. 86, No. 31-32, 8/8/42, pp. 487-494.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
325	5149	G.B. ...	... *Rolls Royce Vulture Engine.* (M. W. Bourdon, Autom. Ind., Vol. 87, No. 2, 15/7/42, p. 23.)
326	5158	U.S.A.	... *Forged Cylinder Heads (Extruded Blank Pressed in Die).* (Autom. Ind., Vol. 87, No. 2, 15/7/42, p. 36.)
327	5178	Germany	... *The Supercharging of Two-Stroke Diesel Engines (Sulzer).* (F. Olderlin, W.R.H., Vol. 23, No. 12, 15/6/42, pp. 163-172.)
328	5206	Germany	... *Power Plant Installation in the Tail of Aircraft (Pat. Series 36, No. 722,885).* (Dornier, Flugsport, Vol. 34, No. 18, 2/9/42, p. 146.)
329	5217	G.B. ...	... *Supercharges and Exhaust Turbine Supercharges.* (J. L. Beilschmidt, Aeronautics, Vol. 6, No. 3, April, 1942, pp. 50-60.)
330	5233	G.B. ...	... *Cylinder Wear and Liner Materials.* (R. H. Collacott, Aeronautics, Vol. 6, No. 4, May, 1942, pp. 32-33.)
331	5240	G.B. ...	... *Interchangeable Power Plants (Merlin XX).* (Flight, Vol. 42, No. 176, 24/9/42, pp. 331-333.)
332	5268	Japan	... *Mitsubishi "Kinsei" Aero Engine.* (Inter. Avia., No. 835-836, 28/9/42, pp. 18-19.)
333	5276	Germany	... *Possible Cylinder/Crank Arrangement for Single Piston Power Units of 4,000 h.p. (II).* (J. Smirra, Luftwissen, Vol. 9, No. 8, Aug., 1942, pp. 234-237.)
334	5277	Germany	... *Automatic Mixture Boost and Blower Speed Control of the J.U. 211 Petrol Injection Engine.* (Luftwissen, Vol. 9, No. 8, Aug., 1942, pp. 238-241.)

FUELS AND LUBRICANTS.

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
335	4695	G.B. ...	... *Fuel Research Intelligence Section.* (Summary for two weeks ending 5th and 12th Sept., 1942.)
336	4760	U.S.A.	... *Stability Characteristics of Turbine Oils.* (H. R. Peterson, Trans. A.S.M.E., Vol. 64, No. 3, April, 1942, pp. 227-230.)
337	4887	U.S.A.	... *Vapour Lock.* (H. Alfaro, J. Aeron. Sciences, Vol. 1, No. 5, Aug., 1942, p. 25. Review Section.)
338	4903	U.S.A.	... *Anti-Knock Petrol from CO and H_2.* (Ind. and Eng. Chem., Vol. 20, No. 15, 10/8/42, p. 975.)
339	4919	G.B. ...	... *Diesel Fuel.* (Autom. Eng., Vol. 32, No. 427, Sept., 1942, p. 370.)
340	5001	U.S.A.	... *Some Aspects of Industrial Lubrication (Boundary Effects and Corrosion).* (W. J. Huncl and others, Mech. Eng., Vol. 67, No. 7, July, 1942, pp. 525-530.)
341	*5007	U.S.A.	... *The Precision of Motor Fuel Testing.* (D. B. Brooks and R. B. Cleaton, S.A.E.J., Vol. 50, No. 9, Sept., 1942, pp. 393-401.)
342	5043	G.B. ...	... *Spectroscopic Examination of Engine Knock. Review of Available Information of Effect of Tetraethyl.* (Autom. Eng., Vol. 32, No. 428, Oct., 1942, pp. 391-392.)
343	5060	U.S.A.	... *Combustion in Diesel Engine.* (M. A. Elliott and L. G. Berger, Ind. and Eng. Chem., Vol. 34, No. 9, Sept., 1942, pp. 1065-1071.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
344	5075	Germany	...	*German Co-operative Fuel Research (Knock Rating).* (A.T.Z., Vol. 45, No. 11, 10/6/42, pp. 301-302.)
				INSTRUMENTS.
345	4575	Germany	...	*Sensitive Measuring Device for Small Friction Couples (Instrument Pivots).* (R. Sewig, Z. Instrum., Vol. 62, No. 3, March, 1942, pp. 93-94.)
346	4576	Germany	...	*A New Method for Producing Timing Marks on Films Moving at 100 ft./sec. (Electric Spark).* (D. Kresdel, Z. Instrum., Vol. 62, No. 3, March, 1942, pp. 97-99.)
347	4577	Germany	...	*Measuring Short Time Intervals with the Help of a Condenser and Thyratron.* (B. Puschel, Z. Instrum., Vol. 62, No. 3, March, 1942, pp. 100-101.)
348	4578	Germany	...	*Method for Measuring the Friction of Small Ball Bearings.* (A. Kohaut, Z. Instrum., Vol. 62, No. 3, March, 1942, pp. 101-103.)
349	4579	Germany	...	*A Photo Electric Recorder for the Measurement of Small Friction Couples.* (R. Vieweg and F. Gothwald, Z. Instrum., Vol. 62, No. 3, March, 1942, p. 104.)
350	4580	Germany	...	*Simple Optical Device for Transferring Aerial Photographic Details on to a Map.* (P. Werkmeister, Z. Instrum., Vol. 62, No. 5, May, 1942, pp. 161-163.)
351	4581	Germany	...	*Arrangement of Scale and Pointer so as to Increase Accuracy of Reading.* (A. Lambertz, Z. Instrum., Vol. 62, No. 5, May, 1942, pp. 163-167.)
352	4582	Germany	...	*The Dynamics of the Roller Blind Shutters and the Optical Effect of Small Slit Width.* (A. Rieche, Z. Instrum., Vol. 62, No. 5, May, 1942, p. 171.)
353	4655	Germany	...	*The Free Oscillations of Finite Amplitude of a Gyro Pendulum.* (U. T. Bodenadt, Z.A.M.M., Vol. 20, No. 4, Aug., 1942, pp. 218-234.)
354	4686	Germany	...	*Determination of Centrifugal Moments by Means of the Inertia Moment Planimeter (Intergrator).* (E. R. Berger, Z. Instrum., Vol. 61, No. 11, Nov., 1941, pp. 381-384.)
355	4722	U.S.A.	...	*Improved Solutions of Remote Control Problems.* (H. Chase, Aviation, Vol. 41, No. 6, June, 1942, pp. 97-101.)
356	*4249	U.S.A.	...	*On Some Essentials in Control Chart Analysis.* (E. G. Olds, Trans. A.S.M.E., Vol. 64, No. 5, June, 1942, pp. 521-527.)
357	4762	U.S.A.	...	*Experimental Study of Automatic Control Systems.* (J. C. Peters, Trans. A.S.M.E., Vol. 64, No. 3, April, 1942, pp. 247-255.)
358	4879	G.B. ...	...	*Magnetic Flux Meter (Direct Reading with Reversed Connections).* (Nature, Vol. 150, No. 3,803, 19/9/42, pp. 355-356.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
359	4880	G.B. ...	... *New Electrostatic Air Cleaner.* (D. W. Aldous, Electrician, Vol. 129, No. 3,354, 11/9/42, pp. 271-272.)
360	4951	Germany	... *Effect of Elasticity of Knife Edge and Support on the Period of a Pendulum.* (H. Tesch, Z. fur Instrum., No. 4, April, 1942, pp. 140-143.)
