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Ionisation as a Factor in Fluid Mechanics. (F. W. Durand, Kármán Anniversary Volume of Applied Mechanics, 1941, pp. 76-84.) (109/1 U.S.A.)

The factors controlling the behaviour of a fluid in relative motion with solid boundaries have usually been taken as follows:—

(1) The geometry of the solid boundaries.
(2) The surface character of these boundaries.
(3) The density of the fluid.
(4) The viscosity of the fluid.
(5) The velocity of the fluid relative to the boundaries.

The important question here is, however, the mutual force reactions between adjacent unities of the fluid, whether these unities be considered as individual molecules, or as groups or bundles of molecules. In any case we may gain a suitable approach to the present problem by taking the individual molecule as unit of fluid movement.

It does not appear simple to estimate with any degree of assurance the particular direction in which the influence of ionisation should influence these various features of fluid motion. To the extent to which greater intermolecular forces are in play, greater energies will be involved, with presumably greater transfers of such energy and momentum and with correspondingly increased coefficients of drag. It is not easy to see in what direction ionization might affect the break from laminar flow to turbulent flow, or the characteristic that has been called the "grain" of turbulence, or the point of separation from a convex surface such as a sphere—at least until what may be called the mechanics of these characteristics of fluid motion are better understood than at present.

It may be that all of these affects are too small to be of any practical significance, perhaps too small to be measurable or observable with any means now at our disposal. The possibility of such effects and the possibility that they might be observable, perhaps measurable and of some practical significance, seems at least a sufficient reason for some experimental investigation looking toward the furnishing of further light on the question here raised.

To this end it may be suggested that some study is needed of the flow behaviour of highly ionised air about a thin plane and about a sphere, controlled by measurements of neutral air about the same geometrical forms, other conditions the same.

Isotropic Turbulence in Theory and Experiment. (H. L. Dryden, Kármán Anniversary Volume of Applied Mechanics, 1941, pp. 85-102.) (109/2 U.S.A.)

At the 5th International Congress for Applied Mechanics a Turbulence Symposium organised by Prandtl gave much attention to the statistical theory of isotropic turbulence, to which subject von Kármán has made many important contributions. A large part of the general lecture by G. I. Taylor was devoted to a review of theoretical and experimental developments in the study of isotropic turbulence, in the course of which some unpublished experimental results of Hall on the decay of isotropic turbulence behind screens in a wind tunnel were compared with the published results of similar measurements at the National Bureau of Standards. At the Congress von Kármán summarized the main results of his analysis of the correlation theory for the case of isotropic turbulence and also gave some experimental results on the decay of isotropic turbulence behind screens. The experimental results from the three sources, although each self-consistent by many checks, showed rather larger discrepancies, which have not as yet been fully explained.

A slight extension of von Kármán's theory leads to interesting results. However, the existence of discrepancies in the experimental results makes it difficult to distinguish clearly between various theoretical predictions. Further experimental work has thrown some light on the probable causes of the discrepancies although no major experimental programme has been possible. This paper describes these developments.

The discrepancies are discussed in relation to the systematic errors arising from (1) the finite length of the hot wires used for the measurements, (2) the cut-off frequency of the amplifier, and (3) the variation in heating current produced by changes in resistance of the wire associated with the turbulent velocity fluctuations. A part of the discrepancy is believed to arise from the influence of the construction details and surface roughness of the screens and of the turbulence of the airstream in which the screens are placed. Further experimental work will be required to answer many questions that arise.

Fluid Motion Inside Rotating Radial Impellers. (E. Grunagel, V.D.I., Forschungsheft, No. 405, December, 1940, pp. 1-21.) (109/3 Germany.)

Experiments were carried out on a variety of radial impeller forms with cylindrical blades 400-500 mm. in diameter immersed in a water tank and rotated by means of an electric motor. Elaborate precautions were taken to obtain steady flow conditions both at entry and exit (guide vanes), the flow being either towards the centre of the impeller (turbine) or in the reverse direction (pump). The blades just projected above the surface of the water (constant level) and the flow was examined by means of a rotating mirror or photographed by means of a camera rotating with the impeller, the flow line being rendered visible either by sprinkling the surface with Al. powder or introducing coloured filaments below the surface. Special attention was paid to phenomena in the gap between impeller and guide vanes. The experiments covered a large variation of blade angles and flow conditions, including shock at entry. Over 1,000 photographs were taken, of which a representative selection is reproduced. It appears that for the same type of impeller, the flow is much more irregular when pumping than when acting as a turbine. In the former case the rotating channels are only partly filled with true fluid jets, the remainder of the passage being occupied with turbulent eddies. This is especially marked with partial admission but persists also in many cases with full admission (shock free entry). In the case of pumps, the fluid jets generally follow the contour of the blade front if the admission is below normal, but adhere to the back of the blade if the admission is excessive. In case of turbine blades with small exit angles, the flow tends to separate from the blade front and leave the impeller in a more radial direction. Evidently the suction at the trailing edge is insufficient to ensure a further reduction in the velocity moment. In each case regions of excessive turbulence caused axial deviation of the jet and obstructed its free passage. Such obstructions are, however, not only due to separation of the flow (break away of boundary layer). As is well known, theory indicates a velocity gradient at right angles to the flow in the rotating impeller passage, the velocity being least in the neighbourhood of the blade front. Under certain circumstances the flow in these regions should even become negative, i.e. a reversal of flow takes place along the front edge of the blade. We thus have a second cause for obstruction of the free passage of the jet which was confirmed by flow photographs. In the majority of cases, however, no reversal of flow could be observed, the region in question simply becoming turbulent.

Another type of flow reversal occurs with pump impellers at low admission. This is known as surging or pulsating flow and seems to originate in the clearance gap between rotor and diffusor. The disturbance travels along the diffuser at about $\frac{1}{3}$ to $\frac{1}{8}$ rotor speed and in extreme cases the flow reversal may project up to the impeller intake. The total rate of delivery is not necessarily affected by this phenomenon, reduced speeds over one section of the impeller being balanced by excess velocities in others.

The cause of these pulsations is still obscure. The experiments indicate, however, that such flow reversals can be controlled by reducing the number of impeller blades. Rearward curvature of the blades is also beneficial in preventing the pulsations from reaching the rotor intake and causing a serious drop in efficiency.

In the concluding section of his paper, the author attempts to elucidate some of these phenomena theoretically, and it is interesting to note that flow pulsations over the circumference of the impeller can apparently also arise in the case of ideal fluids.

Simple expressions for the turbulent friction between fluid layers at different velocities are also derived which enable the energy transformation in the pump to be followed more closely. It may ultimately be possible to calculate the power consumption and delivery head under partial admission provided more experimental data on the turbulent friction coefficient become available.

A useful bibliography (21 items) covering recent investigations on centrifuge pumps is given.

Some Two-Dimensional Aspects of the Ejector Problem. (J. A. Goff and C. N. Coogan, J. App. Mech., Vol. 9, No. 4, Dec., 1942, pp. 151-154.) (109/4 U.S.A.)

Several investigators have attempted to analyze the performance of the ejector on a one-dimensional basis. Some doubt exists whether such analyses can lead to a rational ejector design because of the questionable validity of certain necessary assumptions. Recently, consideration has been given to the two-dimensional aspects of the problem, and while a rational design has not yet been evolved, the results attained seem to point in the right direction. The theory of turbulent mixing in jets, developed by Tollmien is used as the basis of the study reported in this paper. Tollmien's analysis of the mixing zone produced by a homogeneous air stream issuing into still air of the same pressure and density is reviewed.

On the basis of this theory the ratio α of the mass rates of flow of driven to driving fluid is a numerical constant (.387) and independent of the velocity of the driving fluid, provided the densities of the two fluids are the same.

Making reasonable assumptions, the author extends this theory to include difference of density, and shows that α diminishes from .387 to .25 as the ratio of densities of driving to driven fluids increase from 1 to 2.

Experimental measurements with an apparatus designed to conform as closely as possible with the 2 dimensional boundary conditions of Tollmien, gave a velocity distribution in satisfactory agreement with theory and a value of $\alpha = .38$.

The author suggests that the present theory will ultimately be satisfactory for design, but much additional experimentation will be required.

Theory of Heat Transfer in Smooth and Rough Pipes. (G. D. Mattioli, Forschung, Vol. 11, No. 4, July-August, 1940, pp. 149-158.) (T.M. 1,037.) (109/5 Italy.)

Heat transfer in turbulent flow has been investigated on the basis of moment transfer (Prandtl) or vorticity transfer (Taylor).

The author points out that a large difference exists between molecular and turbulent motions. Whilst the former can be satisfactorily treated on the basis of linear momentum, the units partaking in turbulent motion are so large that both their linear and angular momentum must be considered.

On this basis, the author obtains an expression for the heat transfer in smooth tubes (as a function of Pr and Re numbers) which becomes asymptotic at $Re \rightarrow \infty$ and is in satisfactory agreement with the available experimental data.

The use of this formula is illustrated in a worked-out example for water at a mean temperature of 50°C. flowing through a 3 cm. pipe at 100 cm./sec., wall temperature 100°C. Under these conditions $\alpha = 6{,}120\ k$ cal./m.^{2} in °C.

In the case of rough tubes, the heat transfer coefficient is shown to be a function of kv_*/γ where v_* = so-called friction velocity at wall. k = mean height of roughness elements. Two further empirical constants which appear in the formula cannot as yet be evaluated due to lack of experimental data.

The Performance of a Vaneless Diffusor Fan. (V. Polikosky and M. Nevelson, Reprint No. 224, C.A.H.I., Moscow, 1935.) (R.T.P. Translation T.M. 1,038.) (109/6 U.S.S.R.)

In the case of a centrifugal fan the flow path in the vaneless diffusor depends on the impeller design and operating conditions. Generally speaking, the path should be made as short as possible so as to reduce pressure losses, and for this reason the velocity at the entry to the diffusor should be radial. As is well known, the air on leaving the impeller follows a spiral path in the absence of friction. The author shows that due to friction on the walls of the diffusor, the spiral unrolls at a more rapid rate and the exit angle at the diffusor is increased. It is interesting to note that this increase in the angle α is directly proportional to the product of the resistance coefficient λ and the radius.

Assuming a value $\lambda = 0.05$ for smooth surfaces, the author shows, by means of a worked out example, how to determine the static pressure at the diffusor exit on the assumption that—

1. The flow fills the entire exit cross-section of the impeller.
2. The diffusor is of constant width and equal to that of the impeller.

The results are in very satisfactory agreement with experiments on a particular fan, the difference between calculated and observed static head being less than 1 mm. of water for static pressure between 78 and 50 mm. corresponding to flow rates ranging from 300 to 700 m.^{3}/h. In this case the loss in head due to friction in the vaneless diffusor amounts to 18.2 mm. at 300 m.^{3}/h. and 10.7 mm. at 700 m.^{3}/h. respectively.

The advantages of the vaneless diffusor are its simplicity and the fact its efficiency is reasonable over a large working range. Its main disadvantage is the relatively large space required. In all cases, therefore, where compactness is a deciding factor, vanes must be employed. Such vaned diffusors, besides being less bulky, will generally have a slightly higher efficiency when operating under designed conditions. For flow rates departing markedly from the normal, however, the shock and separation losses at the blades render such diffusors less efficient than the vaneless type.

In conclusion, the author extends his method to cover the case of vaneless diffusors for axial flow fans and, in a further worked-out example, gives calculated values for the static head. Comparison with experimental results is again satisfactory, although the agreement is not quite as good as for the centrifugal case.

In conclusion, it should be noted that the method of calculation adopted is largely based on that given by Pfleiderer in his standard text book on Fans in 1927. The author has, however, simplified the more general problem dealt with by Pfleiderer and reduced the method of calculation to a form which will appeal to the practical designer.

Pressure Distribution in Non-Uniform Two-Dimensional Flow. (M. Schwabe, Ing.-Archiv., Vol. 6, No. 1, Feb., 1935.) (T.M. 1,039, R.T.P. Translation No. 250.) (109/7 Germany.)

In an attempt to follow the time rate of change of the processes in turbulent flows by quantitative measurements the measurement of the pressure is often beset with insuperable difficulties for the reason that the speeds, and hence the pressures to be measured, are often very small. On the other hand, the measurement of very small pressures requires, at least, considerable time, so that the follow-up of periodically varying processes is practically impossible.

In order to obviate these difficulties a method, suggested by Prof. Prandtl, has been developed by which the pressure distribution is simply determined from the photographic flow picture. The two-dimensional flow past a circular cylinder is made visible on the surface of water by scattered particles and recorded under long exposure by a moving picture camera. The velocity of flow is deduced from the path lengths of the particles, the radius of curvature of the paths is defined, the pressure along a streamline is determined according to Bernoulli's general formula $(p=p_o-\frac{1}{2}\rho w^2-\rho\partial\Phi/\partial t)$, and transverse to the streamlines according to the centrifugal force formula $(p=p_0+\rho\int v^2/rds')$. The pressure distribution formulas for different stages of development of the vortex pair and for one state of the vortex street is indicated, the pressure field determined, the pressure drop behind the cylinder analysed and the variation of the pressure drag coefficient with respect to time demonstrated. It reaches a value about twice as high as in the steady state. The asymmetrical pressure distribution on the cylinder is demonstrated for one stage of development of the vortex street and the force traverse to the flow direction defined; it amounts to more than 40 per cent. of the drag in this instance.

In the theoretical treatment the customary potential flow is superposed by a source-sink flow, the potential of which is secured by series development, from which the velocity components are deduced. In the pressure formula $p_o=\frac{1}{2}\rho w^2+p+\rho\partial\Phi/\partial t$ the time variable $f(t)/a$ and its derivation are solved from the recorded motion of the free stagnation point.

A comparison of theory and experiment indicates good agreement in the streamline pattern. The approximation of the theoretical to the experimental pressure distribution on the zero streamline for an early stage of development of the vortex pair is also satisfactory.

Aileron Effectiveness at High Flying Speeds. (W. Wirz, Flugwehr und Technik, Vol. 4, No. 5 and 6, 1942, pp. 117-124 and 146-155.) (109/8 Switzerland.)

Aileron effectiveness can be defined in a variety of ways of which the simplest is the final angular velocity of steady roll associated with a given aileron deflection. Of greater practical importance is the angular acceleration and subsequent response immediately following on a sudden deflection of the aileron by a given amount as arises for example when the pilot initiates a sudden turn.

The author shows that the general problem can be simplified by the introduction of two moment coefficients derived as follows:—

M_Q = rolling moment at unit dynamic pressure and 1° deflection of the aileron due to change in lift distribution.

M_R = *ditto* due to a linear wing twist along the span and reaching unit value at the tip. (This twist may be either elastic or aerodynamic.)

Both these coefficients are constant for a given wing-aileron combination and their values have been calculated by the author for a range of designs from the change in lift distribution, the Pearson tables (N.A.C.A. Rept. No. 585) being extended for this purpose by making use of the method described by Multhopp (L.F.F., Vol. 15, 1938). For a normal fighter aircraft $M_Q/M_R \sim 5 \times 10^{-3}$.

Taking the simplest case of steady roll, the angular velocity of rotation finally set up must be such that the moment due to reduction of incidence brought about by rotation and wing twist balances the aileron control moment.

Putting

q = dynamic head.

ω = steady angular velocity.

v = forward speed.

b = span.

ϕ_E = aerodynamic or elastic wing twist at the tip (produced by roll or aerodynamic moment, *i.e.*, shift of c.p.).

β = aileron deflection,

we have

$$q\beta M_Q = qM_R\,(b\omega/2v + \phi_E) \quad \quad (1)$$

it being assumed that the actual moments vary directly as $q\beta$ and $q\phi_E$ respectively.

Now

$$\phi_E = q\beta\phi$$

where ϕ = flexibility of wing under aileron action.

We then obtain finally

$$\omega = (2v\beta/b)\,[M_Q/M_R - q\phi] \quad \quad (2)$$

This at once gives the critical dynamic head (zero angular velocity) as

$$q_{\text{crit}} = (M_Q/M_R) \times (1/\phi)$$

Beyond this speed we have reversal of aileron effect, the elastic deformation $q\phi$ becoming the controlling factor.

Compressibility effects can be allowed for by putting

$$q = \tfrac{1}{2}\rho v^2\,[1 + \tfrac{1}{2}M^2]$$

where M = Mach number.

This so-called Prandtl rule applies only up to $M = .6$. Over this region $M = .6 - .7$ some experimental data for the compressibility effect are available.

Beyond this limit the lift decreases very rapidly. It should be emphasised however that such data only apply to smooth wing contours and that an earlier collapse of this lift has to be reckoned with when ailerons are fitted (compression shock at slot).

Using the above equations, the author has calculated the velocity of steady roll for a standard fighter wing at various forward speeds for a 10° deflection of the aileron.

If the wing were completely rigid, ω would increase directly as v, varying from .4 to 1.8 radius/sec. as v increases from 50 to 225 m./sec. In practice, due to flexibility of the wing, ω reaches a maximum value of only .7 radian per sec. at 125 m./sec. After this, it rapidly diminishes and becomes negative at 225 m./sec. (−.055 radians/sec.), the critical q value being reached at about 220 m./sec.

Neglecting compressibility effects, the critical speed would be reached at 250 m./sec. The above equations can obviously also be utilised to calculate the aileron deflection to obtain a certain rolling speed. Practical considerations (breakaway of the flow and magnitude of control force required) limit these deflections to about $\pm 20°$ at 100 m./sec. and $\pm 10°$ at 225 m./sec. ($\simeq$ 800 km./h. or 500 m.p.h.).

The author has also calculated the variation in angular velocity of roll during a nose dive from rest at an altitude of 6,000 m. With rigid wings, an angular velocity of about 1.75 radian per sec. would be reached at 2,000 m. With a wing of standard flexibility, however, aileron reversal would take place at just about this altitude ($\omega = 0$). Reducing wing flexibility to half would reproduce the original rate of turn, but in the opposite direction, reversal having taken place already at about 4,000 m.

Whilst the actual position of the elastic in relation to the aerodynamic axis has but little effect on these results (the wing twist due to lift distribution being relatively small in the steady state), matters are very different if we investigate the accelerated motion following sudden aileron operation. In this case, due to the relatively large lift loading, a rearward displacement of the elastic axis from the original 30 per cent to 45° chord position will raise q_{crit} by nearly 100 per cent. for the same wing flexibility (aerodynamic axis at 24 per cent. chord). If the elastic axis could be displaced to 69 per cent. of the chord, the wing would act as an apparently rigid structure under these conditions ($q_{crit} \rightarrow \infty$). This is however not considered practicable from the point of view of weight.

In the examples considered above, the elasticity of the wing reduced the effectiveness of the aileron, *i.e.*, the rearward travel of the c.p. accompanying the aileron deflection twists the wing so as to reduce the increase in lift normally associated with aileron operation. It is obvious that if the elastic deflection could be made to assist the required rolling moment, a very considerable decrease in the value of β for a given ω would result. Thus at 200 m./sec. the normal fighter previously considered will require $\beta \sim 10°$ for an angular velocity of .225 radians/sec. This is reduced to about half if the sign of ϕ_E in equation (1) above could be reversed.

Schemes for rendering this possible are discussed by the author. It is interesting to note that Messerschmitt has taken out a patent for producing the rolling moment by ejection of air over certain regions of the wing. By continuing suction and ejection in a suitable manner, it is possible to produce a wing twist in the required direction.

As an alternative, leading edge flaps are discussed. These, however, will have a deleterious effect on the boundary layer of the main wing and thus lead to considerable increase in drag.

In conclusion, the author points out the extreme importance of using thin wing sections for high speed flight so as to delay the occurrence of the shock wave.

In order to obtain sufficient stiffness, it may be necessary to adapt a braced wing construction.

The Determination of Fuselage Moments. (C. E. Pappas, S.A.E. Preprint War Engineering Prod. Meeting, Jan. 11-15, 1943.) (109/9 U.S.A.)

The purpose of this paper is to present theoretical coefficients of additional apparent mass for an ellipsoid of three unequal axes and to indicate the change in the theoretical coefficients when boundary layer, interference and turbulence effects are considered. In order to determine the effect of a viscous, incompressible fluid on the additional apparent mass coefficients, wind tunnel tests on circular fuselages alone and in combination with a wing were used to determine the extent of the variation in the theoretical coefficients.

Pitching and yawing moments can be readily determined for circular fuselages alone and in addition the change in fuselage moments resulting from the interference effects of a wing can be found from the figures presented in the main body of the paper.

An attempt has been made to give the necessary theory associated with the concept of additional apparent mass so that the reader may understand better the actual variation of moment of a body moving in a viscous fluid in terms of the mass coefficients.

Elimination of Unnecessary Weight in Aircraft. (M. Boe, Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 154-158.) (109/10 U.S.A.)

At the moment weight control is practised to an effective degree on only that part of the aircraft which is designed and built by the aircraft manufacturer. That means that only about 40 per cent of the gross weight (i.e. the airframe proper) is really efficient, this result being achieved at considerable trouble and expense by the weight control group. Extensive re-designs are often found necessary and advisable rather than accept the penalty imposed by unnecessary weight. The remainder of the gross weight is made up of approximately 20 per cent disposable load and 40 per cent equipment.

The author points out that with rare exceptions, weight consciousness has not yet percolated through to those responsible for equipment design and that considerable improvements should be possible in this group which in total weight approximates to that of the aircraft structure itself. In this connection it is pointed out that examination of the equipment of the German Me 110 has revealed that German instruments and small accessories are approximately 10-15 per cent lighter, armament equipment up to 50 per cent lighter, and the engines 9.5 per cent lighter (on the basis of pounds per take-off horse-power) than the equivalent standard American equipment. It is interesting to note that every lb. of equipment requires on the average ½ lb. of supporting structure, so that a saving in equipment weight is doubly beneficial. Even if, however, the old structure is retained, an 8 per cent. reduction in equipment weight of a 7,250 lb. fighter (gross) will enable it to carry an additional 230 lb. of load.

This saving could be used either:—

(1) To increase range by 25 per cent.

(2) To increase fire power by 750 rounds.

(3) Addition of 17 sq. ft. of armour protection.

Alternatively, the addition load rendered available could be utilised in fitting a more powerful engine and thus increase the performance at the expense of the range.

Under normal conditions, a 10 per cent increase in the power output of a standard fighter entails an increase of about 3.5 per cent of the gross weight of the aircraft, with the result that the increase in performance is relatively slight. This is shown in the following table:—

	Original	+10 per cent. power (same weight)	+3.5 per cent. weight	New performance
Speed	350	+12	−2	360
Rate of climb (ft./min.) ...	2,480	+500	−310	2,670
Ceiling (ft.)	31,600	+5,060	−3,210	33,450
Range (M)	1,000	—	−15	985
Landing speed (m.p.h.) ...	80	—	+1.5	81.5
Take-off distance (ft.) over 50 ft. obstacle ...	1,800	−200	+140	1,740

It will be noted that the increase in weight is specially detrimental in wiping out a large proportion of the increase in rate of climb and ceiling to be expected from the power increase.

If, therefore, the gross weight of the aircraft could be decreased by only 3.5 per cent by careful design of equipment or airframe, the rate of climb could be increased by another 300 feet/min., and the ceiling raised by over 3,000 feet.

Whilst it has been customary up to now to increase performance by fitting ever bigger and heavier engines, the alternative of weight reduction seems to have been lost sight of somehow.

The Mitsubishi OO fighter is an interesting example of what can be done with relatively small power plants if the weight of the aircraft is sufficiently reduced.

Flight Research and Routine Testing at Various German Aircraft Works. (C. Cornelius and others, Luftwelt, Vol. 10, No. 3, 15/1/43, pp. 22-23.) (109/12 Germany.)

The article covers notes ranging from flight research proper to works acceptance tests after which the aircraft is passed to the front.

The Junkers firm appears to have specialised in research, their flight research section having been in existence now for nearly 20 years. Special aircraft were built to test such items as transmission shafts for propeller drives and single wheel landing gears (in this case two lateral skids are fitted below the wing).

The standard transport Ju. 52 has also been modified to act as a flying laboratory for power plant investigations and has even been fitted with an additional wing and water spray for icing experiments.

It is interesting to note that investigations on dive bombing were carried out as long ago as 1928, using a Junkers K47 aircraft fitted with a very makeshift bomb release gear below the wing. A year earlier a pressure cabin aircraft was successfully flown at an altitude of 13,000 m.

The article gives some details of the acceptance tests on the Ju. 88 dive bomber. As is to be expected in an aircraft of this type, hardly any two samples leaving the assembly track behave alike during the first dive, and careful retrimming is generally required. The proper functioning of the diving brakes and automatic pull-out device has to be assured, and instrument readings supervised. It speaks highly for the skill of the chief test pilot of the works to have carried out over 2,000 dives without a single accident.

The development work carried out by the Messerschmitt firm on the Me 109 fighter seems to have been very lengthy. It is emphasised that the Luftwaffe fighter pilot does not generally receive as long or thorough a training as is given to the bomber pilot, and it is therefore necessary to make the fighter aircraft as simple to handle as possible. An adequate factor of safety must be retained even if mistakes of control are made such as are likely to arise in aerial combat. In earlier models several cases of wing fracture and severe tail flutter arose which have now been cured. The tail surface itself has been modified many times before adequate control was assured. It is stated that this machine now recovers automatically from a stall. The utmost attention was paid to securing the highest possible speed, and dozens of flight tests were carried out on the shape of the cockpit alone so as to combine minimum drag with best vision for the pilot.

Some interesting notes on routine testing the Do. 215 and a maximum speed test on the He. 111 conclude the article.

The state now seems to have been reached where the human element rather than the machine is determining the performance limit. Reference is made to a fatal accident brought about by sudden altitude collapse of the pilot at an altitude of 9,000 m., although the oxygen plant was functioning properly. It appears that the attack was accompanied by cramp in the legs, with the result that the pilot put the aircraft into a steep spiral dive. The aircraft disintegrated but the observer managed to escape by parachute.

Escher-Wyss Variable Pitch Airscrew Adapted for Braking Landing Run. (Inter. Avia., No. 848-849, 21/12/42, pp. 11-12.) (109/13 Switzerland.)

The well known Escher-Wyss variable pitch propeller has now been modified to allow braking during the landing run. With the employment of a rate of pitch change of about 8 deg./sec. and the extension of the speed control range from 100 per cent to 40 per cent. of the normal speed, it was possible to relieve the pilot entirely from the supervision of the airscrew even in flying manœuvres which place the greatest demands on the pitch control, for example, the sudden initiation of a dive at any engine output. For the tactical employment of aircraft types at present in use as well as for the increase in the speed of future types, the landing brake has opened up new possibilities. According to official measurements, the following results have been obtained with a single-engined fighter equipped with the Escher-Wyss airscrew: with the wheel brakes alone, the landing run amounted to 61 per cent., with the airscrew brake alone to 28 per cent., and with the simultaneous operation of wheel and airscrew brakes to 17 per cent. of the normal landing run without brake at all. The braking of the landing run with the aid of the airscrew became possible only after the designers had succeeded in increasing the speed of the airscrew pitch to such an extent as definitely to eliminate the engine racing hazard. The Escher-Wyss airscrew, which is now in quantity production, has a pitch angle change rate of more than 20 deg./sec. for changing the blades from the normal to the braking position and vice-versa. Since, as is natural, the greatest importance has to be attached to maximum operational safety of the installation, a combined panel has been adopted to simplify the operation of the airscrew; in order to avoid all errors in operation, the panel contains a single lever. By actuating this single lever the following functions can be carried out: Control of the engine output and selection of the airscrew speed constantly to be maintained; application of the short-period emergency output; reversing the airscrew blades to the braking position; control of the engine with the blades in the negative position and the latter's reverse to the normal position. The weight of the entire additional installation required for the braking of the landing run amounts to about 26½ lb. The practical design of a safe controllable pitch airscrew capable of being used for braking the landing run is bound to meet with interest everywhere where modern, highly loaded aeroplanes featuring high landing speeds must be operated from airfields of limited dimensions. In particular, this type of brake might make it possible to equip aircraft carriers with modern aeroplanes of high landing speeds. On the other hand, the normal landing speed can be increased considerably beyond the limit possible to-day; which in turn would allow a corresponding increase to be made in the maximum speed of the aircraft without entailing the disadvantage of excessively long landing runs. The experiences gathered so far are limited to the braking of single-engined tractor aeroplanes with conventional landing gears: the employment of the airscrew brake in twin-engined aeroplanes or types equipped with tricycle landing gears is unlikely to meet with insuperable difficulties.

Bearings and Bearing Corrosion. (L. Raymond, J.S.A.E., Vol. 50, No. 12, Dec., 1942, pp. 533-537.) (109/14 U.S.A.)

"Babbitt" bearings have been accepted generally as the preferred bearing metal for by far the great majority of bearing applications due to their low friction characteristics, conformability, embeddability, bonding characteristics, and corrosion resistance. However, under conditions of increased bearing loads and higher oil temperatures, babbitt bearings of conventional design are susceptible to fatigue failure, resulting in breaking out of the bearing metal. In such cases, protection has been sought in bearing metals with improved high-temperature strength characteristics, the bearing alloys resorted to being copper-lead, cadmium-silver, cadmium-nickel, and hardened high lead (98 per cent. lead), as well as other high-lead alloys. The most widely used of these newer types of precision bearings has been the copper-lead. A typical approximate analysis of this bearing metal is 65 per cent. copper, 35 per cent. lead.

Unfortunately such bearings, unlike babbitts are corroded by the products of oil oxidation, the lead being dissolved and the remaining copper shell breaking away from the backing.

Data presented in this paper indicate the bearing corrosion problem to be fairly straightforward in that:—

1. Corrosion of copper-lead bearings specifically can be reduced by improving the fineness of the microstructure;

2. All bearings appear to be aided greatly by reduction of operating temperatures; and

3. Treating the corrodible bearings by special processes, such as indium plating, greatly increases their corrosion resistance.

However, anomalies are cited which indicate that bearing and oil combinations do not behave in relatively the same manner in all engines.

Different types of corrosion may occur in different engines or bearings, or a mechanical or assembly defect, rather than a corrosive oil, may be responsible for bearing failure. The appearance of a bearing frequently fails to indicate the reason for its failure, and more thorough investigation must be made.

In his conclusion the author emphasizes that the field of bearing corrosion still has large unexplored areas.

Aircraft Engine Radio Shielding. (D. W. Randolph, J.S.A.E., Vol. 50, No. 12, Dec., 1942, pp. 538-541.) (109/15 U.S.A.)

Spark ignition engines require a heavy and troublesome ignition harness for eliminating disturbances in the radio systems for communication and navigation used on the aeroplane. The disturbance produced by the high-voltage electrical system is distributed over a wide range of frequency and covers all the frequencies used in radio both of the ultra-high and moderately-high frequency ranges. The interference in moderately-high wave lengths may arise from voltage regulators, generators, and other electrical apparatus, as well as in the ignition system alone. In the short and ultra-short wave regions the ignition system is the worst offender. The disturbances that arise are very severe in the high-frequency ranges and will completely prevent radio communication unless they are eliminated. The use of damping resistors in the high-voltage circuits is only a partial solution to the problem and is of little value with high-sensitivity sets. To confine the field caused by the oscillations in the ignition circuit, all of the high-tension wiring, and the low-tension wiring associated with it is enclosed in a continuous metal shield which makes good contact with the engine. How to secure a structure that will shield the high-tension circuits while providing good insulation under severe conditions of vibration, temperature, altitude, and exposure, is the problem.