361	4987	Germany	... *Accuracy of Power Measurements with the Torsion Indicator.* (G. Lehmann, W.R.H., Vol. 23, No. 15, 1/8/42, pp. 211-216.)
362	5041	G.B. ...	... *A Periscope Aircraft Sextant.* (Flight, Vol. 41, No. 1,758, 3/9/42, p. 264.)
363	5083	Germany	... *Automatic Stop Watch of the D.V.L.* (R. Hesse, A.T.Z., Vol. 45, No. 12, 25/6/42, p. 346.)
364	5138	Germany	... *Optical Device for Projecting Reading of Instruments Outside the Field of Vision of the Observer and Requiring Occasional Control (Pat. Series 32, No. 719,098).* (Henschel, Flugsport, Vol. 34, No. 14, 8/7/42, p. 132.)
365	5168	Germany	... *Electromagnetic Device for Counting Rapid Current Impulses (up to 120/sec.) (Specially Designed for Aircraft).* (D.V.L., E.T.Z., Vol. 63, No. 35-36, 10/9/42, p. 416.)
366	5251	G.B. ...	... *Floatless Liquid Level Control (Lectro Level).* (Engineer, Vol. 174, No. 4,526, 9/10/42, p. 306.)
367	5273	Germany	... *Flow Meter for Industrial Gases.* (I Lempert, Gas, Vol. 14, No. 7, July, 1942, pp. 115-120.)
368	5279	Germany	... *New Instrument for Measuring Acceleration in Flight.* (H. Freise and others, Luftwissen, Vol. 9, No. 8, Aug., 1942, pp. 245-247.)

MATERIALS.

369	4584	G.B. ...	... *Volumetric Expansion of Plastics.* (M. A. Ayan, British Plastics, Vol. 13, No. 154, March, 1942, pp. 404-405.)
370	4585	G.B. ...	... *Water Absorption of Resin Impregnated Oregon Pine.* (R. S. Hawkins, British Plastics, Vol. 13, No. 154, March, 1942, pp. 406-408.)
371	4586	G.B. ...	... *Accelerated Testing of Plastics for Weathering Resistance.* (L. K. Merrill and C. S. Myers, British Plastics, Vol. 13, No. 154, March, 1942, pp. 416-422.)
372	4597	U.S.A.	... *Vagueness of Present Specifications for Surface Quality.* (C. F. Nagel, Metal Progress, Vol. 41, No. 3, March, 1942, pp. 323-329 and 428.)
373	4598	U.S.A.	... *Boron in Steel and Cast Iron.* (N. F. Tisdale, Metal Progress, Vol. 41, No. 3, March, 1942, pp. 330-331.)
374	4599	U.S.A.	... *Dies for the Fabrication of Porous Bearings.* (A. J. Langhammer and M. F. Smith, Metal Progress, Vol. 41, No. 3, March, 1942, pp. 135-337.)
375	4600	U.S.A.	... *American Standard Steel Compositions.* (Metal Progress, Vol. 4, No. 3, March, 1942, p. 345.)
376	4601	U.S.A.	... *A New Alloy for Working at High Temperature. (Ni-Co-Cr-Ti-Fe).* (P. H. Brace, Metal Progress, Vol. 41, No. 3, March, 1942, pp. 354-360.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
377	4602	U.S.A. ...	*Extrusion of Light Alloys.* (S. Wonsdale, Metal Progress, Vol. 41, No. 3, March, 1942, p. 388.)
378	4603	U.S.A. ...	*Electron Microscope.* (Metal Progress, Vol. 41, No. 3, March, 1942, pp. 430, 434, 438.)
379	4604	U.S.A. ...	*Heavy Alloy (Wo-Cu).* (G.H.S. Price and others, Metal Progress, Vol. 41, No. 3, March, 1942, pp. 337, 406, 414.)
380	4605	U.S.A. ...	*Electrolytic Cleaning of Metals.* (H. R. Hanley, Metal Progress, Vol. 41, No. 2, Feb., 1942, pp. 179-183.)
381	4606	U.S.A. ...	*Evaluation of the Drawability of Thin Metals.* (T.F. Mika, Metal Progress, Vol. 41, No. 2, Feb., 1942, pp. 192-197.)
382	4607	U.S.A. ...	*Confusion of Testing Terms and Methods.* (G. P. Lentz, Metal Progress, Vol. 41, No. 3, Feb., 1942, pp. 198-202.)
383	4608	U.S.A. ...	*Fluxes for Oxyacetylene Welding and Brazing.* (Metal Progress, Vol. 41, No. 2, Feb., 1942, p. 202a.)
384	4609	U.S.A. ...	*Crack Sensitivity of Welded Aircraft Steel.* (J. G. Ball, Metal Progress, Vol. 41, No. 2, Feb., 1942, pp. 213, 232, 240.)
385	4610	U.S.A. ...	*Surface Hardness of Metals.* (B. Chalmers, Metal Progress, Vol. 41, No. 2, Feb., 1942, pp. 200, 226.)
386	4611	U.S.A. ...	*Structure of Alloy.* (W. Hume Rothery, Metal Progress, Vol. 41, No. 2, Feb., 1942, pp. 186, 280, 284.)
387	4612	U.S.A. ...	*Terms Used in Powder Metallurgy.* (Metal Progress, Vol. 41, No. 1, Jan., 1942, pp. 44-46.)
388	4613	U.S.A. ...	*Wire Drawing.* (K. B. Lewis, Metal Progress, Vol. 41, No. 1, Jan., 1942, pp. 102, 114.)
389	4614	U.S.A. ...	*Utilisation of Stainless Scrap.* (H. A. Grove, Metal Progress, Vol. 41, No. 1, Jan., 1942, pp. 47-48.)
390	4616	U.S.A. ...	*Stainless Clad Steels.* (S. L. Hoyt, Metal Progress, Vol. 41, No. 1, Jan., 1942, pp. 51-53.)
391	4617	U.S.A. ...	*Orientation on Copper Strip.* (M. Cook and J. L. Richards, Metal Progress, Vol. 41, No. 1, Jan., 1942, pp. 53, 126, 130, 134.)
392	4618	U.S.A. ...	*Microstructure of 24S Al-Cn-Mg Alloy.* (F. Keller and R. A. Bossert, Metal Progress, Vol. 41, No. 1, Jan., 1942, pp. 63-72.)
393	4619	U.S.A. ...	*Rolling a Mg Alloy.* (W. R. D. Jones and L. Powell, Metal Progress, Vol. 41, No. 1, Jan., 1942, p. 72.)
394	4620	U.S.A. ...	*Heat Treatment of Mo High Speed Steel.* (L. C. Grimshaw and R.P. Kell, Vol. 4, No. 1, Jan., 1942, pp. 76-81.)
395	4623	U.S.A. ...	*Rapid Sorting of Small Castings to Test Heat Treatment (Magnetic Method).* (C. S. Williams, Metal Progress, Vol. 41, No. 1, Jan., 1942, p. 85.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
396	4626	U.S.A.	...	*Design Charts for Tubes Subjected to Bending.* (W. C. Clayton, Aviation, Vol. 41, No. 4, April, 1942, pp. 80-82 and 205.)
397	4629	U.S.A.	...	*Strength Analysis of Riveted and Bolted Joints.* (W. A. McGowan, Aviation, Vol. 41, No. 4, April, 1942, pp. 91-99 and 206.)
398	4631	U.S.A.	...	*Synthetic Resin in Construction.* (H. N. Hart, Aviation, Vol. 41, No. 4, April, 1942, pp. 103-105 and 210-214.)
399	*4648	Germany	...	*Pressure Die Casting of Igamid Plastic.* (H. Beck and F. Schaupp, Kunststoffe, Vol. 32, No. 7, July, 1942, pp. 205-209.)
400	*4649	Germany	...	*Influence of Heat Treatment on the Impact Strength (Plain or Notched) of Plastic with Paper on Fabric Filler.* (C. Brinkmann, Kunststoffe, Vol. 32, No. 7, July, 1942, pp. 213-216.)
401	4650	Germany	...	*Injection of Igamid Plastic with the Help of Isoma Automatic.* (H. Gastrow, Kunststoffe, Vol. 32, No. 7, July, 1942, pp. 210-211.)
402	4651	Germany	...	*High Duty Plastic Bearings of the Wound Tape Type.* (Kunststoffe, Vol. 32, No. 7, July, 1942, p. 200.)
403	*4653	Germany	...	*Theoretical Stress Distribution in Notched Plates.* (H. Neuber, Z.A.M.M., Vol. 20, No. 4, Aug., 1942, pp. 199-207.)
404	4654	Germany	...	*Experimental Determination of Three-Dimensional Stress Distributions on Transparent Models by the Tyndale Effect.* (H. J. Menges, Z.A.M.M., Vol. 20, No. 4, Aug., 1942, pp. 210-217.)
405	4664	U.S.A.	...	*The Intrinsic Theory of Elastic Shells and Plates.* (J. L. Synge and W. Z. Chien, Kármán Anniversary Volume of Applied Mechanics, 1941, pp. 103-120.)
406	4665	U.S.A.	...	*The Compressibility of Solids Under Extreme Pressures (Stress and Strain).* (F. D. Murragban, Kármán Anniversary Volume of Applied Mechanics, 1941, pp. 121-135.)
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410	4674	U.S.A.	...	*The Creep of Metals Under Various Stress Conditions.* (A. Nadai, Kármán Anniversary Volume of Applied Mechanics, 1941, pp. 237-275.)
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ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
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413	4681	U.S.A. ...	*Stress Pattern Crazing.* (W. B. Klemperer, Kármán Anniversary Volume of Applied Mechanics, 1941, pp. 328-337.)
414	4690	Germany ...	*Investigations on Engineering Surfaces.* (G. Schmattz, Text Book, 1937, pp. 112-124.)
415	4698	U.S.A. ...	*Control Procedure of Torch Welding in Aircraft.* (E. Dudley, J. Aeron. Sci., Vol. 1, No. 4, July, 1942, pp. 21-27.)
416	4720	U.S.A. ...	*Forming by Drawing (Compound Curved Surfaces in Sheet Metal.* (F. Anderson, Aviation, Vol. 41, No. 6, June, 1942, pp. 82-85.)
417	4723	U.S.A. ...	*Instructional Film on Tool Grinding and Cutting.* (Aviation, Vol. 41, No. 6, June, 1942, p. 132.)
418	4728	U.S.A. ...	*Working Transparent Plastics, Part II (Machinery, Finishing and Repairing).* (J. Sasso, Aviation, Vol. 41, No. 6, June, 1942, pp. 105-109 and 255.)
419	4737	U.S.A. ...	*A Simple Apparatus for Testing Corrodibility of Bearings and Corrosiveness of Lubricants.* (N. McCoull and others, S.A.E.J., Vol. 50, No. 8, Aug., 1942, pp. 339-345.)
420	*4740	U.S.A. ...	*Progress in Structural Design Through Strain-Gauge Technique.* (C. R. Strang, S.A.E.J., Vol. 50, No. 8, Aug., 1942, pp. 346-357.)
424	4745	U.S.A. ...	*Embrittlement of Boiler Steels (Collection of Papers by Various Authors).* (Trans. A.S.M.E., Vol. 64, No. 5, June, 1942, pp. 393-444.)
425	*4751	U.S.A. ...	*Relaxation Resistance of Nickel Alloy Springs.* (B.B. Betty and others, Trans. A.S.M.E., Vol. 64, No. 5, June, 1942, pp. 465-474.)
426	4752	U.S.A. ...	*Symposium on Formulation of Code for Design of Helical Springs (Various Authors).* (Trans. A.S.M.E., Vol. 64, No. 5, June, 1942, pp. 475-488.)
427	4764	U.S.A. ...	*Rayon in Tyres.* (Scientific Am., Vol. 167, No. 3, Sept., 1942, pp. 124-125.)
428	4765	U.S.A. ...	*Separation of Low Grade Ores by Electronic Means.* (Sci. Am., Vol. 167, No. 3, Sept., 1942, p. 126.)
429	4771	G.B.	*The Fireproofing of Timber.* (Engineering, Vol. 154, No. 4,000, 11/9/42, p. 208.)
430	4772	G.B.	*Mechanical Detection of Wheel-Seat Flaws in Railway Axles.* (Engineering, Vol. 154, No. 4,000, 11/9/42, pp. 215-216.)
431	4773	France ...	*Light Alloys in Motor Cycles and Motorised Bicycles (Part II), from the French.* (Light Metals, Vol. 5, No. 55, Aug., 1942, pp. 286-220.)
432	4774	U.S.A. ...	*Electroplating of Magnesium with Nickel (from the U.S.A.).* (Light Metals, Vol. 5, No. 55, Aug., 1942, pp. 291-296.)
433	4776	G.B.	*Design and Use of Explosive Rivets.* (Light Metals, Vol. 5, No. 55, Aug., 1942, pp. 309-312.)

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ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
434	4777	Germany ...	*Surface Treatment of Light Alloy Pistons (from the German).* (Light Metals, Vol. 5, No. 55, Aug., 1942, pp. 317-324.)
435	4778	G.B. ...	*Electro-Deposition of Nickel on Aluminium and Al. Alloys.* (Light Metals, Vol. 5, No. 55, Aug., 1942, pp. 322-334.)
436	4792	U.S.A. ...	*Mobile X-Ray Laboratory for Diagnosing Structural Weaknesses in the Field.* (Flight, Vol. 41, No. 1,757, 27/8/42, p. 227.)
437	4820	G.B. ...	*Cold-Pressing Properties of Duralumin Alloy Sheets.* (J. C. Arrowsmith and others, Engineering, Vol. 154, No. 4,002, 25/9/42, pp. 258-260.)
438	4821	G.B. ...	*On the Equilibrium of Thick or Thin Plate (Use of Complex Variables).* (A. C. Stevenson, Phil. Mag., Vol. 33, No. 224, Sept., 1942, pp. 639-661.)
439	4825	G.B. ...	*Railway Bearing Metals.* (J. N. Bradley and H. O'Neill, Metal Industry, Vol. 61, No. 14, 2/10/42, pp. 210-212.)
440	4826	G.B. ...	*Tin Free Bronze for Worm Gears.* (Metal Industry, Vol. 61, No. 14, 2/10/42, p. 212.)
441	4827	G.B. ...	*Notes on Solder Dipping Operations with Special References to Silver Content of Solder (Argent Solders).* (L. G. Earle, Metal Industry, Vol. 61, No. 14, 2/10/42, pp. 213-215.)
442	4828	G.B. ...	*Bismuth—its Effect on the Working Properties of Brass.* (W. B. Price and R. W. Bailey, Metal Industry, Vol. 61, No. 14, 2/10/42, pp. 216-217.)
443	4835	G.B. ...	*Rubber Mouldings with Felt Cores.* (The Engineer, Vol. 174, No. 4,524, 25/9/42, p. 264.)