As regards shielding, the resistance across a joint or at a grounding point must not exceed .002 ohm. This will require specially machined bearing surfaces of adequate area. Anodized surface and non-metallic gaskets must be eliminated. Moreover the grounding point must be closely spaced (9 to 18 inches apart).

The next difficulty is to supply adequate electrical insulation inside the shield the insulator being exposed to the combined effect of moisture, corona discharge and acid decomposition products of the air. One method of overcoming the difficulty is to ventilate the harness with dry air. This, although successful on civil aircraft, is too cumbersome on military machines. In their case, air and moisture are excluded by embedding the individual conductors in a special compound which completely fills the harness. A small opening is provided near the spark plug to enable any gas leaking past the electrodes to escape into the air. Methods of testing insulation resistance of the harness are described and the beneficial effects of fitting a damping resistance at the spark plug are discussed (reduction of electrode erosion).

An interesting recent development consists in a low voltage current distribution to individual spark coils in or near the spark plugs. This obviates the considerable lengths of high voltage cables in the standard equipment and facilitates shielding.

Methods of Stress Determination in Engine Parts. (C. Lipson, S.A.E. Preprint, War Engineering Production Meeting, Jan. 11-15, 1943.) (109/16 U.S.A.)

Development of experimental stress analysis has now reached the point where it has become a practical tool in the hands of an engineer or a designer. Four methods are available and in the utilization of these methods there are two principal means of procedure: static tests, using simulated service loading, and dynamic tests, under actual service conditions.

Static load testing is usually the most convenient and generally favoured because the problem of instrumentation is greatly simplified. The penalty for this simplification lies in the fact that the investigation is often conducted on the basis of loads which may or may not correspond to operating conditions. Dynamic loads testing demands more complex instrumentation and so far it is less thoroughly developed. A comprehensive stress analysis investigation requires both phases of testing: dynamic tests should establish the mode and magnitude of operating loads while static measurements will determine the corresponding stresses. Refinements of instrumentation and technique are necessary to promote greater accuracy and speed but this particular phase of experimental stress analysis is developing in a satisfactory manner.

Essential information is still lacking for the following problems:—

1. The influence of size when translating fatigue data from small specimens to larger parts.
2. Evaluation of the effect of combined stresses in terms of the fatigue data derived from rotating beam testing.
3. The influence of preload and operating stress range on the endurance life.
4. The effect of stress-raisers on the mechanical properties of materials.
5. The effect of manufacturing processes on the endurance life.
6. The mechanical properties at elevated temperatures.

The author attempts to show that stress analysis, even in its as yet partially developed stage, can provide essential information involving strength of materials.

The Influence of Lubricating Oil Viscosity on Cylinder Wear. (H. A. Everett, S.A.E. Preprint, War Engineering Prod. Meeting, Jan. 11-15, 1943.) (109/17 U.S.A.)

Wear of piston rings and cylinder walls is the greatest single item of wear in the modern automotive internal combustion engine. While under normal service conditions such mechanical wear is slight, the process is continuous and is materially influenced by such factors as (a) operative conditions, (b) characteristics of fuels and lubricants, and (c) the composition and surface condition of the parts themselves. It has been shown that different lubricating oils have a marked influence on cylinder and ring wear, even though scuffing or seizure does not develop, and these tests were undertaken with the purpose of determining the influence on wear of one single property of the lubricating oil, its viscosity.

Special precautions were taken to eliminate all other variables and the range of viscosities covered was as extensive as compatible with this restriction. Tests were made with six oils ranging from a viscosity lighter than SAE 10 to a viscosity greater than SAE 70.

Each oil was tested in a battery of six single-cylinder engines operating under conditions artificially controlled to closely simulate moderately heavy duty road operation of automobile passenger car engines.

From one result it appears that the cylinder and ring wear in well-lubricated engines decreases progressively with increasing viscosity throughout the range tested, the wear being almost inversely proportional to the kinematic viscosity. This is in harmony with our current understanding of fluid film lubrication as the film thickness for a given loading is probably nearly proportional to the kinematic viscosity and certainly wear is an inverse function of the film thickness. An accurate determination of the character of the lubrication, i.e. whether of fluid film or boundary type, cannot be made but the small amount of wear, the smooth surfaces, and the light loading due to ring pressures indicate that through the majority of the reciprocating cycle fluid film action was predominant.

New Methods for the Evaluation and Recording of Piston Skirt Deposits. (H. R. Luck and others, S.A.E. Preprint No. 7, National Fuels and Lubricants Meeting, Oct. 22-23, 1942.) (109/18 U.S.A.)

Although a lubricating oil or additive may originate in the chemical laboratory and be subjected to many physical and chemical laboratory tests, the final proof of its suitability comes as a result of engine tests under conditions simulating those that the oil must meet in service. These tests, to be of value, must be carefully controlled and the result accurately evaluated and recorded in a form that is reproducible.

This task is especially difficult when piston skirt deposits are to be considered. The bare statement that piston *A* has more deposits than piston *B* is not sufficient. Quantitative results must be available: first, when a given engine test is developed, so as to determine the degree of reproducibility attained by the test, and second, when comparisons are to be made between different lubricants. Added advantages of quantitative measurements are that they make possible comparisons between separate laboratories and facilitate the standardization of test procedures.

Specifications for such measurements should include:—

1. Numerical evaluation of piston skirt deposits that could be reproduced by different observers even though not skilled in the procedure used.

2. A method of evaluation that uses commercially available equipment in order that any laboratory could adopt the procedure with minimum of trouble.

3. An objective system of measurement, so that the method will not be subject to major revision by each individual observer.

In addition to the problem of measuring the deposit on the piston, there is the problem of photographing the form, location and intensity of these deposits in order to keep a record available without the need of preservation of all used pistons. Photography of a cylindrical object is not easy, if all direct light reflection from the surface is to be avoided and photography of a piston surface to show the entire circumference on one print with uniform lighting that accents the carbon deposits and without distortion of portions of that surface is desirable.

It is the purpose of this paper to describe two devices now in use in the authors' laboratory that greatly assist in the solution of these problems.

Damping Characteristics of Some Mg. and Al. Alloys Over the Range of −50° to 280°C. (L. R. Stanton and F. C. Thompson, J. Inst. Metals, Vol. 10, No. 1, Jan., 1943, pp. 29-42.) (109/19 U.S.A.)

The damping capacities (P) of some magnesium alloys have been measured at temperatures varying from about 50° to 280°C., and, for comparison, the damping capacities of two typical aluminium alloys have also been determined. The conclusions are: (1) In general the magnesium alloys have a distinctly higher value of P than have the aluminium-base alloys, and, for equal fibre stresses, both materials have much greater damping capacities than has steel. (2) Both sets of alloys show a minimum in their damping characteristics at a temperature just below the normal room temperature, the damping increasing as the temperature is either raised or decreased. With the exception of the magnesium alloy Elektron AZ855, the properties of which are abnormal in this respect, the damping capacity of the alloys decreases as the fibre stress is reduced.

Magnetic Method for Testing the State of Heat Treatment for Fabricated Products. (H. Lange, Kaiser Wilhelm Inst. fur Eisenf., Vol. 21, 1939, No. 6, pp. 105-113.) (109/23 Germany.)

Non-destructive testing by magnetic methods can be of two types. The first deals with the determination of flaws by irregularities in the stray magnetic field, making use either of a magnetic powder applied to the surface or by direct measurement of the field strength in the immediate neighbourhood of the specimen.

The second type of testing attempts to obtain data on constitution, strength or hardness of the specimen by purely magnetic means. It may thus serve for routine testing as to nature of material and effectiveness of heat treatment. Whilst the magnetic method of flaw detection has been developed very considerably of late and is extensively used in industry, the correlation of mechanical strength with magnetic qualities is still very much in the experimental stage. The author has carried out investigations on this subject making use of the Siemens Ferrometer (see Z. Techn. Physik, Vol. 15 (1934), pp. 469/473). This instrument enables the determination of the differences in magnetic inductions of two samples at the same field strength as a function of the latter. For this purpose the two samples (standard and test) are magnetised by identical coils placed in series and supplied with alternating current. Secondary coils are arranged in opposition and the voltage generated is a measure of the difference in magnetic induction between the two specimens. The ferrometer enables a record of this difference to be traced by a special oscillograph on a field strength basis. It was hoped that the resultant curves would be sufficiently characteristic to differentiate between steel specimens of different constitution and heat treatment. For this purpose four characteristic steels of gradually increasing carbon content (.09 to .45 per cent.) were chosen and subjected to different heat treatments. The author concluded that the Siemens Ferrometer is not suited for determination of constitution (so-called magnetic analysis) since it cannot differentiate between purely constitutional effects and those due to heat treatment. It appears that such constitutional analyses are better carried out by constant current methods working in the saturation range (see same journal, Vol. 20, 1938, pp. 239/246). If, however, the tests are confined to steels of similar constitution but subjected to different heat treatment, a satisfactory correlation between Rockwell hardness of the tempered specimens and ferrometer readings were obtained, provided the maximum field strength was kept sufficiently low (hysteresis loop deteriorates into the so-called Rayleigh loop consisting of two intersecting parabolas).

Under these conditions, the results show that either the remanent or the maximum induction are a measure of the hardness of the specimen. It is therefore not necessary to trace out the complete loop for this correlation and the author describes a simple circuit in which a simple soft iron amperemeter and a thermo millivoltmeter replaces the ferrometer oscillograph.

The two samples undergoing comparison are provided with primary and secondary windings, of which the primary is fed with alternating current as before. Since the mean value of the secondary voltage is a direct measure of the maximum induction, and since distribution can be kept small by working with low excitation, the deflection of the thermo millivoltmeter will give directly the difference in maximum induction of the two specimens for the field strength corresponding to the soft iron amperemeter reading.

The apparatus is easy to use and results show that it can satisfactorily sort out bolts of the same material but different hardness. Similarly it is possible to follow the tempering process magnetically.

A New Double Joke Electromagnet for the Testing of Magnet Steels. (F. Stablein and R. Steinitz, Tech. Mitteil. Krupp, Vol. 3, 1935, pp. 129-135.) (109/24 Germany.)

After a review of available methods for testing the magnetic qualities of nickel aluminium steels of high coercivity and a discussion of their defects, the author describes a novel magnet tester specially suited for routine testing. Such a control is necessary since these magnets are supplied in the cast state and are very sensitive in their magnetic qualities to the rate of cooling in the mould. Investigations carried out on specially cast samples of different dimensions to the ultimate product are thus apt to give misleading results and control tests on the actual magnets are necessary.

The apparatus devised by the author consists of a double joke electromagnet, each half resembling the letter E. This is wound with four coils in series under exact conditions of symmetry with the result that in the absence of magnetic materials in the air gaps, the field strength is zero in the central gap. If, however, one of the outer gaps is bridged with a magnetic sample, the field strength in the central gap is proportional to the magnetisation (B-H) of the sample.

This magnetisation is recorded directly by the deflection of a moving coil placed in the central gap and carrying a small current. The magnitude of this current is so chosen that the deflection of the coil is directly proportional to the induction. The value required depends on the length and cross-section of the test specimen as well as on the dimensions of the electromagnet and can be obtained from a series of calibration curves utilising known materials. The field strength H producing the magnetisation of the sample is measured directly from the voltage generated by a small rotating coil placed in close proximity to the sample.

Results obtained with this instrument are in good agreement with those obtained by the more complicated and lengthy ballistic methods. Routine testing as regards remanence and coercivity of the sample can be carried out quickly over the range $\pm$8,000 gauss and $\pm$2,000 oersted respectively. As pointed out by the author the instrument could be easily modified to record the B-H/H curve automatically on an oscillograph by providing a second rotating coil in the central air gap.

New Apparatus for the Non-Destructive Testing of Materials. (Schweizerische Technische Zeitschrift, 1942, p. 562.) (109/25 Germany.)

In the X-ray examination of materials it has been usual to make use of a fluorescent screen. As an alternative, the ionisation of the air after passage of the X or γ rays through the specimen can be measured directly by means of a Geiger counter. The latter consists essentially of a condenser contained in a lead tube filled with air at a reduced pressure (.1 atmos.) and connected to a potential difference just below the normal breakdown value.

A slight initial ionisation of the air in the tube brought about by entry of radiation through a light metal window is rapidly increased by collision and a considerable charge is transmitted to the central electrode which is connected to a string electrometer. After every deflection of this instrument, the condenser can discharge through a high resistance shunt and the number of deflections per second is thus a measure of the degree of ionisation to which the counter is exposed.

This ionisation will in turn depend on the weakening effect of the interposed specimen (nature of material and size). By calibrating the instrument with a standard specimen, departure due to internal faults can be found and in this manner cavities in steel at a distance of 30 cm. from the surface have been detected. The instrument is also very useful in examining steel blanks for gear wheels and a special counter (14 mm. diameter) can be inserted inside tubes for rapid testing of consistency of wall structures. It should be noted that the instrument does not only show up flaws but also any differences in wall thickness due to corrosion, etc. This is especially useful in the case of tank or boiler installations. Other interesting applications of the counter are in connection with liquid level gauges (weakening effect of liquid on radiation) and automatic control of the powder core of match fuses. In this case the fuse is made to travel past the instrument at a constant rate ($\sim$80 cm./sec.). Any break of the order of 5 mm. in the core is at once recorded and the motion automatically stopped. The fault is then examined visually on the X-ray screen.

On the Elastic Distortion of a Cylindrical Hole by a Localised Hydrostatic Pressure. (H. M. Westergaard, Kármán Anniversary Volume, 1941, pp. 154-161.) (109/26 U.S.A.)

A hydrostatic pressure applied only within a small part of the length of a cylindrical hole extending through a large elastic solid will create a greatest radial displacement and a greatest circumferential tension that are smaller than if the pressure were applied over the entire length of the hole. The difference may be significant when high pressures are contemplated. The analysis presented is approximate. A first approximation and an improved second approximation give numerical results that are quite close together. This will appear from the following table.

Values of the ratio of the greatest displacement P_0, produced by a hydrostatic pressure in the space $Z^2 < C^2$, to the displacement P_m, produced by the same pressure applied over the entire length of the hole C, 'a' being the radius of the hole.

C/A	P_0/P_m by the first approximation	P_0/P_m by the second approximation
0.25	0.557	0.537
0.50	0.806	0.770

This close agreement and considerations of the singularities at the ends of the space under pressure are evidence that the procedure is adequate for some practical applications.

On the Minimum Buckling Load for Spherical Shells. (K. I. Friedrichs, Kármán Anniversary Volume of Applied Mechanics, 1941, pp. 258-272.) (109/27 U.S.A.)

Von Kármán and Tsien have recently introduced a basic new notion into the theory of elasticity; the "minimum buckling load." If a spherical shell of constant thickness is subjected to a uniformly distributed normal load p, a uniform contraction will result. This contracted state will be stable until a critical value of p, the "Euler" load p_E is reached. Experiments, however, show that the shell will already buckle out when the load p is only a fraction of the Euler load p_E. Von Kármán and Tsien have explained this phenomenon. They have discovered that for values of p considerably below p_E quite different stable states of equilibrium exist, which could be revealed only by abandoning the classical linearisation of the problem. The minimum of such values of p is the "minimum buckling load," p_K; if p exceeds p_K the chances are great that buckling will occur.

In determining the minimum buckling load von Kármán and Tsien make various simplifying assumptions which have a rather strong influence, as will be shown. The aim of the author is to investigate the influence of such assumptions and, after removing some of them, to propose a somewhat different procedure for obtaining the buckling load.

A first assumption of von Kármán and Tsien is that the shape of the buckled shell differs noticeably from a sphere only in the neighbourhood of one point.