444	4836	G.B. ...	*Plastics in Aircraft Construction.* (G. W. De Bell, The Engineer, Vol. 174, No. 4,524, 25/9/42, pp. 265-266.)
445	4838	G.B. ...	*Inspection and Examination of Ship Metal.* (E. Mills, Metal Industry, Vol. 61, No. 12, 18/9/42, pp. 178-180.)
446	4839	G.B. ...	*Plaster Mould for Al. Castings.* (Metal Industry, Vol. 61, No. 12, 18/9/42, p. 180.)
447	4840	G.B. ...	*Sand Cast Tin Bronzes.* (Metal Industry, Vol. 61, No. 12, 18/9/42, pp. 181-182.)
448	4841	G.B. ...	*Sintering Furnaces and Atmospheres.* (R. P. Koehring, Metal Industry, Vol. 61, No. 12, 18/9/42, pp. 183-185.)
449	4842	G.B. ...	*Copper Oxide Rectifiers.* (L. W. Burton, Metal Industry, Vol. 61, No. 12, 18/9/42, pp. 186-188.)
450	4843	G.B. ...	*Measuring Drawability.* (Metal Industry, Vol. 61, No. 12, 18/9/42, p. 188.)
451	4844	G.B. ...	*Electrolytic Polishing of Brass and Copper.* (G. J. Foss and L. Shiller, Metal Industry, Vol. 61, No. 11, 11/9/41, p. 170.)
452	4845	G.B. ...	*Detection of Crack by Means of a Fluorescent Filler.* (Metal Industry, Vol. 61, No. 11, 11/9/42, p. 171.)
453	4846	G.B. ...	*Volumetric Estimation of Carbon.* (Metal Industry, Vol. 61, No. 11, 11/9/42, p. 171.)
454	4847	G.B. ...	*Precision Castings by the "Lost Wax" Process.* (Metal Industry, Vol. 61, No. 13, 25/9/42, p. 197.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
455	4848	G.B. ...	... *Brittleness of Anodic Coatings Insufficient for Strain Determinations by the Crack Method.* (Metal Industry, Vol. 61, No. 13, 25/9/42, p. 202.)
456	4849	G.B. ...	... *Enlarging Magnesium Output.* (P. D. Wilson, Metal Industry, Vol. 61, No. 13, 25/9/42, pp. 203-204.)
457	4850	G.B. ...	... *Universal Superfinishing Machine.* (Engineering, Vol. 154, No. 4,001, 18/9/42, pp. 226-227.)
458	4851	G.B. ...	... *Electrolytic Tin Plate.* (Engineering, Vol. 154, No. 4,001, 18/9/42, pp. 227-228.)
459	4852	G.B. ...	... *Cold-Pressing Properties of Duralumin Alloy Sheets.* (T. C. Arrowsmith and others, Engineering, Vol. 154, No. 4,001, 18/9/42, p. 235.)
460	4853	G.B. ...	... *The Electric Arc Furnace.* (T. F. Wall, Engineer, Vol. 174, No. 4,522, 11/9/42, pp. 216-218.)
461	4854	G.B. ...	... *Densified Laminated Wood for Engineering Uses.* (Engineering, Vol. 174, No. 4,522, 11/9/42, pp. 219-221.)
462	4856	G.B. ...	... *The Electric Arc Furnace.* (T. F. Wall, Engineer, Vol. 174, No. 4,521, 4/9/42, pp. 188-191.)
463	4858	G.B. ...	... *Fireproofing of Timber.* (Engineer, Vol. 174, No. 4,521, 4/9/42, p. 200.)
464	4859	G.B. ...	... *Crack Detection by Fluorescent Fillers (Glo-Crack).* (Engineer, Vol. 174, No. 4,521, 4/9/42, p. 201.)
465	4860	Germany	... *Wear in Sand Blast Pipe Lines.* (Stahl und Eisen, Vol. 62, No. 30, 23/7/42, pp. 635-637.)
466	4861	Germany	... *Fatigue Strength of Steel at High Temperature (Reasons for Scattering of Results).* (Stahl und Eisen, Vol. 62, No. 30, 23/7/42, p. 637.)
467	4862	Germany	... *Relation between Static Yield Point and Fatigue Strength of Steel (Tension-Compression, Torsion and Bending).* (Stahl und Eisen, Vol. 62, No. 30, 23/7/42, p. 637.)
468	4863	Germany	... *Effect of Titanium on the Creep Strength of Steel.* (Stahl und Eisen, Vol. 62, No. 30, 23/7/42, p. 637.)
469	4865	G.B. ...	... *Resistance of Wood to Impact Loads.* (C. B. Pettifor, Airc. Eng., Vol. 14, No. 163, Sept., 1942, pp. 248-250.)
470	4866	G.B. ...	... *Plastics in Aircraft Production.* (C. W. De Bell, Airc. Eng., Vol. 14, No. 163, Sept., 1942, pp. 254-257 and 259.)
471	4867	G.B. ...	... *Failure—a New Definition Needed.* (E. Pribram, Airc. Eng., Vol. 14, No. 163, Sept., 1942, pp. 258-259.)
472	4868	G.B. ...	... *The Buckling of Rectangular Plate with Stiffeners.* (J. Ratzersdorfer, Airc. Eng., Vol. 14, No. 163, Sept., 1942, pp. 260-263.)
473	4869	G.B. ...	... *Principles Involved in Die Casting.* (A. J. Schroeder, Airc. Eng., Vol. 14, No. 163, Sept., 1942, pp. 264-265.)
474	4875	G.B. ...	... *The Glo-Crack System of Crack Detection.* (Nature, Vol. 150, No. 3,803, 19/9/42, pp. 343-344.)
475	4876	G.B. ...	... *Magnetic Crack Detection (Magnaflux).* (Nature, Vol. 150, No. 3,803, 19/9/42, p. 344.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
476	4877	G.B. ...	... *Mechanism of Metallic Friction.* (Nature, Vol. 150, No. 3,803, 19/9/42, p. 349.)
477	4881	G.B. ...	... *Hydrolised Lignocellulose as a Plastic Filler.* (Chemical Trade J., Vol. 111, No. 2,885, 4/9/42, p. 207.)
478	4883	G.B. ...	... *Fire Resistant Timber.* (Chemical Trade J., Vol. 111, No. 2,886, 11/9/42, pp. 239-240.)
479	4896	Germany	... *Welded and Soldered Joints in Electric Cables (Cr. and Al.).* (E.T.Z., Vol. 63, No. 31-32, 13/8/42, p. 376.)
480	4899	G.B. ...	... *Graphite in Fibrous Material (Impregnation for Lubrication).* (Mech. World, Vol. 112, No. 2,905, 4/9/42, p. 221.)
481	4900	G.B. ...	... *Ringing Properties and the Hardness of Metal.* (Mech. World, Vol. 112, No. 2,905, 4/9/42, p. 222.)
482	4902	G.B. ...	... *Welding Conditions and Weld Hardness.* (T. N. Harmstrong, Mech. World, Vol. 112, No. 2,905, 4/9/42, pp. 232-234.)
483	4904	U.S.A.	... *Fire-Fighting Spray Nozzles (Plastic).* (Ind. and Eng. Chem., Vol. 20, No. 15, 10/8/42, p. 975.)
484	4906	G.B. ...	... *Arc Welding Electrodes.* (Autom. Eng., Vol. 32, No. 427, Sept., 1942, pp. 375-377.)
485	4910	G.B. ...	... *Tool Steels.* (D. Taylor, Autom. Eng., Vol. 32, No. 427, Sept., 1942, pp. 349-350.)
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488	4913	G.B. ...	... *Short Blasting Increases Fatigue Resistance.* (Autom. Eng., Vol. 32, No. 427, Sept., 1942, p. 362.)
489	4916	G.B. ...	... *High Speed Steels—Delayed Cooling Improves Toughness.* (Autom. Eng., Vol. 32, No. 427, Sept., 1942, p. 362.)
490	4918	G.B. ...	... *Tin Economy in Plain Bearings.* (P. T. Holligan, Autom. Eng., Vol. 32, No. 427, Sept., 1942, pp. 367-369.)
491	4920	G.B. ...	... *Lubrication of Furnace Chains with Graphite (Use of Carrier Oil).* (Autom. Eng., Vol. 32, No. 427, Sept., 1942, p. 379.)
492	4924	G.B. ...	... *Shear Stress in Tapered Beams.* (A. G. Pugsley and R. A. Weatherhead, J. Roy. Aeron. Soc., Vol. 46, No. 381, Sept., 1942, pp. 218-226.)
493	4925	G.B. ...	... *Tapered Beams.* (E. H. Atkins, J. Roy. Aeron. Soc., Vol. 46, No. 381, Sept., 1942, pp. 227-236.)
494	4926	G.B. ...	... *Manufacture of Moulded Horn Hoof and Tortoise-shell from Raspings, Sawdust and Waste.* (British Plastics, Vol. 14, No. 160, Sept., 1942, pp. 185-186 and 196.)
495	4928	G.B. ...	... *Flaw Detection by Fluorescent Fillers (Glo-Crack).* (British Plastics, Vol. 14, No. 160, Sept., 1942, pp. 194-196.)
496	4929	G.B. ...	... *Acrylic Resins for Dentures.* (W. T. Sweeney and others, British Plastics, Vol. 14, No. 160, Sept., 1942, pp. 204-212.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
497	4936	G.B. ...	... *Spark from Aluminium Painted Steel (Heat Treated after Painting) on Striking or Scraping.* (T. S. E. Thornes, J. Am. Soc. Nav. Eng., Vol. 54, No. 3, Aug., 1942, p. 491.)
498	4937	G.B. ...	... *Stretching Machine for Forming Contoured Metal Sheets.* (Engineering, Vol. 154, No. 4,003, 2/10/42, p. 267.)
499	4939	G.B. ...	... *Cold Pressing Properties of Dural Alloy Sheets.* (J. C. Arrowsmith and others, Engineering, Vol. 154, No. 4,003, 2/10/42, pp. 278-280.)
500	4950	Germany	... *Oscillation of Linkage Systems.* (W. M. Capellen, Z. fur Instrum., No. 4, April, 1942, pp. 123-138.)
501	4953	G.B. ...	... *Silicon Bronze Castings.* (Mech. World, Vol. 112, No. 2,906, 11/9/42, pp. 239-240.)
502	4954	G.B. ...	... *Strength of Long Steel Wire.* (J. T. McIntyre, Mech. World, Vol. 112, No. 2,906, 11/9/42, pp. 244-246.)
503	4957	G.B. ...	... *"Inclad" Composite or Clad Steel Castings.* (Machinery, Lloyd, Vol. 14, No. 18, 5/9/42, p. 45.)
504	4958	G.B. ...	... *Powder Metallurgy (Dust Explosion Hazards).* (H. R. Brown, Machinery, Lloyd, Vol. 14, No. 18, 5/9/42, pp. 49-50.)
505	4961	G.B. ...	... *Railway Bearing Metals.* (J. N. Bradley and H. O'Neill, Engineer, Vol. 174, No. 4,527, 16/10/42, pp. 324-326.)
506	4967	Germany	... *Electrical Hand Tools for Construction and Repair (Drills and Shears).* (A. Schumann, Flughafen, Vol. 10, No. 4, April, 1942, pp. 10-11.)
507	4977	G.B. ...	... *Plastic Bearings.* (D. W. Brown, Plastics, Vol. 6, No. 65, Oct., 1942, pp. 333-339.)
508	4978	G.B. ...	... *Lignum—a Plastic from Wood (Masonite Process).* (J. Grant, Plastics, Vol. 6, No. 5, Oct., 1942, pp. 345-347.)
509	4979	Germany	... *German Valves Made of Polyvinyl Chloride (Igelit).* (Plastics, Vol. 6, No. 65, Oct., 1942, pp. 340-344.)
510	4980	G.B. ...	... *Fillers for Plastics.* (E. E. Halls, Plastics, Vol. 6, No. 65, Oct., 1942, pp. 352-358.)
511	4981	G.B. ...	... *High Frequency Electrothermics in the Plastics Field.* (B. J. Brajnikoff, Plastics, Vol. 6, No. 65, Oct., 1942, pp. 362-374.)
512	4990	Germany	... *Sorting of Alloy Steels by Dabbing with Acids and Taking Imprints on Special Impregnated Paper.* (Stahl und Eisen, Vol. 62, No. 34, 20/8/42, p. 720.)
513	4991	Germany	... *The Damage Line of Steel.* (Stahl und Eisen, Vol. 62, No. 34, 20/8/42, pp. 720-721.)
514	4992	Germany	... *The Solubility of Titanium Carbide and its Effect on the Heat Treatment and Hardening of Steel.* (Stahl und Eisen, Vol. 62, No. 34, 20/8/42, p. 721.)
515	4999	U.S.A.	... *Solvent for Removing Cylinder Bolts (Use of Plastic Cups).* (Modern Plastics, Vol. 19, No. 8, April, 1942, p. 35.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
516	5000	U.S.A. ...	*Injection Moulded Mycalex (Ground Mica and Glass Insulator).* (T. N. Willcox, Modern Plastics, Vol. 19, No. 8, April, 1942, pp. 54 and 118-120.)
517	5002	U.S.A. ...	*Practical Aspects of Flame Hardening.* (A. L. Hartley, Mech. Eng., Vol. 67, No. 7, July, 1942, pp. 531-540.)
518	5012	G.B. ...	*X-Ray Analysis in Industry (Stress-Strain in Metals).* (H. P. Rookby, Electrical Times, Vol. 102, No. 2,654, 3/9/42, pp. 337-338 and 347-348.)
519	5013	U.S.A. ...	*Resistoflex Synthetic Rubber.* (Ind. and Eng. Chem., Vol. 20, No. 16, 25/8/42, pp. 1003, 1040 and 1041.)
520	5014	U.S.A. ...	*Properties of Luminescent Materials.* (C. E. Barnett, Ind. and Eng. Chem., Vol. 20, No. 16, 25/8/42, pp. 1006-1009.)
521	5016	U.S.S.R. ...	*Russian Experiments on the Production of Alumina in a Smelting Furnace, from Low Grade Bauxite.* (Stahl und Eisen, Vol. 62, No. 35, 27/8/42, p. 735.)
522	5017	Germany ...	*The Effect of Cold Working on the Strength Characteristic of Stainless Steel.* (Stahl und Eisen, Vol. 62, No. 35, 27/8/42, pp. 735-736.)
523	5045	G.B. ...	*Precision Pipe Bending.* (Autom. Eng., Vol. 32, No. 428, Oct., 1942, pp. 393-395.)
524	5046	G.B. ...	*Super Hard Steel (Sintered Powdered Iron and Iron Carbide).* (Autom. Eng., Vol. 32, No. 428, Oct., 1942, p. 410.)
525	5047	G.B. ...	*Hollow Rubber Mouldings.* (Autom. Eng., Vol. 32, No. 428, Oct., 1942, p. 396.)