They then introduce a simplification by assuming that the shell buckles only inside a certain segment, at the edge of which it is clamped. In this paper, the first assumption is formulated in a different manner, it is considered to refer to a boundary layer phenomenon, and this is made the basis of an asymptotic treatment. Thus the advantage is gained that it is no longer necessary to restrict buckling artificially to only a segment of the shell, and that the difficulty of the reaction moment at the edge of such a segment disappears. Von Kármán and Tsien's assumption that the deflection is rotationally symmetric is here retained by the author. The further assumption, however, that the deflection is vertical, *i.e.*, parallel to the axis of symmetry is dropped. The author shows that this assumption has an exceedingly strong effect. For the linearised problem its effect is to double the Euler load; for the non-linear problem it invalidates our asymptotic procedure and even changes the order of magnitude of the minimum buckling load. The assumption that Poisson's ratio ν vanishes is not made. For the numerical approximation a Ritz method involving two parameters is employed; the results deviate considerably from those of von Kármán and Tsien. It appears that approximation by the Ritz method is rather uncertain when applied to these problems. No definite value for the minimum buckling load has yet resulted. It is felt, however, that the results in their present stage may nevertheless be of interest.

Experimental Determination of the Isostatic Lines. (A. J. Durelli, J. App. Mech., Vol. 9, No. 4, Dec., 1942, pp. 155-160.) (109/28 U.S.A.)

In this paper a direct method for obtaining the isostatics or stress trajectories is described. These lines indicate the directions of the principal stresses. The procedure used by the author can be applied almost without regard to the geometrical form of the object under stress. It also possesses the advantage in that the test is non-destructive and that in most cases it will yield values of the stress magnitudes within 10 or 15 per cent. of the correct values. The technique consists in covering the surface of the body with a thin coat of lacquer which becomes brittle upon hardening. If the object being tested is painted under zero load and then stressed after the coating has hardened, the layer of lacquer will crack along lines perpendicular to the maximum tensile strain. The companion set of trajectories at right angles can usually be formed through relaxation. As an aid in photo-elasticity this procedure has great possibilities as it eliminates the necessity for determining the isoclinic lines which are difficult to obtain.

The Photoelastic Analysis of Transverse Bending of Plates in the Standard Transmission Polariscope. (D. C. Drucker, J. App. Mech., Vol. 9, No. 4, Dec., 1942, pp. 161-164.) (109/29 U.S.A.)

In this paper the ideas of three-dimensional photo-elasticity are applied to the analysis of plates under transverse bending, resulting in a simple photo-elastic method, employing the standard two-dimensional transmission polariscope. The procedure used is to " freeze " a fairly high initial tension in bakelite or similar material, cut out the model at some angle to the direction of the tension, bend, and observe. Results of various tests are given; photographs of two cases, the circular hole and the semi-circular notch, are included. Stress concentration factors are also obtained and analysed. The problem of the thick plate as contrasted with the thin plate, assumed in the usual theory, is discussed briefly.

The stress concentration factor of 2.4 obtained for the circular hole and semi-circular notch, in a plate under pure bending for a diameter equal to the thickness of the plate, is of practical interest. Further work is planned to obtain theoretical stress concentration factors between the 1.8 for the thin plate and 3 for the small hole.

Brittle Coatings for Quantitative Strain Measurements. (A. V. de Forest and others, J. App. Mech., Vol. 9, No. 4, Dec., 1942, pp. 184-188.) (109/30 U.S.A.)

The use of brittle coatings in stress analysis is discussed in this paper. Particular reference is made to the " stress-coat " materials and method which can effect quantitative analyses within the elastic range by use of brittle coatings alone. In the plastic range, the flaking off of the coating is shown to be caused by a compression component of strain of about 1 per cent. Graphs and illustrations show the effect of such variables as coat thickness, time of dry, temperature and humidity, creep and bubbles in the coating. Test procedure is outlined. Application of the method to a part from a high-speed sewing machine shows stress values and correlation of results with fatigue failures. Another application illustrated is a plate, penetrated by a bullet, showing elastic and plastic deformations during the impact loading.

Mechanics of Creep for Structural Analysis. (J. Am. Soc. Nav. Engs., Vol. 54, No. 4, Nov., 1942, pp. 578-594.) (109/31 U.S.A.)

In this paper a new creep-stress law is proposed for materials in which creep at both normal and elevated temperatures is important. Some experimental evidence is given and other data are cited that show the validity of the creep law assumed. A theory for stress and deflections in members subjected to bending is developed and the values compared with creep test results. Theories are then derived for the analysis of statically indeterminate structures in cases where creep is present. Comparison of results with the elastic case shows that there may be an appreciable difference in the values of reactions and moments. It should be noted that there is considerable need for experimental work on this problem. In the meantime, however, this paper shows, in general, how structural analysis is modified when creep occurs in engineering materials.

Stresses and Displacements in a Rotating Conical Shell. (J. L. Meriam, A.S.M.E. Preprint, Annual Meeting, Nov. 30th-Dec. 4th, 1942.) (109/32 U.S.A.)

The analysis of shells is an important sub-division of the general theory of elasticity, and its application is useful in the solution of engineering problems involving thin-walled structures. A common type of shell is one which possesses symmetry with respect to an axis of revolution. A theory for such shells has been developed by various investigators and applied to a few simple cases such as the cylindrical, spherical, and conical shapes. Boundary conditions, for the most part, have been simple static ones, and conditions of surface loading have been included in certain special cases. This paper extends the theory of axially symmetrical shells by including the body force of rotation about the axis and applies the results to the rotating conical shell. The analysis follows a pattern established by several investigators and for this reason is abbreviated to a considerable extent. Only where the inclusion of the body force makes elucidation advisable or where a slightly different method of approach is used are the steps presented in more detail.

Experimental Investigation of Tube Expanding. (E. D. Grimison, A.S.M.E. Preprints, Annual Meeting, Nov. 30th-Dec. 4th, 1942.) (109/33 U.S.A.)

This paper gives results of an experimental investigation to determine (a) the fundamentals involved in tube expanding; (b) the various practical methods of measuring the degree of expansion; (c) the optimum degree of expanding; and (d) the ultimate strengths of expanded joints under various conditions of service. Characteristic relationships of seat pressure on tube to degree of expanding are given, which clearly show the optimum degrees of expanding. An explanation

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for the existence of the optimum is developed. Determinations of structural strengths of joints under instantaneous loading to failure are reported, as well as the results of repeated smaller loadings through 1,000 cycles. The joint was not injured by these repeated applications of loads. The investigation has derived information which has led to a more positive procedure for rolling-in tubes.

The Holding Power and Hydraulic Tightness of Expanded Tube Joints Analysis of the Stress and Deformation. (J. N. Goodier and G. J. Schoessow, A.S.M.E. Preprint, Annual Meeting, Nov. 30th-Dec. 4th, 1943.) (109/34 U.S.A.)

The expanding process used for making the tubes of boilers tight and in other applications is idealized to form a problem in the theory of plasticity. This problem is solved in order to find out how far the factors taken into account in this theory are adequate to explain the results obtained in tests. The pressure left between the tube and plate or seat, which gives it tightness and contributes to its strength, is the principal object of calculation. Its variations with the yield stresses of tube and plate material, with degree of expanding, and with the thickness of the plate, are obtained in graphical form. Numerical comparison with tests is made for six joint, with fair agreement in five, the theoretical values being within 12 per cent. All are on the low side, and this is to be expected from the fact that the theory disregards strain-hardening, stress in the direction of the tube axis, and possible differences between expanding by a three-roller tool and expanding by uniform pressure within the tube.

A Principle of Maximum Plastic Resistance. (M. A. Sadowsky, A.S.M.E. Preprint No. 11, Annual Meeting, Nov. 30th-Dec. 4th, 1942.) (109/35 U.S.A.)

Hitherto, a complete determination of stresses in a plastic body has been dependent upon a successful analysis of deformation in plastic flow, the method of computation being essentially based on Nadai's stress-strain relations. The principle of maximum plastic resistance, as introduced in this paper, establishes a new method of computation of stresses only, without any explicit reference to deformation. Formally, the principle is progressive, since it supplies equations sufficient for solution; intrinsically and physically, the principle treats the plastic body as a reacting medium automatically producing maximum values of resultant reaction. Combined plastic tension, torsion, and inner pressure (in a boiler) are chosen as cases in which to apply the principle. The results are condensed in the relative diagram accompanying the paper.

Volute-Spring Formulæ. (C. J. Holland, A.S.M.E. Preprint No. 12, Annual Meeting, Nov. 30th-Dec. 4th, 1942.) (109/36 U.S.A.)

Previous formulæ for determining stresses, loads, and deflections in volute springs are very few, such as there are being unwieldy and difficult to apply. To correct this situation, the author has developed simple formulæ for volute springs based on tensile stress, which include factors covering the proper consideration of bar curvature, pitch angle, and bending stress. By geometry he shows that a line, drawn through the mean diameters of the turns of a volute spring, is a parabola, but that the line differs very little from a straight line forming the side of a triangle; that using the triangle as a base for the derivation of his formulas does not introduce any appreciable error and does permit of extreme simplification. He also points out that volute-spring formulas should be based on diameters, because the turns of a volute spring are not circles and, therefore, using the radius will not give accurate results. The author carries through typical design calculations to show the application of the formulas, including the developed bar length and the weight of the finished spring.

The Influence of the Shape and Rigidity of an Elastic Inclusion on the Transverse Flexure of Thin Plates. (Martin Goland, A.S.M.E. Preprint No. 17, Annual Meeting, Nov. 30th-Dec. 4th, 1942.) (109/37 U.S.A.)

The purpose of this paper is to investigate the influence of several types of inclusions on the stress distribution in elastic plates under transverse flexure. An " inclusion " is defined as a close-fitting plate of some second material cemented into a hole cut in the interior of the elastic plate. Depending upon the properties of the material of which it is composed the inclusion is described as rigid or elastic. In particular, the solutions presented will deal with the effects of circular inclusions of differing degrees of elasticity and rigid inclusions of varying elliptical form. Since the rigid inclusion and the hole are limiting types of elastic inclusions, and the circular shape is a special form of the ellipse, plates with either a circular hole or a circular rigid inclusion are important special cases of this discussion. It is hoped that the present analysis of several types of inclusions will aid in a future study of perforated plates stiffened by means of reinforcing rings fitted into the holes.

Measurement of Dynamic Strain. (C. O. Dohrenwend and W. R. Meheffey, A.S.M.E. Preprint No. 18, Annual Meeting, Nov. 30th-Dec. 4th, 1942.) (109/38 U.S.A.)

The measurement of dynamic strains of both high and low frequency give rise to a variety of problems in instrumentation. Two types of equipment and circuits designed and used by the authors are discussed in detail. The first type based on the amplitude-modulated method is for low frequencies from zero to about 15 per cent. of the carrier frequency of 1,025 cycles per sec. The equipment has application to strain measurements varying from static values to those produced in moving vehicles, various machine parts, structures such as crane bridges, in fact all strain measurements where the frequency is 150 cycles per sec. or less. The second type of equipment discussed is a potentiometer type and is for high-frequency strain measurements from 100 cycles per sec. to 8,000 cycles per sec. This high-speed equipment is conveniently used for impact strain, such as produced in hammer blows, shock loading, forging equipment, and impact-factor determination. Both units are designed to be used with a cathode-ray oscillograph which lends itself to a variety of recording methods. The method discussed includes both the type where the time axis is obtained by sweeping the oscilloscope beam on a stationary film and where the time axis is obtained mechanically.

Hydrodynamic Three-Component Balance. (M. Medici, Wasserkraft und Wasserwirtschaft, Vol. 35, No. 2, 15/2/40, pp. 38-40.) (109/39 Italy.)

The balance is intended for measurement on model blade sections (app. 15 x 5 cm.) in the hydrodynamic tank of the Padova University.

The model is attached to a vertical spindle supported in ball-bearings at the ends of a cylinder. This cylinder in its turn is cardanically suspended so that it can rotate about two horizontal axes placed parallel to the surface of the water. Rotation about the fore and aft axis (parallel to the direction of flow), is due to lift whilst rotation about the other horizontal axis indicates drag. Rotation about the vertical axis is due to the moment of the hydrodynamic forces.

During a test, rotation about the axes is prevented by means of weights acting on pulleys. (Null method.)

It is stated that the balance is robust and yet sensitive. No springs or gears are required, the control forces being measured directly.

A series of photographs give details of the suspension.

New Instruments for Measuring Acceleration in Flight. (H. Freise and others, Luftwissen, Vol. 9, No. 8, August, 1942, pp. 245-247.) (109/40 Germany.)

The article describes in some detail two new types of accelerometer developed by the D.V.L. for flight research.

Both utilise the cantilever spring suspension for the inertia mass which is housed in a separate compartment containing the damping fluid and sealed off from the recording gear by means of a rubber diaphragm.

Contrary to the well known D.V.L. instruments used primarily for stress research operating by the scratch method and requiring subsequent optical magnification of the record, the new accelerometers give a direct record on wax paper requiring no subsequent magnification, its maximum deflection being of the order of 50 mm. The range covered is from -4 g. to $+8$ g., with an accuracy of about $\pm .05$ g.

Whilst the first model is primarily intended for vertical accelerations, the second is provided with an adjustment for sensitivity so that horizontal accelerations can be recorded with equal accuracy. Both instruments are of relatively small dimensions (18 x 10 x 9 cm. and 24 x 20 x 16 cm. respectively), the weight of the complete installations being 2 and 8 lbs. respectively. The heavier instrument will give records of one hour's duration.

An interesting development of these instruments is the "acceleration peak" recorder which counts and classifies automatically the number of maximum accelerations experienced by the aircraft over a given period (gust research).

In the instrument, the pointer which normally contacts the wax paper is fitted with a number of electrical contacts arranged on either side of a cross bar which is perpendicular to the pointer and at right angles to its direction of travel. These contacts move along a cylindrical bridge provided with a second set of contacts at gradual increasing arcual distance. Deflections of different amplitude thus bridge the gap at various positions and are recorded electrically on appropriate counters.

The instrument illustrated has 10 such contacts and covers the range -1.5 to 3.5 g. The accelerometer itself weighs 6 lb., the electrical counters 9 lb. The latter can be placed in any convenient position on the aircraft and joined by cables.

Measurement of High Temperature in High Velocity Gas Streams. (W. J. King, A.S.M.E. Preprint No. 19, Annual Meeting, Nov. 30th-Dec. 4th, 1942.) 109/41 U.S.A.)

Conventional methods of measuring temperatures are subject to considerable errors, when applied to gas streams at velocities about 500 fps. and temperatures at the order of 1600 F., which conditions occur, for example, in the exhaust-gas pipe of an aero engine. An investigation of this problem, the results of which are reported in the paper, was suggested by the Special Sub-committee on Exhaust Gas Turbines and Intercoolers of the N.A.C.A., and was carried out with the assistance of the Sub-committee on Exhaust Gas Temperature Measurement of the Committee on Industrial Instruments and Regulators. Tests were conducted on the thermocouple, which at present is the most satisfactory temperature-measuring device available, to develop a shield and mounting that would achieve maximum accuracy and minimum size and weight for aircraft application. The results indicate that something better than the ordinary thermocouple mountings is required for even a fair degree of accuracy with either the high velocities or temperatures considered. A few tentative devices are suggested which will serve until further studies have been made and more adequate solutions provided.

Plugging Porous Castings with Plastic. (A. Rehbock, Z.V.D.I., Vol. 86, No. 7-8, 21/2/42, p. 126.) (109/44 Germany.)

A high degree of gas-tightness is frequently required of castings employed in the construction of refrigeration plant. To ensure this is not always possible as metal castings are frequently permeated with fine pores with the result that it becomes necessary to increase the wall-thickness of the castings to a considerable extent if they are to be rendered adequately gas-tight. Lacquer coatings hitherto used to overcome this difficulty have not always proved satisfactory under actual working conditions. Two processes in this connection have recently been adopted whereby plastic material is used for plugging these porous cavities. This plastic material is applied to the pores of the casting either in the form of a solution or as a liquid which subsequently hardens. The plastic materials most suitable for this purpose are polyvinylchloride and polystyrol.