526	5048	G.B. ...	*Fluorescent Iron Dust for Crack Detection.* (Autom. Eng., Vol. 32, No. 428, Oct., 1942, p. 414.)
527	5049	G.B. ...	*Governor Design for Crack Detection.* (Autom. Eng., Vol. 32, No. 428, Oct., 1942, pp. 397-400.)
528	5050	G.B. ...	*Beryllium Copper.* (Autom. Eng., Vol. 32, No. 428, Oct., 1942, p. 403.)
529	5051	G.B. ...	*Powder Metallurgy.* (Autom. Eng., Vol. 32, No. 428, Oct., 1942, pp. 401-402.)
530	5052	G.B. ...	*Carbon Arc Welding.* (Autom. Eng., Vol. 32, No. 428, Oct., 1942, p. 403.)
531	5054	G.B. ...	*Copper Lead Bearings.* (Autom. Eng., Vol. 32, No. 428, Oct., 1942, p. 402.)
532	5055	U.S.A. ...	*Furnace Atmospheres (American Practice).* (Autom. Eng., Vol. 32, No. 428, Oct., 1942, pp. 415-418.)
533	5056	U.S.A. ...	*Fluorescence of Glass.* (W. A. Weyl, Ind. and Eng. Chem., Vol. 34, No. 9, Sept., 1942, pp. 1035-1041.)
534	5057	U.S.A. ...	*Transition Temperature and Cubical Expansion of Plastic Materials.* (F. E. Wiley, Ind. and Eng. Chem., Vol. 34, No. 9, Sept., 1942, pp. 1052-1056.)
535	5058	U.S.A. ...	*Viscosity and Cryoscopic Data on Polystyrene.* (A. R. Kemp and H. Peters, Ind. and Eng. Chem., Vol. 34, No. 9, Sept., 1942, pp. 1097-1102.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
536	5059	U.S.A. ...	*Effect of Viscosity of Medium on Rate of Grinding in Pebble Mills.* (H. E. Schweyer, Ind. and Eng. Chem., Vol. 34, No. 9, Sept., 1942, pp. 1060-1065.)
537	5062	U.S.A. ...	*Plasticizers, II.* (Ind. and Eng. Chem., Vol. 34, No. 9, Sept., 1942, p. 1119.)
538	5065	G.B.	*The Practice of Powder Metallurgy (Influence of Particle Shape and Size).* (H. W. Greenwood, Metal Industry, Vol. 61, No. 16, 16/10/42, pp. 242-244.)
539	5066	G.B.	*Railway Bearing Metals, III.* (J. N. Bradley, Metal Industry, Vol. 61, No. 16, 16/10/42, pp. 245-247.)
540	5067	G.B.	*Industrial Uses of the Platinum Metals.* (E. M. Wise, Metal Industry, Vol. 61, No. 16, 16/10/42, pp. 247-248.)
541	5068	G.B.	*The Trend of Electroplating Development.* (S. Wernick, Metal Industry, Vol. 61, No. 16, 16/10/42, pp. 249-252.)
542	5070	G.B.	*Railway Bearing Metals.* (J. N. Bradley and H. O'Neil, Engineering, Vol. 154, No. 4,005, 16/10/42, pp. 318-320.)
543	5071	U.S.A. ...	*Cold Rolled Stainless Steels in Aircraft.* (R. Franks and W. O. Binder, Mech. Eng., Vol. 64, No. 8, pp. 589-598.)
544	5072	U.S.A. ...	*Load Relations in Bolted Joints.* (T. J. Dolan, Mech. Eng., Vol. 64, No. 8, Aug., 1942, pp. 607-611.)
545	5074	U.S.A. ...	*Magnesium Fires.* (Mech. Eng., Vol. 64, No. 8, Aug., 1942, p. 617.)
546	5077	Germany ...	*Metallic Coatings for Piston Rings.* (A.T.Z., Vol. 45, No. 11, 10/6/42, p. 311.)
547	5079	Germany ...	*Improving the Fatigue Strength of Springs by Surface Compression (Short Blasting).* (O. Fopple, A.T.Z., Vol. 45, No. 12, 25/6/42, pp. 321-325.)
548	5082	Germany ...	*The Effect of Rest Periods on Fatigue Strength.* (A.T.Z., Vol. 45, No. 12, 25/6/42, p. 386.)
549	5088	G.B.	*Elastic Theory in Sheet Forming Problems. (from Inst. of Aero. Sciences).* (F. R. Shanley, Airc. Eng., Vol. 14, No. 164, Oct., 1942, pp. 293-299.)
550	5089	U.S.A. ...	*Heat Treatment at the Wright Paterson Plant (U.S.A.).* (H. W. Perry, Airc. Eng., Vol. 14, No. 164, Oct., 1942, pp. 300-302.)
551	5117	G.B.	*Stressed Skin Pioneering in Great Britain (Short Silver Streak).* (O. Short, Flight, Vol. 41, No. 1,758, 3/9/42, pp. 250-252.)
552	5118	Germany ...	*Device for Determining Rivet Shaft Length for Various Plate Thicknesses and Type of Head.* (Junkers, Flugsport, Vol. 34, No. 16, 5/8/42, pp. 246-247.)
553	5119	Germany ...	*Device for the Rapid Determination of the Correct Air Pressure for Rubber Die Pressings.* (Junkers, Flugsport, Vol. 34, No. 16, 5/8/42, pp. 247-248.)
554	5129	Germany ...	*Device for Bending Thin-Walled Light Alloy Tubes (Junkers).* (Flugsport, Vol. 34, No. 14, 8/7/42, pp. 220-221.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
555	5141	G.B. ...	... *Infra-Red Baking of Industrial Finishes.* (Nature, Vol. 152, No. 3,084, 26/9/42, p. 371.)
556	5142	G.B. ...	... *Soldering of Electrical Joints.* (Nature, Vol. 152, No. 3,804, 26/9/42, p. 371.)
557	5146	Germany	... *Containers of Moulded Cardboard.* (Z.V.D.I., Vol. 86, No. 31-32, 8/8/42, p. 495.)
558	5150	G.B. ...	... *British Practice in Reconditioning Worn Parts.* (Autom. Ind., Vol. 87, No. 2, 15/7/42, p. 49.)
559	5157	U.S.A.	... *Hardenability of Steel.* (Autom. Ind., Vol. 87, No. 2, 15/7/42, p. 76.)
560	5160	Germany	... *The Testing of Light Alloys at Elevated Temperatures Under Pulsating Load.* (E. Siebel and others, Z. fur Metalk., Vol. 34, No. 7, July, 1942, pp. 143-150.)
561	5161	Germany	... *The Determination of the Damage Line of a Fully Aged Al.-Cn.-Mg. Wrought Alloy.* (F. Bollenrath and H. Cornelius, Z. fur Metalk., Vol. 34, No. 7, July, 1942, pp. 150-156.)
562	5162	Germany	... *On the Connection Between Weldability and Wear of Tool Steels (Turning, Drilling, Shaping, etc.).* (W. Dawihl and W. Rix, Z. fur Metalk., Vol. 34, No. 7, July, 1942, pp. 156-159.)
563	5163	Germany	... *Layer Corrosion of Al. Alloys.* (F. Bollenrath and W. Bungardt, Z. fur Metalk., Vol. 34, No. 7, July, 1942, pp. 160-165.)
564	5164	Germany	... *The Presence of Iron in Purified Magnesium.* (W. Bulian and E. Fahrenhorst, Z. fur Metalk., Vol. 34, No. 7, July, 1942, pp. 166, 170.)