In the first process an impregnating solution, PCU 3, is used. This consists of a solution of Igelit PCU of a certain grade of polymerisation mixed with suitable solvents. The viscosity and adhesion of this solution are of a consistency required for efficiently sealing up the porous cavities. The impregnation is bes carried out in a special impregnating plant, the solution being applied to the pore under suction and pressure.

On heating (80°-90°C.) the solvent evaporates. The plastic is resistant t acid and lye as well as to the cooling agents usually employed for refrigeratio (with the exception of sulphuric acid and methylchloride).

In the second process, monostyrol in thinly liquid state is applied to the pores This synthetic resin polymerises on heating the castings and on applying pressure The polystyrol thus obtained is still only resistant to ammonia if used for refrigera tion purposes.

(From paper given at a session of the Committee for the Development oi Refrigeration Technique of the V.D.I., 15.11.41.)

Impact Extrusion and Cold Pressing of Aircraft Parts. (Phil Koenig, S.A.E. Preprint No. 5, National Aircraft Production Meeting, Oct. 1-3, 1942.) (109/45 U.S.A.)

Many aircraft parts which would normally be produced by casting, forging, or by machining from solid stock, can be produced very rapidly and extremely economically by the impact-extrusion method.

Aluminium and aluminium alloys can be extruded by the Impact method. The only limit to the size of the parts so produced, is the power of the press that can be obtained for the work. Small parts can be produced on standard crank presses which are nearly always available. Any type of press can be used as it is not necessary to have a high speed, except, of course, in respect to production capacity. Hydraulic presses can be used to advantage. Small parts can be produced in multiple dies and, in this way, much large production obtained. It has been found by experiment that aluminium requires a pressure of approximately 45 tons per sq. inch for this production method while 24 s aluminium alloy requires a pressure of approximately 90 tons per sq. inch.

Impact-extrusion can be used advantageously as a method of producing a very satisfactory substitute for many parts that are now being made by the drop-hammer process. Because of the increasing difficulty in obtaining forgings, this substitute method should be rapidly promoted and used to the maximum extent possible.

The dies for the manufacture of parts produced by the Impact-extrusion method must have sufficient strength and proper heat-treatment to withstand the extreme pressures and impact shocks under the continuous operation imposed. During the flow period through which the metal passes, there is, as a consequence of the high pressures between the die surfaces and the flowing metal, considerable friction and, as a consequence, wear to be considered. It has been found that a plating of chromium is advantageous as it materially lengthens the life of the dies.

Chemical Protective Treatment and Cleansing Methods in Aircraft Production. (R. Sanders, J.S.A.E., Vol. 51, No. 1, Jan., 1943, pp. 23-30, Transactions.) (109/46 U.S.A.)

Chemical protective treatment for light alloys has the two-fold object of minimising corrosion and providing improved adhesion for subsequent painting. Of the three treatments in common use (anodising, chromatisation and phosphatisation) only the first (anodising) is sufficiently corrosion resistant not to require painting. It has the disadvantage, however, of requiring a rather elaborate electrolytic installation and is not suitable for large structural parts. Chromatisation is obtained by dipping in a chromic acid bath, whilst phosphatisation consists of a treatment with a phosphoric acid compound which may be carried out either by hand (swab), dipping or spray, and is thus easily applied to large surfaces, no special equipment being required. All other treatments require a preliminary degreasing of the surface which must be especially thorough when chromatisation is applied. This preliminary cleaning may be carried out by the emulsion, vapour or spray method, generally followed by an alkaline bath and water rinsing. Machines for carrying out this cleansing operation are described, special attention being paid to the special requirements in the case of Mg alloys.

The author also deals with the problem of cadmium plating on steel, copper and brass. Before any paint is applied to such deposits, the surface should be chromatised or phosphatised. Phosphoric acid compounds can also be applied to raw steel to retard corrosion and improve paint adhesion.

Successful spot welding also requires careful surface cleaning prior to the welding operation, since dirt or oxide affect the contact resistance and contaminate the electrodes.

In this case the cleansing agent usually contains hydrofluoric acid which may present a health hazard. It is interesting to note that a phosphoric acid compound (Koldweld) has been developed lately which is generally effective and contains no aggressively active acid or virulent poison. Use of this type of compound consists in a single cold dip, eliminating the use of hot caustic etch or alkaline solution.

Another development has been a compound in jelly form for treatment of sections which are too large to submerge in solution. This viscous compound is painted over the area and wiped off after one minute with a cloth damped with clean water. Spot welding can then be carried out satisfactorily.

Cyaniding of High Speed Tool Steels. (H. Schanmann, Der Betrieb, Vol. 21, No. 9, Sept., 1942, pp. 375-379.) (109/47 Germany.)

Cyaniding is a special surface hardening process carried out in a salt bath at temperatures between 500 and 550°C. It is only applicable to high speed tool steels, with a tempering temperature of the same order. The steels moreover should not be temper sensitive and the process cannot be applied to ordinary tool steels.

The bath consists mainly of a mixture of sodium and potassium cyanide, the temperature of which is kept about 20°C. below the tempering temperature of the steel. During the immersion, which lasts from 15 to 45 minutes, gaseous cyanogen compounds are evolved which necessitates efficient ventilation. The nitrided layer is very thin (20-30μ) but of considerable hardness (1,100-1,200 Vickers Units).

Satisfactory nitriding by this process can only be carried out if the surface of the tool is in good condition, and has not been decarbonised by previous re-hardening. The high speed steels employed should be hardened in such a way that a fine grain structure has become established before the cyaniding process is applied.

It appears that dimensional changes in the tool only become important when the tempering temperature of the particular steel is reached or exceeded.

On the other hand the hardness of the nitrided layer generally increases with the temperature of the cyanide bath. It is therefore essential for best results that the tempering temperature of the particular steel be known accurately and work with a bath temperature about 20-30°C. below this.

Excessive bath temperature or prolonged immersion leads to a reduction in the hardness of the nitrided layer. In this case the only remedy is annealing at 800-850°C. in the absence of air and fresh hardening. The article concludes with some data on the increase in tool life which can be obtained by proper application of the cyaniding process. In the case of spiral drills subjected to considerable wear, the life can be increased by at least 50 per cent. For broaches and milling cutters even greater improvements have been noted. In the case of broaches, a 20 fold increase in life has been obtained in certain cases.

On the Significance of CO_2 for High Altitude Breathing. (Hermann Rein, Schriften der deutschen Akademie der Luftfahrtforschung, No. 32, 17th Jan., 1941.) (109/48 Germany.)

This paper reviews the experimental work carried out in the last few years on the function of CO_2 in the human organism, particularly at high altitudes. Experiment has shown that CO_2 is an effective antidote against altitude sickness and, on the basis of this knowledge, the advisability of using CO_2 and O_2 mixtures for high altitude, breathing has been advocated by various investigators.

The author shows that there are still many problems, some of them of a fundamental character, which require careful investigation. Too little is known, for example, about the influence of CO_2 on the respiratory mechanism and the part it plays in releasing oxygen from the blood to the tissues. It is shown that 3-5 per cent of CO_2 added to the respired air at high altitude can completely relieve tissue anoxia. The usual explanation given to account for this phenomenon is that CO_2 stimulates ventilation of the lungs and thus improves the arterialisation of the blood. These explanations are shown by the author to be incorrect. Tests showed conclusively that CO_2 acted on the tissue by way of the vegetative nervous system. How the latter affected the metabolism of the tissue is still a matter for further study.

The importance of the vegetative nervous system is borne out by experiments which were carried out as far back as 1932 at Cannons Laboratory in Boston. These experiments showed that though animals suffered no apparent harm when the sympathetic nervous system had been removed, they sustained serious injury under oxygen want.

The author concluded by emphasising the importance of the central nervous system which by virtue of its regulative control over respiration and circulation and its susceptibility to CO_2 will provide an answer to some of the outstanding problems of aviation medicine. It is interesting to note that according to the author the administration of drugs such as adrenalin sympatholor veritol will have no effect unless there is already an adequate supply of CO_2 in the body.

Welding Fumes from Arc Welding and Their Danger to Health. (G. C. Harold, J. Am. Soc. Nav. Engs., Vol. 54, No. 4, Nov., 1942, pp. 650-657.) (109/49 U.S.A.)

In general, potential sources of injury from arc welding other than from trauma and thermal effects seemingly may be grouped in the following categories:—

Oxygen deficiency.
Carbon monoxide.
Nitrous gases.
Ozone.
Metal fume from alloyed steel.
Metal fume from the metal electrodes.
Silica from welding rod coatings.
Harmful substances other than silica in rod castings.
Injurious substances coated on to the metal being welded.
Radiations.
Possible other gases such as cyanides theoretically produced in the electric arc.

From the author's experience and from his appraisal of the literature, it does not appear that the health of arc welders as a class may be set apart as especially different from metal workers in general. Although occasional records of deaths appear associated with some aspect of welding as the cause, we have no evidence of any prevailing diseases characteristic of the work of the arc welder (radiation effects excepted).

The following ventilation rates when welding with coated electrodes are recommended:—

	c.f.m.
Steel electrodes:—	
5/32 in. or less	250
3/16 in.	400
1/4 in.	700
5/16 in.	1,200
3/8 in.	1,500
Alloy electrodes (fluoride coated):	
5/32 in. or less	250
Galvanized plate:	
5/32 in.	1,000-1,500

Suitable suction devices connected to local exhaust hoods placed within 8 to 9 inches of the arc with a minimum air velocity of about 125 feet per minute for smaller electrodes are also recommended.

It should be remembered that if the welding is carried out in large open spaces, artificial ventilation will in general not be required.

Transportation of Patients by Aeroplane. (W. R. Lovelace and J. Hargreaves, J. Av. Med., 1942, Vol. 13, No. 1, pp. 2-25.) (Bull. of War Med., Vol. 3, No. 5, Jan., 1942, pp. 299-230.) (109/50 Great Britain.)

The first air ambulance in the U.S.A. was used in 1918. Since then they have been used with increasing frequency in various parts of the world. In the Spanish Civil War the journey from the battle front to Berlin took only 8-10 hours, and many flights were made at 16,000-18,000 ft. In the Polish campaign 2,500 patients were evacuated by this means, and the ambulance planes were used for bringing supplies to the front on the return trip. German press reports state that up to August, 1941, 280,000 wounded had been evacuated from the Eastern Front. The authors review briefly the literature on the administrative and medical problems associated with this form of transport. An outline of the requirements under various conditions is included.

The disadvantages of air ambulances are many; economic and administrative. There are also physiological problems. The decrease in pressure results in the symptoms of anoxæmia being normally first apparent at about 10,000 ft., but any conditions such as cardiac failure, anæmia, shock, severe head injury, severe infection or massive sulphonamide therapy, which impair the oxygen supply to the tissue, will require the use of additional oxygen at much lower altitudes.

The other effect of the fall in pressure is the expansion of the gases in, for example, a pneumothorax or the intestines. Such cases are best flown at as low an altitude as possible, or preferably in a pressure cabin.

Prevention and Control of Hazards in the Radium Dial Painting Industry. (L. F. Curtiss, J. Ind. Hyg. and Toxicol., 1942, Vol. 24, No. 6, pp. 131-141.) (Bull. of War Med., Vol. 3, No. 5, Jan., 1942, p. 301.) (109/51 Great Britain.)

Radium has almost entirely replaced mesothorium as an ingredient of self-luminous paint used for dials. Hence any harm experienced by workers using such paint may correctly be termed "radium poisoning." Radium emits three types of radiation, alpha, beta, and gamma rays. The alpha ray is a doubly charged atom of helium with low penetrating power. The beta ray is a high-speed electron with greater penetrating power. The gamma ray is an electro-magnetic wave, like the X-ray, and has still greater penetrating power. The immediate decomposition product of radium is the gas radon; from this gas the other radio-active members (which are solid) are derived. The final decomposition product is lead. Radium, like lead, when it gains entry to the body tends to collect in the bones.

After the radium has once been ingested and absorbed, there is no known way in which it can be again eliminated; it remains to exert its destructive effects. But the gas radon decays rapidly and will disappear in a few weeks after inhalation; indeed, the breathing process may completely eliminate the gas in about three or four hours. Ultra-violet light, such as a small argon lamp, may be used in a dark room to examine the hands and clothing of workers; it causes any deposits of radium paint to fluoresce brightly. Distance has a great effect in reducing the intensity of radiations; therefore, stocks of paint should be stored well away from work places. A method is described for determining radon present in air. Another device, developed by the author, is described, which may be used to determine gamma ray intensity; the tolerance limit is 0.1 roentgen per eight-hour day.

Zinc Dermatitis (An Additional Hazard in the Aircraft Industry). (H. E. Freeman, J. Amer. Mid. Ass., 1942, Vol. 119, No. 13, July, 1942, p. 1,016.) (Bull. of War Medicine, Vol. 3, No. 5, Jan., 1943, pp. 301-302.) (109/52 U.S.A.)

Zinc salts are used widely in the welding processes of aeroplane manufacture. The present record is of a man, 33 years of age, employed in an aircraft factory, who was burned at the bend of the left elbow by a splash of "kirksite," an alloy of zinc with a small admixture of aluminium, copper and magnesium. Zinc oxide was one of the ointments used in early treatment of the burn. Although the wound was healing when the patient came under observation, there was an erythemato-vesicular eruption for about 3 cm. in all directions around it.

The patient stated that his grandmother, mother and father were sensitive to zinc.

The condition was clearly allergic, and this was further confirmed by the "recurrent patch test reaction," i.e. the flare-up at previously involved sites on application of the test.

LIST OF SELECTED TRANSLATIONS.

No. 55.

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

TRANSLATION NUMBER AND AUTHOR.		TITLE AND JOURNAL.
		AIRCRAFT (DESIGN AND PERFORMANCE).
1697	Belleroche, P.	*Torpedo-Carrying Aircraft.* (La Science et la Vie, No. 282, Feb., 1941, pp. 76-77.)
1739	Scheubel, F. N.	*The Effect of the Density Gradient on the Longitudinal Motion of an Aircraft.* (L.F.F., Vol. 19, No. 4, 5/5/1942, pp. 132-136.)
1740	Kaul, H. W. Filzeh, B.	*Results of Measurements of Wing Stresses in Flight.* (Luftwissen, Vol. 8, No. 1, Jan., 1941, pp. 20-24.)
		PRESSURE CABINS (GERMAN PATENTS DIGEST).
1713	——	*Pressure Cabin for Aircraft. (Henschel Aircraft Co., Patent No.* 678,457.) (Flugsport, Vol. 31, No. 16, 2/8/39, p. 45.)
1714	——	*Packing Glands for Control Rods Passing Through the Walls of Pressure Cabins. (Henschel Aircraft Co., Patent No.* 680,689.) (Flugsport, Vol. 31, No. 20, 27/9/39, pp. 57-58.)
1715	——	*Manhole Consisting of External and Internal Cover Plates for Pressure Cabins. (Henschel Aircraft Co., Patent No.* 680,562.) (Flugsport, Vol. 31, No. 20, 27/9/39, p. 57.)
1716	——	*Pressure Chamber for Aircraft. (Dornier Aircraft Works, Patent No.* 705,929.) (Flugsport, Vol. 33, No. 17, 9/7/41, p. 29.)
1717	——	*Pressure Regulating Valve for Pressure Cabins. (Arado Aircraft Co., Patent No.* 705,844.) (Flugsport, Vol. 33, No. 14, 9/7/41, p. 29.)
1718	——	*Aircraft with One or More Pressure Cabins. (Focke-Wulf Aircraft Co., Patent No.* 678,516.) (Flugsport, Vol. 33, No. 20, 1/10/41, p. 49.)
		ENGINES AND ACCESSORIES.
1701	Schneider, E.	*Friction Tests in Plain and Roller Bearings.* (Petroleum Zeit., Vol. 26, No. 7, 1930, pp. 221-236, and No. 11, 1930, pp. 337-339.)

TRANSLATION NUMBER AND AUTHOR.		TITLE.
1702	Mertz, R.	*Problems of Two-Stroke Engine Design.* (A.T.Z., Vol. 45, No. 6, 25/3/42, pp. 149-156.)
1709	Himmler, C. R. ...	*Torque Measurement of Aero Engines in Altitude Ground Tests and During Flight.* (Z.V.D.I., Vol. 84, No. 26, 29/6/40, pp. 445-454.) (Translated by the Bristol Aeroplane Co.)
1732	Pabst, O.	*Frictional Heat in Turbo Machinery.* (L.F.F., Vol. 19, No. 8, 20/8/1942, pp. 267-270.)

PLASTICS AND WOOD.

1710	Prandtl, L.	*On the Resistance to Indentation (Hardness) and the Strength of Plastic Materials.* (Z.A.M.M., Vol. 1, No. 1, Feb., 1921, pp. 15-20.) (Translated by D.S.I.R.)
1711	Steuer, H.	*Plastics for Aircraft Production.* (Flugsport, Vol. 34, No. 21, Oct., 1942, pp. 315-330.)
1731	Geiger, F.	*Mechanical Testing and Grading of Wood for High Grade Structures.* (Flughafen, Vol. 10, No. 2-3, Feb.-Mar., 1942, pp. 13-20.)

WIRELESS.

1699	Hepcke, G.	*Wireless Equipment of Enemy (i.e., non-German) Aircraft.* (Luftwissen, Vol. 9, No. 8, Aug., 1941, pp. 230-234.)

OPTICS AND PHOTOGRAPHY.

1698	Ziedentopf, H. and others	*New Measurements on the Sensitivity of Vision.* (Z. f. Instrum., Vol. 61, No. 11, 1941, pp. 372-380.)
1706	Schonwald, B. ...	*The Range of Optical Signals in Daylight.* (Z. f. Instrum., Vol. 62, No. 1, Jan., 1942, pp. 35-36.)
1728	Nagel, M.	*Investigation on the Loss of Definition in Air Photographs Due to the Translational Motion of the Camera as Affected by the Density of the Negative.* (Z. f. Wiss. Photographie Photophysik and Photochemie, Vol. 38, No. 9-10, Sept.-Oct., 1939, pp. 181-209.)

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

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Theory and Practice of Warfare.

Tactics and Design.

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
1	6123	G.B.	*Survey of Technical Progress in Military Aircraft during* 1942. (W. Nichols, Flight, Vol. 42, No. 1,775, 31/12/42, pp. 717-720.)
2	6145	U.S.S.R. ...	*Ramming Tactics Developed by the Soviet Air Force.* (R. B. Hotz, Flying, Vol. 31, No. 4, Oct., 1942, pp. 32 and 100.)
3	6253	U.S.A. ...	*Comfortization of Military Aircraft (III) (Heating, including Ground Equipment).* (A. A. Arnhym, Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 149-154 and 254-266.)
4	6255	U.S.A. ...	*Basic Theory of the Dive Bomber.* (Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 210-212.)
5	6258	U.S.A. ...	*Changed Warfare (Invasion of Europe).* (J. A. Ward, Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 87-89 and 237-238.)
6	6273	G.B.	*Pilot's Seat of Laminated Plastic (Spitfire).* (Plastics, Vol. 7, No. 68, Jan., 1943, pp. 14-15.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
7	6280	Germany ...	*Nazi Air Force Equipment.* (L. Zacharoff, Aviation, Vol. 41, No. 9, Sept., 1942, pp. 98-99 and 276-283.)
8	6291	U.S.A. ...	*Bomb Bay Fuel Tank Installation in Flying Fortress.* (Aviation, Vol. 41, No. 9, Sept., 1942, p. 152.)
9	6396	G.B.	*Specifications of Operational Aircraft of the Anglo-American Forces.* (Flight, Vol. 43, No. 1,776, 7/1/43, pp. 19-22.)
10	6402	G.B.	*Pursuit Effect.* (Aeroplane, Vol. 164, No. 1,650, 8/1/43, p. 56.)
11	6407	U.S.A. ...	*Improvements in American Aircraft.* (Canadian Aviation, Vol. 15, No. 10, Oct., 1942, pp. 112 and 120.)
12	6608	G.B.	*High Altitude Spitfires Oppose Ju. 86P.* (Trade and Eng. Times, Vol. 52, No. 947, Jan., 1943, p. 36.)
13	6675	U.S.S.R. ...	*Russian Long Range Bombing.* (N. Denisov, Aeroplane, Vol. 64, No. 1,652, 22/1/43, pp. 95-97.)
14	6692	G.B.	*Fighter Progress.* (F. H. M. Lloyd, Aeronautics, Vol. 7, No. 6, pp. 28-32, January, 1943.)
15	6711	U.S.A. ...	*Comfortization of Military Aircraft (IV).* (A. A. Arnhym, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 202-209, 278-282.)
16	6780	U.S.A. ...	*Airplanes Fit to Fight (with a List of the World's Best Military Aircraft).* (N. F. Silsbee, Mech. Eng., Vol. 64, No. 12, Dec., 1942, pp. 847-852.)
			Training and Organisation.
17	6152	U.S.A. ...	*Age and the Fighter Pilot.* (M. C. Grow and H. G. Armstrong, Vol. 31, No. 4, Oct., 1942, pp. 9 and 83-87.)
18	6113	Germany ...	*The German Ministry of Propaganda.* (Signal, No. 15, Aug., 1942, pp. 13-18.)
19	6153	U.S.A. ...	*U.S. Army Air Force Flexible Gunnery School.* (Flying, Vol. 31, No. 4, Oct., 1942, pp. 50-51.)
20	6279	Japan ...	*Japanese Air Power.* (E. S. Peyer, Aviation, Vol. 41, No. 9, Sept., 1942, pp. 94-97 and 317-318.)
21	6399	Germany ...	*Leaders of the Luftwaffe, XVIII.* (Aeroplane, Vol. 164, No. 1,650, 8/1/43, p. 39.)
22	6443	Germany ...	*National Socialist Flying Corps (Organisation and Achievements).* (J. Von Leers, Luftwelt, Vol. 9, No. 20, 15/10/42, pp. 389-399.)
23	6646	Germany ...	*The T,N. Organisation at the Front (Engineer Corps for Emergency Work) (Photographs).* (F. D. Schmitz, Motor Schau., Vol. 6, No. 8, Aug., 1942, pp. 318-321.)
24	6649	Sweden ...	*Swedish Rearmament in the Air.* (Der deutsche Sportflieger, Vol. 9, No. 12, Dec., 1942, pp. 249-250.)
25	6678	Germany ...	*Leaders of the Luftwaffe, XX (W. Baumbach).* (Aeroplane, Vol. 64, No. 1,652, 22/1/43, p. 103.)

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26	6721	U.S.A. ...	*Automatic Direction Finder Simulator for Link Trainer.* (Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 313-314.)
			Military Types (British).
27	6250	G.B. ...	*Handley Page "Hampden."* (Aero Digest, Vol. 41, No. 4, Oct, 1942, pp. 195-196.)
28	6293	G.B. ...	*Boulton Paul "Defiant."* (Aviation, Vol. 41, No. 9, Sept., 1942, pp. 201 and 297-298.)
29	6398	G.B. ...	*Bristol* 160 *(New Version of Blenheim V) (Photo).* (Aeroplane, Vol. 164, No. 1,650, 8/1/43, p. 35.)
30	6400	G.B. ...	*Avro Lancaster Loading Up with Mines (Photo).* (Aeroplane, Vol. 164, No. 1,650, 8/1/43, p. 52.)
31	6403	G.B. ...	*Avro Lancaster (Flying Characteristics).* (C. Pangborn, Canadian Aviation, Vol. 15, No. 10, Oct., 1942, pp. 35-36 and 69.)
32	6671	G.B. ...	*Bristol Beaufort II (Photograph).* (Aeroplane, Vol. 64, No. 1,652, 22/1/43, p. 86.)
33	6680	G.B. ...	*D.H. Mosquito (Photograph).* (Aeroplane, Vol. 64, No. 1,652, 22/1/43, p. 105.)
			Military Types (German).
34	6122	Germany ...	*Heinkel He.* 177 *(Recog. Det.).* (Flight, Vol. 42, No. 1,775, 31/12/42, p. 716b.)
35	6389	Germany ...	*Me.* 109 *G.* (Flight, Vol. 43, No. 1,776, 7/1/43, p. 7.)
36	6397	Germany ...	*Me.* 115. (Flight, Vol. 43, No. 1,776, 7/1/43, p. 23.)
37	6404	Germany ...	*Focke Wulf* 190 *A3 (Photographs).* (Canadian Aviation, Vol. 15, No. 10, Oct., 1942, p. 38.)
38	6424	G.B. ...	*Focke Wulf F.W.* 190 *Fighter.* (Engineer, Vol. 175, No. 4,541, 22/1/43, pp. 68-71.)
39	6444	Germany ...	*Junkers Variable Pitch V.S.* 5. (Der Adler, No. 24, 1/12/42, pp. 746-747.)
40	6637	Germany ...	*Focke Wulf Aircraft Types* (1919 *to Date).* (Der Flieger, Vol. 21, No. 6, June, 1942, pp. 166-172.)
41	6638	Germany ...	*Asymmetrical Aircraft B.V.* 141. (Der Flieger, Vol. 21, No. 6, June, 1942, pp. 174-175.)
42	6639	Germany ...	*Dornier* 217 *(Photographs).* (Der Flieger, Vol. 21, No. 6, June, 1942, p. 176.)
43	6648	Germany ...	*He.* 111 *(Comparison of* 1935 *and* 1942 *Designs).* (Motor Schau, Vol. 6, No. 8, Aug., 1942, pp. 331-334.)
44	6652	Germany ...	*Blind Flying Equipment in Ju.* 52. (Der deutsche Sportflieger, Vol. 9, No. 12, Dec., 1942, pp. 254-255.)
45	6825	Germany ...	*Catapult Start of Do.* 18 *(Photo).* (Flugsport, Vol. 35, No. 2, 20/1/43, p. 17.)
			Military Types (U.S.A.).
46	6125	U.S.A. ...	*Lockheed Ventura (Recognition Details).* (Flight, Vol. 42, No. 1,775, 31/12/42, p. 716a.)
47	6148	U.S.A. ...	*Grumman "Avenger" (Silhouette).* (Flying and Pop. Av., Vol. 31, No. 4, Oct., 1942, p. 36.)
48	6149	U.S.A. ...	*Martin Mars (Silhouette).* (Flying and Pop. Av., Vol. 31, No. 4, Oct., 1942, p. 36.)

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49	6150	U.S.A. ...	*Boeing "Sea Ranger" (Silhouette).* (Flying and Pop. Av., Vol. 31, No. 4, Oct., 1942, p. 37.)
50	6203	U.S.A. ...	*Aircraft of the U.S. Navy.* (W. L. Robinson, Sci. Am., Vol. 167, No. 6, Dec., 1942, pp. 246-249.)
51	6252	U.S.A. ...	*Ryan PT-25 Trainer.* (Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 198-202.)
52	6283	U.S.A. ...	*P. 40 Engine Installation.* (Aviation, Vol. 41, No. 9, Sept., 1942, p. 156.)
53	6296	U.S.A. ...	*Fairchild AT-13 Trainer (Duramold).* (Aviation, Vol. 41, No. 9, Sept., 1942, p. 225.)
54	6297	U.S.A. ...	*Harlow PC-5A Basic Trainer.* (Aviation, Vol. 41, No. 9, Sept., 1942, p. 231.)
55	6394	U.S.A. ...	*Brewster Bermuda (Identification Details).* (Flight, Vol. 43, No. 1,776, 7/1/43, p. b.)
56	6641	U.S.A. ...	*American Types with the R.A.F. (Fortress, Maryland, Liberator, Boston, and Havoc).* Der Flieger, Vol. 21, No. 6, June, 1942, pp. 180-181.)
57	6673	U.S.A. ...	*Douglas Boston II (Photograph).* (Aeroplane, Vol. 64, No. 1,652, 22/1/43, p. 91.)
58	6674	U.S.A. ...	*Brewster Bermuda (Photograph).* (Aeroplane, Vol. 64, No. 1,652, 22/1/43, p. 93.)
59	6679	U.S.A. ...	*North American Mitchell (Photograph).* (Aeroplane, Vol. 64, No. 1,652, 22/1/43, p. 104.)
60	6718	U.S.A. ...	*Identification of American Aircraft in the R.A.F. and Fleet Air Arm.* (Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 288, 292.)
61	6779	U.S.A. ...	*Grumman Martlet Deck Landing (Photo).* (Flying and Pop. Av., Vol. 31, No. 2, Aug., 1942, p. 55.)
62	6781	U.S.A. ...	*Martin Mars (Photograph).* (Mech. Eng., Vol. 64, No. 12, Dec., 1942, p. 908.)
			Military Types (U.S.S.R.).
63	6151	U.S.S.R. ...	*I. 16 Fighter.* (Flying and Pop. Av., Vol. 31, No. 4, Oct., 1942, p. 37.)
64	6242	U.S.S.R. ...	*Russian Modern Military Aircraft.* (Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 157-161 and 236-237.)
65	6281	U.S.S.R. ...	*Typical Soviet Aircraft.* (Aviation, Vol. 41, No. 9, Sept., 1942, pp. 100 and 186.)
66	6676	U.S.S.R. ...	*Tupolev S.B.-Z Medium Bomber (Photograph).* (Aeroplane, Vol. 64, No. 1,652, 22/1/43, p. 96.)
67	6693	France/ U.S.S.R.	*Some French and Russian Fighters (Silhouettes).* (Aeronautics, Vol. 7, No. 6, January, 1943, pp. 52-53.)
68	6824	U.S.S.R. ...	*Russian Medium Bomber DB-3F.* (Flugsport, Vol. 35, No. 2, 20/1/43, p. 16.)
			Military Types (Japan and Italy).
69	6147	Japan ...	*Mitsubishi OO Fighter (Silhouette).* (Flying and Pop. Av., Vol. 31, No. 4, Oct., 1942, p. 35.)
70	6393	Italy	*Macchi C. 202 Fighter (Identification Details).* (Flight, Vol. 43, No. 1,776, 7/1/43, p. a.)
71	6802	Italy	*Cant Z 1007 Asso Medium Bomber.* (Flugsport, Vol. 35, No. 1, 6/1/43, pp. 1-2.)