565	5167	Germany	... *Modern Developments in Powdered Metal Cored Transformers.* (G. Kiessling and O. Ludl, E.T.Z., Vol. 63, No. 35-36, 10/9/42, pp. 413-416.)
566	5169	Germany	... *Experiments on the Strength Characteristics of Wrought Al. Alloys at Temperatures up to 250°C.* (E. Von Rajakovics and H. O. Maier, Z. fur Metalk., Vol. 34, No. 8, Aug., 1942, pp. 173-187.)
567	5170	Germany	... *Effect of Welding Conditions on the Consistency of Spot Welds on Light Alloy Sheet of Various Compositions.* (F. Bollenrath and V. Hauk, Z. fur Metalk., Vol. 34, No. 8, Aug., 1942, pp. 187-193.)
568	5171	Germany	... *Investigation on Surface Structure Under Conditions of Sliding Wear.* (O. Glemser and K. Escher, Z. fur Metalk., Vol. 34, No. 8, Aug., 1942, pp. 196-197.)
569	5172	Germany	... *Effect of Crystal Lattice Distortion on Stress-Strain Curves of Aggregates.* (U. Dehlinger, Z. fur Metalk., Vol. 34, No. 8, Aug., 1942, pp. 197-199.)
570	5177	U.S.A.	... *Conservation of Critical Materials by Use of Alternatives.* (J. Horn, Ind. and Eng. Chem., Vol. 20, No. 15, 10/8/42, pp. 957-959.)
571	5179	Germany	... *How to Avoid Coarsening of Grain of Al.-Cn.-Mg. Alloy Sheet After Repeated Drawing and Heat Treatment.* (K. L. Dreyer and M. Hansen, Z. fur Metalk., Vol. 34, No. 6, June, 1942, pp. 121-125.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
572	5180	Germany ...	*The Diffusion of Carbon in Alloy Steels.* (W. Seith and F. Bartschat, Z. fur Metalk., Vol. 34, No. 6, June, 1942, pp. 121-125.)
573	5181	Germany ...	*Measurement on Metallic Diffusion by Means of Micro-Hardeners.* (H. Buckle, Z. fur Metalk., Vol. 34, No. 6, June, 1942, pp. 130-133.)
574	5182	Germany ...	*The Stability of a Thin Conical Shell.* (A. Pfluger, Ing. Archiv., Vol. 62, No. 2, April, 1942, pp. 59-72.)
575	5184	Germany ...	*The Stressing of S-Shaped Springs Under Axial Load.* (T. E. Schunk, Ing. Archiv., Vol. 62, No. 2, April, 1942, pp. 73-79.)
576	5186	Germany ...	*Bending Vibrations of a Circular Ring Subjected to Pulsating Radial Pressure (Evenly Distributed).* (S. Woinowsky-Krieger, Ing. Archiv., Vol. 62, No. 2, April, 1942, pp. 90-96.)
577	5187	Germany ...	*On the Stability of Forced Vibrations of Elastic Bodies.* (E. Meltler, Ing. Archiv., Vol. 62, No. 2, April, 1942, pp. 97-103.)
578	5188	Germany ...	*Graphical Method for Determining the Natural Frequencies of a Multi-Mass System.* (S. Salyi, Ing. Archiv., Vol. 62, No. 2, April, 1942, pp. 104-109.)
579	5213	G.B. ...	*Notes on Plastics.* (J. S. Trevor, Aeronautics, Vol. 6, No. 5, June, 1942, pp. 59-61.)
580	5218	G.B. ...	*Synthetic Rubber.* (J. S. Trevor, Aeronautics, Vol. 6, No. 2, March, 1942, pp. 25-26.)
581	5246	G.B. ...	*The Electric Arc Furnace (IV).* (T. F. Wall, Engineer, Vol. 174, No. 4,523, 18/10/42, pp. 228-230.)
582	5247	G.B. ...	*Sponge Iron.* (Engineer, Vol. 174, No. 4,523, 18/10/42, p. 235.)
583	5248	G.B. ...	*Magnetic Powder Method of Crack Detection.* (J. F. Kayser, Engineer, Vol. 174, No. 4,523, 18/10/42, p. 241.)
584	*5253	G.B. ...	*Inspection by Sampling—Effect of Number of Sample to Bulk Number.* (R. H. Parsons, Engineering, Vol. 154, No. 4,004, 9/10/42, pp. 294-295.)
585	5254	G.B. ...	*Fire Proofing of Timber.* (Engineering, Vol. 154, No. 4,004, 9/10/42, p. 295.)
586	5255	G.B. ...	*The Practice of Powder Metallurgy.* (H. W. Greenwood, Metal Industry, Vol. 61, No. 15, 9/10/42, pp. 226-227.)
587	5256	G.B. ...	*Railway Bearing Metals.* (J. N. Bradley and H. O'Neill, Engineering, Vol. 154, No. 4,004, 9/10/42, pp. 298-300.)
588	5257	G.B. ...	*Tinning of Al. Pistons.* (Metal Industry, Vol. 61, No. 15, 9/10/42, p. 229.)
589	5258	Germany ...	*Secondary Al. in Germany.* (Metal Industry, Vol. 61, No. 15, 9/10/42, p. 236.)
590	5278	Germany ...	*The Bending Factor (Relation Between Bending and Tensile Stresses at Fracture).* (J. Cassens, Luftwissen, Vol. 9, No. 8, Aug., 1942, pp. 242-244.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
591	5280	G.B. ...	... *Railway Bearing Metals, II (Cast Iron Shells).* (J. N. Bradley and H. O'Neill, Metal Industry, Vol. 61, No. 15, 9/10/42, pp. 228-229.)
			SOUND, LIGHT AND HEAT.
592	4583	G.B. ...	... *Refrigeration Insulation.* (B. Quarmby, British Plastics, Vol. 13, No. 154, March, 1942, pp. 376-381 and 405.)
593	4668	U.S.A.	... *On the Absorption of Sound Wares in Suspensions and Emulsions.* (P. S. Epstien, Kármán Anniversary Volume of Applied Mechanics, 1941.)
594	*4746	U.S.A.	... *High Performance Fins for Heat Transfers.* (R. H. Norris and W. A. Spofford, Trans. A.S.M.E., Vol. 64, No. 5, June, 1942, pp. 489-496.)
595	4757	U.S.A.	... *Vapourization Inside Horizontal Tubes, II. (with Discussion).* (W. H. McAdams and others, Trans. A.S.M.E., Vol. 64, No. 3, April, 1942, pp. 193-200.)
596	4822	G.B. ...	... *Temperature Distribution Around a Spherical Hole in an Infinite Conducting Medium.* (H. D. Pugh and A. J. Harris, Phil. Mag., Vol. 33, No. 224, Sept., 1942, pp. 661-666.)
597	4824	G.B. ...	... *Viscosity-Temperature Function of Liquids.* (E. P. Iranz, Phil. Mag., Vol. 33, No. 224, Sept., 1942, pp. 685-688.)
598	4982	G.B. ...	... *Luminous Radiation from Hot Gases.* (W. T. David, Nature, Vol. 195, No. 3,801, 5/9/42, pp. 291-292.)
599	5061	U.S.A.	... *Correlating Vapour Pressure and Latent Heat (Use of Critical Constants).* (D. F. Othmer, Ind. and Eng. Chem., Vol. 34, No. 9, Sept., 1942, pp. 1072-1078.)