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			Armament (Guns, Turrets and Armour).
72	6154	U.S.A. ...	*Tail Gunner on B-17E (Photo).* (Flying and Pop. Av., Vol. 31, No. 4, Oct., 1942, p. 53.)
73	6160	Germany ...	*Aircraft Machine Gun M.G.* 131. (Flugsport, Vol. 34, No. 26, 23/12/42, pp. 407-410.)
74	6257	U.S.A. ...	*The Armament of Big Bombers.* (J. I. Waddington, Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 218, 241-244.)
75	6287	U.S.A. ...	*Aircraft Armour (Breeze Process).* (Aviation, Vol. 41, No. 9, Sept., 1942, pp. 120-122.)
76	6390	U.S.A. ...	*Tail Turrets on Liberator and Fortress (Photo).* (Flight, Vol. 43, No. 1,776, 7/1/43, p. 7.)
77	6406	Canada ...	*Arms and the Bomber (with Special Reference to Turrets).* (J. L. Waddington, Canadian Aviation, Vol. 15, No. 10, Oct., 1942, pp. 50 and 60.)
78	6426	U.S.A. ...	*"Fortress" Gunnery and Rear Fire.* (Engineer, Vol. 175, No. 4,541, 22/1/43, pp. 72-73.)
79	6607	G.B.	*Boulton Paul Turrets.* (Trade and Eng. Times, Vol. 52, No. 947, Jan., 1943, pp. 35-36.)
80	6743	Germany ...	*Aircraft Machine Gun M.G.* 131. (Luftwissen, Vol. 9, No. 12, Dec., 1942, p. 342.)
81	6754	Germany ...	*Sound-Proofed Firing Range for the Testing of Small Arms.* (Z.V.D.I., Vol. 86, No. 49-50, 12/12/42, p. 748.)
82	6837	Germany ...	*Ammunition Belt Container for Aircraft Guns.* (L.A.B. Pat. No. 727,860, Flugsport, Vol. 35, No. 2, 20/1/43, Pat. Series 46, p. 186.)
			Armament (Bombs and Dropping Gear).
83	6169	Germany ...	*Device for Spraying Liquid from Aircraft. (Pat. Series* 44, *No.* 726,999.) (E. Mirovsky, Flugsport, Vol. 34, No. 26, 23/12/42, p. 180.)
84	6171	Germany ...	*Device for Jettisoning Loads at Predetermined Time Intervals. (Pat. Series* 44, *No.* 725,813.) (H. List, Flugsport, Vol. 34, No. 26, 23/12/42, p. 180.)
85	6173	Germany ...	*Selector Gear for Single or Group Bombing. (Pat. Series* 44, *No.* 725,370.) (Siemens, Flugsport, Vol. 34, No. 26, 23/12/42, p. 179.)
86	6401	G.B.	*Standard R.A.F. Bomb Winch (Photo).* (Aeroplane, Vol. 164, No. 1,650, 8/1/43, p. 55.)
			Ballistics and Explosives.
87	6328	Germany ...	*The Effect of Physical and Mechanical Conditions on Detonation Characteristics of a Powdered Explosive containing Nitroglycerine.* (W. Schneider, Z.G.S.S., Vol. 37, No. 12, Dec., 1942, pp. 221-224.)
88	6329	Germany ...	*A Graphical Numerical Method for the Rapid Determination of the Accuracy of Gun Fire.* (F. Gabriel, Z.G.S.S., Vol. 37, No. 12, Dec., 1942, pp. 224-227.)
89	6330	Germany ...	*The Electrostatic Charge of Powdered Explosives and Liability to Explosions by Electrostatic Sparks.* (E. Kleider, Z.G.S.S., Vol. 37, No. 12, Dec., 1942, p. 227.)

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90	6331	Switzerland ...	*Possible Increase in Muzzle Velocity by Conical Bore of Gun.* (A. Stattbacher, Z.G.S.S., Vol. 37, No. 12, Dec., 1942, p. 229.)
			Military Transport Aircraft.
91	6610	U.S.A. ...	*Curtiss Commando Cargo Plane.* (Autom. Ind., Vol. 87, No. 9, 1/11/42, pp. 24-25.)
92	6672	U.S.A. ...	*Douglas C. 54 Transport "Skymaster" (Photograph).* (Aeroplane, Vol. 64, No. 1,652, 22/1/43, p. 87.)
93	6681	U.S.A. ...	*Lockheed "Constellation" Transport (Model).* (Aeroplane, Vol. 64, No. 1,652, 22/1/43, p. 109.)
94	6826	Germany ...	*Ju. 90 S Four-Engined Transport (Photo).* (Flugsport, Vol. 35, No. 2, 20/1/43, p. 16.)
			Parachutes.
95	6202	G.B.	*Bibliography of Published Information on German Parachutes (including Recent German Patents).* (R.T.P.3, Bibliography No. 79, Ministry of Aircraft Production, Jan., 1943.)
96	6720	U.S.A. ...	*One Man Parachute Boat.* (Aero Digest, Vol. 41, No. 5, Nov., 1942, p. 298.)
			Gliders.
97	6144	U.S.A. ...	*Glider Pick-up.* (J. Randolph, Flying, Vol. 31, No. 4, Oct., 1942, pp. 26-28.)
98	6159	Italy	*Typical Italian Gliders (Pavullo, Balilla, Nibro, Grifo, Cigona, etc.).* (Flugsport, Vol. 34, No. 26, 23/12/42, pp. 403-407.)
99	6251	U.S.A. ...	*Cargo Gliders.* (A. S. Ogden, Aero Digest, Vol. 41, No. 4, Oct., 1941, pp. 139-142.)
100	6282	U.S.A. ...	*U.S. Gliders and Paratroops.* (Aviation, Vol. 41, No. 9, Sept., 1942, pp. 101, 309-313.)
101	6294	G.B.	*British Glider Training.* (Aviation, Vol. 41, No. 9, Sept., 1942, p. 203.)
102	6409	Canada ...	*Ryan Plastic Trainer,* (Canadian Aviation, Vol. 15, No. 10, Oct., 1942, pp. 107 and 110.)
103	6410	Canada ...	*Glider Training.* (Canadian Aviation, Vol. 15, No. 10, Oct., 1942, p. 56.)
104	6642	Italy	*Italian Sailplanes,* (Der Flieger, Vol. 21, No. 6, June, 1942, pp. 182-184.)
105	6643	Switzerland ...	*Sailplane Catapult for Zurich Aero Club.* (Der Flieger, Vol. 21, No. 6, June, 1942, p. 188.)
106	6650	Germany ...	*New German World Record for Sailing Flight (45 hrs. 33mins.).* (Der deutsche Sportflieger, Vol. 9, No. 12, Dec., 1942, p. 250.)
107	6651	Germany ...	*Notes on Auxiliary Engines for Gliders.* (Der deutsche Sportflieger, Vol. 9, No. 12, Dec., 1942, p. 251.)
108	6714	U.S.A. ...	*Piper TG-8 Training Glider (Three-Seater).* (Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 224-225.)
109	6804	Sweden ...	*Sailing Flight in Sweden.* (Flugsport, Vol. 35, No. 1, 6/1/43, pp. 10-11.)
110	6810	Germany ...	*Tow-Rope Take-off for Autogyro Sail Planes (726,613), Patent Series No. 45.* (Focke, Flugsport, Vol. 35, No. 1, 6/1/43, p. 182.)
111	6817	U.S.A. ...	*Cargo Glider Pick-up.* (R. C. du Pont, A.S.M.E. Annual Meeting, Dec., 1942, Paper 105.)

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112	6827	Italy ...	... *Two-Bolt Spar Fitted on Italian Sailplane Sparviero II (Diagrams).* (Flugsport, Vol. 35, No. 2, 20/1/43, pp. 17-18.)
113	6829	Germany	... *Pilot's Flight Report of the New Sailplane Duration Record (45 h. 33 min.).* (E. Vergens, Flugsport, Vol. 35, No. 2, 20/1/43, pp. 25-27.)
			A.R.P.
114	6755	Germany	... *Town Planning and Air Raid Precautions.* (Z.V.D.I., Vol. 86, No. 49-50, 12/12/42, p. 757.)
115	6777	Canada	... *Fighting the Incendiary.* (E. Churchill, Flying and Pop. Av., Vol. 31, No. 2, Aug., 1942, pp. 42-44, 112.)
116	6785	U.S.A.	... *Emergency Repairs to Gas Mains.* (C. S. Goldsmith, Mec. Eng., Vol. 64, No. 12, Dec., 1942, pp. 863-866.)
			Miscellaneous.
117	6146	U.S.A.	... *Blimps.* (E. E. Burton, Flying, Vol. 31, No. 4, Oct., 1942, pp. 224-25 and 97-98.)
118	6391	G.B. ...	... *Scenes on the Flight Deck of a Carrier (Photo).* (Flight, Vol. 43, No. 1,776, 7/1/43, pp. 8-9.)
119	6654	Germany	... *Overhauling a U Boat (Photographs).* Der deutsche Sportflieger, Vol. 9, No. 12, Dec., 1942, pp. 260-262.)
			Aero- and Hydrodynamics.
120	6225	Japan	... *Experiments on Rows of Aerofoils Under Conditions of Retarded Flow.* (Y. Shimoyana, Memoirs of the Faculty of Engineering, Vol. 8, No. 4, 1938, pp. 281-329.)
121	6308	G.B. ...	... *Wave and Tidal Streams.* (P. J. H. Unna, Nature, Vol. 149, No. 3,773, 21/2/42, pp. 219-220.)
122	6450	U.S.A.	... *Aeronautical Research.* (J. C. Hunsaker, J. Aeron. Sci. (Rev. Sec.), Vol. 1, No. 8, Nov., 1942, pp. 21 and 38.)
123	6544	U.S.A.	... *The Dynamic Viscosity of Nitrogen.* (W. L. Sibbitt and others, Annual Meeting of the A.S.M.E., Power Division, 30 Nov.-4 Dec., 1942, pp. 1-4.)
124	6549	U.S.A.	... *An Analysis of Gas Pipe Line Economics (Pipe Resistance).* (H. C. Lehn, Annual Meeting of the A.S.M.E., Power Division, 30 Nov.-4 Dec., 1942, pp. 1-11.) (Preprint No. 30.)
125	6600	Japan	... *On the Permissible Roughness in the Laminar Boundary Layer.* (I. Tani and others, Aero. Res. Inst., Tokyo, No. 199, Oct., 1940, pp. 419-428.
126	6666	U.S.A.	... *Nomograph for Pressure Drop in Isothermal Flow of Compressible Fluids.* (G. W. Thomson, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 12, Dec., 1942, p. 1,485.)
127	6686	U.S.A.	... *Newton and Aerodynamics (Resistance Laws).* (Th. van Kármán, J. Aeron. Sci., Vol. 9, No. 14, Dec., 1942, pp. 521-522.)

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128	6689	U.S.A. ...	*Elliptic Tunnel Wall Corrections on Drag and Stall.* (J. G. Gorvin and R. W. Hensel, J. Aeron. Sci., Vol. 9, No. 14, Dec., 1942, pp. 533-537.)
129	6706	U.S.A. ...	*Wind Tunnel Test and Actual Performance Data.* (H. G. Smith, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 170, 272-279.)
130	6722	Germany ...	*Fluid Motion in Rotating Centrifugal Impellers (Experimental Investigations).* (E. Grunagel, V.D.I., Forschungsheft, No. 405, Nov.-Dec., 1940, pp. 1-21.)
131	6727	Germany ...	*Two-Dimensional Fields of Stress and Viscous Flow in the Case of Two Circular Boundaries (with Special Reference to the Case of the Rotating Cylinder).* (W. Muller, Ing. Archiv., Vol. 13, No. 1, Feb., 1942, pp. 37-58.) z
132	6739	Germany ...	*Photograph of Aircraft Jettisoning Fuel in Flight (Tip Vortices and Downwash).* (Luftwissen, Vol. 9, No. 10, Oct., 1942, p. 306.)
133	6758	Germany ...	*Speed Correction in Wind Tunnel Experiments (Digest).* (Z.V.D.I., Vol. 86, No. 49-50, 12/12/42, p. 755.)
134	6760	Switzerland ...	*Model Experiments on Cavitation in Centrifugal Pumps (Digest).* (Z.V.D.I., Vol. 86, No. 49-50, 12/12/42, pp. 756-757.)
135	6767	Germany ...	*Aerodynamic Forces on a Wing Fitted with a Lateral Plate (with Some Notes on the Effect of the Fuselage on the Rolling Moment and Lateral Force during Side Slip).* (J. Rotta, Ing. Archiv., Vol. 13, No. 3, 1942, pp. 119-131.)
136	6791	Germany ...	*A New Theory of Free Turbulence (Digest).* (W. Tollmien, Z.V.D.I., Vol. 86, No. 35-36, 5/9/42, pp. 553-554.)
137	6793	Germany ...	*Convenient Approximate Equations for Density and Pressure at Great Altitudes.* (F. Haber, Z.V.D.I., Vol. 86, No. 35-36, 5/9/42, p. 555.)
138	6818	U.S.A. ...	*Developments in the Measuring of Pulsating Flows with Inferential Head Meters.* (S. R. Beitler and others, A.S.M.E. Annual Meeting, Dec., 1942, Paper 106.)
139	6821	U.S.A. ...	*Desirable Characteristics of Valves and Final Control Elements for Cascade Control.* (P. W. Keppler, A.S.M.E. Annual Meeting, Dec., 1942, Paper No. 109.)

Aircraft, Airscrews and Accessories.

Construction and Design.

140	6165	Germany ...	*Wing Installation for Double Power Units (Two In-Line Engines Side by Side). (Pat. Series 44, No. 726,495.)* (Heinkel, Flugsport, Vol. 34, No. 26, 23/12/42, pp. 177-178.)
141	6172	Germany ...	*Device for Rapid Connection and Disconnection of Control Rods. (Pat. Series 44, No. 726,531.)* (Dornier, Flugsport, Vol. 34, No. 24, 23/12/42, p. 179.)