600	5063	U.S.A.	... *Mean Temperature Difference in an Array of Identical Exchangers.* (K. A. Gardner, Ind. and Eng. Chem., Vol. 34, No. 9, Sept., 1942, pp. 1083-1087.)
601	5176	G.B. ...	... *Trough Reflectors for Fluorescent Lighting.* (Metal Industry, Vol. 61, No. 11, 11/9/42, p. 172.)
			WIRELESS AND ELECTRICITY.
602	4671	U.S.A.	... *On the Five-Dimensional Representation of Gravitation and Electricity.* (A. Einstein, V. Bargmann and P. G. Bergmann, Kármán Anniversary Volume of Applied Mechanics, 1941, pp.212-225.)
603	4696	G.B. ...	... *Abstracts and References.* (Radio Research Board, Oct., 1942.)
604	4755	G.B. ...	... *Suppressing High Frequency Disturbance from Telephone Apparatus (Dial Contacts).* (M. E. Kron, Nature, Vol. 150, No. 3,800, 29/8/42, p. 265.)
605	4766	U.S.A.	... *Radio-Telegraph Printer (Rejects False Signals).* (Sci. Am., Vol. 167, No. 3, Sept., 1942, p. 127.)
606	4832	G.B. ...	... *Colour Television.* (P. C. Goldmark and others, Electronic Engineering, Vol. 14, No. 176, Oct., 1942, pp. 195-200.)
607	4871	G.B. ...	... *Maintenance of Fluorescent Tubes.* (Airc. Eng., Vol. 14, No. 163, Sept., 1942, p. 272.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
608	4878	G.B. ...	... *Contact Resistance in Electric Switches.* (Nature, Vol. 150, No. 3,803, 19/9/42, p. 355.)
609	4886	U.S.A.	... *Aircraft Radio Communications.* (H. K. Morgan, J. Aeron. Sciences, Vol. 1, No. 5, Aug., 1942, pp. 19-23. Review Section.)
610	4895	Germany	... *Wireless Interference Due to High Tension Mains.* (F. Conrad, E.T.Z., Vol. 63, No. 31-32, 13/8/42, pp. 367-372.)
611	4908	G.B. ...	... *Wave Analysis—General Review.* (K. Browne, Electronic Engineering, Vol. 14, No. 175, Sept., 1942, pp. 149-151.)
612	4921	G.B. ...	... *The Mullard Oscillograph.* (Electronic Engineering, Vol. 14, No. 175, Sept., 1942, pp. 152-154.)
613	4922	G.B. ...	... *Practical Notes on Receiver Design.* (G. T. Clark, Electronic Engineering, Vol. 14, No. 175, Sept., 1942, pp. 160-164.)
614	4923	G.B. ...	... *The Magic Eye Valve (Cathode Ray Tuning Indicator) as a Resonance Indicator.* (J. M. A. Lenihan, Electronic Engineering, Vol. 14, No. 175, Sept., 1942,, p. 164.)
615	4932	G.B. ...	... *Portable Million Volt X-Ray Tube for Industrial Use.* (E. E. Charlton, J. Am. Soc. Nav. Engs., Vol. 54, No. 3, Aug., 1942, pp. 420-437.)
616	*4943	U.S.A.	... *Aircraft Antennæ.* (C. L. Haller, Procs. I.R.E., Vol. 30, No. 8, Aug., 1942, pp. 357-362.)
617	4945	U.S.A.	... *Measuring Methods for Radio Field Intensity, Power Radiated and Noise Field Intensity.* (Technical Committee on Radio Wave Propagation, Procs. I.R.E. Supplement, Part II, Vol. 30, No. 7, July, 1942, pp. 1-16.)
618	4946	U.S.A.	... *Definition of Terms Used in Radio Wave Propagation.* (Technical Committee on Radio Wave Propagation, Procs. I.R.E. Supplement, Part III, Vol. 30, No. 7, July, 1942, pp. 1-8.)
619	4947	U.S.A.	... *Definition of Terms Used in Facsimile Transmission.* (Technical Committee on Facsimile, Procs. I.R.E. Supplement, Part IV, Vol. 30, No. 7, July, 1942, pp. 1-6.)
620	4956	G.B. ...	... *Radiation Energy and Earth Absorption for Dipole Antennæ (Translated from Annalen der Physik,* Vol. 41, No. 1, 1942, pp. 1-36.) (A. Sommerfeld and F. Renner, Wireless Engineer, Vol. 19, No. 227, Aug., 1942, pp. 351-359.)
621	4983	G.B. ...	... *Defraction of Ultra Short Radio Waves.* (J. S. McPetrie, Nature, Vol. 195, No. 3,801, 5/9/42, p. 292.)
622	4993	U.S.A.	... *Electronic Timer (Time Delay Relay).* (I. C. Bechtold, Ind. and Eng. Chem., Vol. 14, No. 5, 15/5/42, pp. 429-430.)
623	4994	U.S.A.	... *Horizontal Polar Pattern Tracer for Directional Broadcast Antennæ.* (F. A. Everest and others, Procs. Inst. Radio Engs., Vol. 30, No. 5, May, 1942, pp. 227-232.)
624	4995	U.S.A.	... *A Mechanical Calculator for Directional Antenna Patterns.* (W. G. Hutton and R. M. Pierce, Procs. Inst. Radio Engs., Vol. 30, No. 5, May, 1942, pp. 233-237.)

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ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
625	4996	U.S.A. ...	*Charts for Determination of the Root Mean Square Value of the Horizontal Radiation Pattern of Two-Element Broadcast Antenna Arrays.* (C. W. Harrison, Procs. Inst. Radio Engs., Vol. 30, No. 5, May, 1942, pp. 237-240.)
626	4997	U.S.A. ...	*The Inclined Rhombic Antenna (Reduces Fading).* (C. W. Harrison, Procs. Inst. Radio Engs., Vol. 30, No. 5, May, 1942, pp. 241-244.)
627	5018	G.B.	*Physical Foundations of Radio (Electrons in Simple Conductors).* (M. Johnson, Wireless World, Vol. 48, No. 9, Sept., 1942, pp. 206-208.)
628	5019	G.B.	*Phase and Frequency Modulation.* (C. Tibbs, Wireless World, Vol. 48, No. 9, Sept., 1942, pp. 210-213.)
629	5020	U.S.S.R. ...	*Russian Morse Code.* (Wireless World, Vol. 48, No. 9, Sept., 1942, p. 213.)
630	5140	G.B.	*Reflexion of X-Rays with Change in Frequency.* (C. V. Raman, Nature, Vol. 152, No. 3,804, 26/9/42, pp. 366-369.)
631	5143	G.B.	*Feedback Amplifiers.* (C. A. A. Wass, Nature, Vol. 152, No. 3,804, 26/9/42, p. 371.)
632	5165	Germany ...	*Testing the Tendency of Electric Contacts to Welds.* (H. E. Linckh and K. Krapf, E.T.Z., Vol. 63, No. 35-36, 10/9/42, pp. 405-409.)
633	5166	Germany ...	*A Simple Electric Current for Operating Electric Motors at Reduced Speed and Appreciable Torque (or Contact Speed at Variable Torque).* (A. Lutjen, E.T.Z., Vol. 63, No. 35-36, 10/9/42, pp. 409-411.)
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ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
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ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
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ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
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684	4829	Italy	... *Ferracuti Producer Gas Generator for Transport Vehicles.* (l'Auto Italiana, Vol. 23, No. 23, 20/8/42, pp. 21-24.)
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693	5151	U.S.A.	... *Ford Tank Engine (Photograph).* (Autom. Ind., Vol. 87, No. 2, 15/7/42, p. 51.)
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