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142	6241	U.S.A.	...	*Fundamental Equations of Weight Control. (Value of a Pound Saved.)* (J. E. Ayers, Aero Digest, Vol. 4, No. 4, Oct., 1942, pp. 108-114 and 244-249.)
143	6246	U.S.A.	...	*Characteristics of Woods for Aircraft Structural Plywoods.* (R. C. Perkins, Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 181-190.)
144	6286	U.S.A.	...	*Future of Water Based Aircraft.* (F. T. Courtney, Aviation, Vol. 41, No. 9, Sept., 1942, pp. 116-119 and 285-286.)
145	6292	U.S.A.	...	*Aircraft Woods (Properties and Uses).* (Aviation, Vol. 41, No. 9, Sept., 1942, pp. 159 and 161.)
146	6385	G.B. ...	...	*Wooden Aircraft for War Purposes.* (Nature, Vol. 151, No. 3,818, 2/1/43, p. 17.)
147	6392	France	...	*Modern French Designs for Large Aircraft.* (Flight, Vol. 43, No. 1,776, 7/1/43, pp. 10-12.)
148	6412	Canada	...	*Developments in Plywood for Aircraft Construction.* (S. Erright, Canadian Aviation, Vol. 15, No. 10, Oct., 1942, pp. 73-90 and 84-86.)
149	6452	U.S.A.	...	*Aeronautical Progress during the Last Ten Years (Contributions by Leading American Aircraft, Engine and Equipment Firms).* Various, J. Aeron. Sci. (Rev. Sect.), Vol. 1, No. 8, Nov., 1942, pp. 39-158.)
150	6551	U.S.A.	...	*Plywood in Aircraft Construction.* (G. A. Allwood, Annual Meeting of the A.S.M.E., Power Division, 30 Nov.-4 Dec., 1942, pp. 1-3.)
151	6563	G.B. ...	...	*The Future of Civil Aviation.* (Engineer, Vol. 175, No. 4,542, 29/1/43, p. 83.)
152	6703	U.S.A.	...	*Low Carbon, Low Alloy Steel in Shell Type Aircraft Structures (Part 3).* (E. Schmued, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 145-150.)
153	6713	U.S.A.	...	*Weight Control Engineering.* (W. F. Nicol, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 216-218, 260.)
154	6717	U.S.A.	...	*Value of a Pound Saved by Weight Control (II).* (J. E. Ayers, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 238-255.)
155	6735	Germany	...	*Strength Investigations on the Steel Spars of the Outer Wing of a Blenheim V.* (F. Glatz, Luftwissen, Vol. 9, No. 10, Oct., 1942, pp. 300-302.)
156	6803	Germany	...	*Flight Research Department at the Junkers Works (Development during Last 20 Years).* (Flugsport, Vol. 35, No. 1, 6/1/43, pp. 2-7.)
157	6805	Germany	...	*Metal Fuselage Construction (Composite Cylinders).* (727,196.) *Patent Series* 45. (Messerschmitt, Flugsport, Vol. 35, No. 1, 6/1/43, p. 181.)
158	6806	Germany	...	*Trap Door for Load Release from Hatches.* (727,219.) *Patent Series* **45.** (Heinkel, Flugsport, Vol. 35, No. 1, 6/1/43, p. 181.)
159	6807	Germany	...	*High Lift Flap (Slotted and Fitted with Tab).* (727,459.) *Patent Series* 45. (Messerschmitt, Flugsport, Vol. 35, No. 1, 6/1/43, p. 181.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
160	6808	Germany ...	*Locking Device for Folding Wings.* (727,460.) *Patent Series* 45. (Fieseler, Flugsport, Vol. 35, No. 1, 6/1/43, pp. 181-182.)
161	6809	Germany ...	*Combination of Nose Slat and Adjustable Wing Nose.* (694,916.) *Patent Series* 45. (Messerschmitt, Flugsport, Vol. 35, No. 1, 6/1/43, p. 182.)
162	6811	Germany ...	*Aircraft with Two Single Blade Rotors which can be Linked to Form a Stationary Lifting Surface.* (725,769.) *Patent Series* 45. (Dornier, Flugsport, Vol. 35, No. 1, 6/1/43, p. 183.)
163	6812	Germany ...	*Wing Flaps Capable of Auto-Rotation.* (727,298.) *Patent Series* 45. (Henschel, Flugsport, Vol. 35, No. 1, 6/1/43, p. 183.)
164	6813	Germany ...	*Tail Wheel Elastic Mounting.* (725,968.) *Patent Series* 45. (Gotha, Flugsport, Vol. 35, No. 1, 6/1/43, p. 183.)
165	6814	Germany ...	*Tail Wheel Elastic Mounting.* (726,650.) *Patent Series* 45. (Heinkel, Flugsport, Vol. 35, No. 6/1/43, pp. 183-184.)
166	6815	Germany ...	*Nose Wheel Installation Alongside Engine (Unsymmetrical Engine Installation.)* (727,197.) *Patent Series* 45. (Arado, Flugsport, Vol. 35, No. 1, 6/1/43, p. 184.)
167	6831	Germany ...	*Reports of the German Academy of Aeronautical Research (New Series of Publications). Contents of No. 1: Assisted Take-off; Increase of Max. Lift by Wing Vibration; Bending Vibrations of Supercharger Blades, etc.* (Flugsport, Vol. 35, No. 2, 20/1/43.)
168	6832	Germany ...	*Fuselage with Nose and Tail Engine Installation.* (Dornier Patent No. 728,044, Flugsport, Vol. 35, No. 2, 20/1/43, Pat. Series 46, p. 185.)
169	6833	Germany ...	*Pressure Cabin.* (Arado, Pat. No. 728,045, Flugsport, Vol. 35, No. 2, 20/1/43, Pat. Series 46, p. 185.)
170	6834	Germany ...	*Nose Slat with Constant Leading Edge Profile.* (Arado, Pat. No. 727,799, Flugsport, Vol. 35, No. 2, 20/1/43, Pat. Series 46, p. 185.)
171	6835	Germany ...	*Slotted Spoilers.* (Junkers, Patent No. 727,732, Flugsport, Vol. 35, No. 2, 20/1/43, Patent Series 46, pp. 185-186.)
172	6836	Germany ...	*Adjustable Wing Nose.* (D.V.L., Pat. No. 727,712, Flugsport, Vol. 35, No. 2, 20/1/43, Pat. Series 46, p. 186.)
173	6838	Germany ...	*Auxiliary Skids for Take-off on Snow.* (Heine, Pat. No. 728,046, Flugsport, Vol. 35, No. 2, 20/1/43, Patent Series 46, pp. 187-188.)
174	6839	Germany ...	*Elastic Rubber Mounting for Aircraft Wheels.* (M.G., Pat. No. 726,998, Flugsport, Vol. 35, No. 2, Patent Series 46, p. 188.)
			Performance and Control.
175	6344	U.S.A. ...	*Ground Vibration Tests.* (C. D. Pengelley, J. Aeron. Sci., Vol. 9, No. 3, Nov., 1942, pp. 481-490.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
176	6345	U.S.A. ...	*Determination of Airplane Critical Altitude by Flight Tests.* (L. C. Miller, J. Aeron. Sci., Vol. 9, No. 3, Nov., 1942, pp. 491-496.)
177	6346	U.S.A. ...	*Vector Solution of the Three-Degree Case of Wing Bending, Wing Torsion, Aileron Flutter.* (L. Arnold, J. Aeron. Sci., Vol. 9, No. 3, Nov., 1942, pp. 497-500.)
178	6636	G.B.	*Sperry Automatic Pilot.* (*B. Patent No.* 547,484.) (Engineering, Vol. 155, No. 4,021, 5/2/43, p. 120.)
179	6685	U.S.A. ...	*New Developments in Simplified Control.* (R. H. Upson, J. Aeron. Sci., Vol. 9, No. 14, Dec., 1942, pp. 515-520 and 548.)
180	6687	U.S.A. ...	*Proportioning a "Canard" Airplane for Longitudinal Stability and Safety Against Stall.* (J. V. Foa, J. Aeron. Sci., Vol. 9, No. 14, Dec., 1942, pp. 523-528.)
181	6816	Germany ...	*Utilisation of Pressure in Hydraulic Retractable Undercarriage System for Load and Trim Determinations (Aircraft on Ground).* (725,196.) *Patent Series* 45. (Ehrhardt, Flugsport, Vol. 35, No. 1, 6/1/43, p. 184.)

Equipment (Ground and Maintenance).

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
182	6114	G.B.	*Soil Mechanics in Road and Aerodrome Construction (Discussion).* (A. H. Markwick, J. Inst. Civil Engs. Supplement, No. 8, 1941-1942, Oct., 1942, pp. 506-521.)
183	6174	Germany ...	*Lifting Tackle for Loading Aircraft.* (*Pat. Series* 44, *No.* 725,509.) (Heinkel, Flugsport, Vol. 34, No. 26, 23/12/42, pp. 179-180.)
184	6223	G.B.	*Aircraft Landing Grounds.* (Engineer, Vol. 175, No. 4,539, 8/1/43, p. 32.)
185	6276	G.B.	*Servicing Civil Aircraft.* (Trade and Engineering Times, Vol. 52, No. 946, Dec., 1942.)
186	6618	U.S.A. ...	*Aircraft Hangars Made of Bonded Plywood (Photo).* (Autom. Ind., Vol. 87, No. 9, 1/11/42, p. 92.)
187	6619	G.B.	*Introduction to Soil Mechanics.* (W. L. Lowe-Brown, Engineer, Vol. 175, No. 4,543, 5/2/43, pp. 104-106.)
188	6695	G.B.	*Air Ports and Their Planning.* (F. G. Miles, Aeronautics, Vol. 7, No. 6, Jan., 1943, pp. 60-61.)
189	6731	Germany ...	*Repair and Maintenance of Aircraft in the Field.* (Luftwissen, Vol. 9, No. 11, Nov., 1942, pp. 318-319.)
190	6776	Canada ...	*Flight Strips.* (S. S. Hanks, Flying and Pop. Av., Vol. 31, No. 2, Aug., 1942, pp. 25-26, 90.)
191	6778	Canada ...	*Portable Steel Runways.* (G. R. Reiss, Flying and Pop. Av., Vol. 31, No. 2, Aug., 1942, pp. 45-46.)

Equipment (Electrical).

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
192	6321	G.B.	*Cable Weights.* (*R.T.P. Translation No.* 1,475.) (Airc. Prod., Vol. 5, No. 51, Jan., 1943, pp. 23-24.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
193	6704	U.S.A.	...	*Electrical System Testing of "Lightning" Aircraft.* (Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 153, 385.)
194	6705	U.S.A.	...	*Proposed C.A.A. Regulations for Aircraft Electrical Assemblies.* (Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 154-168, 255-256.)
195	6708	U.S.A.	...	*Behaviour of Electrical Equipment at High Altitudes.* (N. J. Clark, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 189-190.)
196	6712	U.S.A.	...	*Quick Disconnect Electric Plugs for Aircraft.* (D. H. Lonkota, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 210-215.)
				Equipment (De-icing).
197	6710	U.S.A.	...	*Electronic Control of De-Icing Equipment.* (W. Kliever, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 197-198, 267-268.)
198	6206	U.S.A.	...	*Electric Ice Indicator for Aircraft.* (Sci. Am., Vol. 167, No. 6, Dec., 1942, p. 280.)
				Model Aircraft.
199	6161	Germany	...	*Classification and Regulations for Aircraft Model Flight Competitions.* (Flugsport, Vol. 34, No. 26, 23/12/42, pp. 415-418.)
200	6222	G.B. ...	...	*The Langley Aeroplane of* 1903. (Engineer, Vol. 175, No. 4,539, 8/1/43, p. 32.)
201	6261	G.B. ...	...	*The* 1914 *Tests of the Langley Aerodrome.* (C. G. Abbot, J. Roy. Aeron. Soc., Vol. 46, No. 384, Dec., 1942, pp. 291-296.)
				Airscrews.
202	6162	Germany	...	*Locking Device for V.P. Airscrews.* (*Pat. Series* 44, *No.* 727,502.) (V.D.M., Flugsport, Vol. 34, No. 26, 23/12/42, p. 177.)
203	6163	Germany	...	*Airscrew Installation for Gliders Fitted with Auxiliary Motors.* (*Pat. Series* 44, *No.* 726,494.) (H. Wunscher, Flugsport, Vol. 34, No. 26, 23/12/42, p. 177.)
204	6164	Germany	...	*Central Contra-Prop Operated by Two Wing Engines.* (*Pat. Series* 44, *No.* 726,862.) (C. R. Wasiege, Flugsport, Vol. 34, No. 26, 23/12/42, p. 177.)
205	6219	G.B. ...	...	*Hydulignum Laminated Wood Airscrews.* (Engineering, Vol. 155, No. 4,017, 8/1/43, pp. 27-28 and 30.)
206	6220	G.B. ...	...	*Suffolk Windmills.* (R. Wailes, Engineering, Vol. 155, No. 4,017, 8/1/43, pp. 34-35.)
207	6277	G.B. ...	...	*Hydulignum Airscrews.* (Trade and Engineering Times, Vol. 52, No. 946, Dec., 1942, p. 36.)
208	6411	Canada	...	*Painting Airscrews for Camouflage.* (Canadian Aviation, Vol. 15, No. 10, Oct., 1942, p. 64.)
209	6422	G.B. ...	...	*Suffolk Windmills.* (R. Wailes, Engineering, Vol. 155, No. 4,019, 22/1/43, pp. 78-79.)
210	6616	U.S.A.	...	*Curtiss Contra-Prop. (Electric Control) (Photo).* (Autom. Ind., Vol. 87, No. 9, 1/11/42, p. 48.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
211	6830	Germany ...	*Auxiliary Lifting Screw for Take-off and Landing of Normal Aircraft (Projects).* (Flugsport, Vol. 35, No. 2, 21/1/43, p. 27.)

Engines and Accessories.

Design.

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
212	6655	U.S.A./G.B. France/Italy	*2,000 h.p. Engine Projects (American, British, French and Italian).* (Der deutsche Sportflieger, Vol. 9, No. 12, Dec., 1942, p. 263.)
213	6677	G.B./U.S.A. Germany	*Engine Mountings (Comparison of British, German and American Practice).* (Aeroplane, Vol. 64, No. 1,652, 22/1/43, pp. 98-100.)
214	6732	Germany/G.B. U.S.S.R./ France	*Design Characteristics of Modern Enemy Aero Engine Pistons (British, American, French and Russian).* (H. Schwarz, Luftwissen, Vol. 9, No. 11, Nov., 1942, pp. 320-328.)
215	6733	Germany ...	*Design Characteristics of Foreign Aero Engine Pistons (British, American, French and Russian).* (H. Schwarz, Luftwissen, Vol. 9, No. 10, Oct., 1942, pp. 283-289.)
216	6744	Germany ...	*The Present State of German and Foreign Aero Engine Design (Digest of Lilienthal Lecture).* (Luftwissen, Vol. 9, No. 2, Dec., 1942, p. 365.)
217	6746	Germany ...	*Fundamental Problems of Aero Engine Design.* (A. Gimon, Luftwissen, Vol 9, No. 12, Dec., 1942, pp. 356-360.)
218	*6796	Germany ...	*Brown Boveri Gas Turbine Locomotive (Electric Transmission).* (Z.V.D.I., Vol. 86, No. 35-36, 5/9/42, pp. 549-557.)
219	6799	Germany ...	*Prohibition of I.C. Locomotive Construction in Germany.* (Z.V.D.I., Vol. 86, No. 35-36, 5/9/42, p. 557.)

Testing and Maintenance.

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
220	6124	G.B.	*Bristol Engine School.* (Flight, Vol. 42, No. 1,775, 31/12/42, pp. 721-722.)
221	6289	U.S.A. ...	*N.A.C.A. Engine Laboratory.* (Aviation, Vol. 41, No. 9, Sept., 1942, pp. 133 and 314-317.)
222	6313	G.B.	*Factors Determining Fuel Economy in Carburettor Engine.* (L. Mantell, Automobile Engineer, Vol. 33, No. 432, Jan., 1943, pp. 19-26.)
223	6456	U.S.A. ...	*Rating Supercharged Engines on the Basis of the Mean Temperature of the Cycle.* (R. Miller, Annual Meeting of the A.S.M.E., Power Division, Nov. 30th-Dec. 4th, 1942, pp. 1-6.)
224	6701	U.S.A. ...	*Sub-Zero Engine Tests (Cyclone).* (Aero Digest, Vol. 41, No. 5, Nov., 1942, p. 90.)

Type.

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
225	6285	U.S.A. ...	*Lawrance Auxiliary Power Unit (15 h.p.).* (B. Reynolds, Aviation, Vol. 41, No. 9, Sept., 1942, pp. 112-115 and 317.)
226	6325	G.B.	*Merlin "Power Egg" Engine (Alvis System of Construction).* (Airc. Prod., Vol. 5, No. 51, Jan., 1943, pp. 37-40.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
227	6388	France ...	*Gnome-Rhone 18 R. 2,000 h.p. Radial.* (Flight, Vol. 43, No. 1,776, 7/1/43, p. 7.)
228	6417	G.B.	*The Development of the Doxford Marine Oil Engine.* (W. Ker Wilson, Engineering, Vol. 155, No. 4,019, 22/1/43, pp. 61-64 and 70.)
229	6606	G.B.	*Rolls Royce Merlin 61.* (Trade and Eng. Times, Vol. 52, No. 947, Jan., 1943, p. 33.)
230	6615	Germany ...	*B.M.W. 801 A Engine* (11). (Autom. Ind., Vol. 87, No. 9, 1/11/42, pp. 38-41.)
231	6626	Germany ...	*Petrol Injection System in B.M.W. 801 Engine.* (Engineer, Vol. 175, No. 4,543, 5/2/43, pp. 109-111.)
232	6640	Germany ...	*B.M.W. 801 Engine.* (Der Flieger, Vol. 21, No. 6, June, 1942, pp. 177-179.)
233	6694	G.B.	*Radial Engine Installations (Hercules and B.M.W.).* (Aeronautics, Vol. 7, No. 6, Jan., 1943, pp. 54-55.)
			Bearings and Manifolds.
234	6217	G.B.	*Bearing Metals and Bearings for I.C. Engine.* (J. W. Donaldson, Metal Industry, Vol. 62, No. 2, 8/1/43, pp. 21-23.)
235	6244	U.S.A. ...	*Rust Proof Coatings for Manifolds.* (R. H. Wendt, Aero Digest, Vol. 41, No. 4, Oct., 1942, p. 162.)
236	6290	U.S.A. ...	*Cleaning and Relubrication of Anti-Friction Bearings on a Mass Scale.* (Aviation, Vol. 41, No. 9, Sept., 1942, pp. 135-138.)
237	6302	U.S.A. ...	*Flow Production of Engine Manifolds (Ryan).* (E. A. Moore, Machinist, Vol. 86, No. 37, 26/12/42, p. 238 EA.)
238	6354	G.B.	*Silver for Aero Engine Bearings.* (Machinery, Vol. 61, No. 1,571, 19/11/42, p. 577.)
239	6378	G.B.	*Cleaning Small Bearings.* (Machinery, Vol. 61, No. 1,573, 3/12/42, p. 623.)
240	6611	U.S.A. ...	*Manufacture of Exhaust Manifolds for Radial Engines.* (E. A. Moore, Autom. Ind., Vol. 87, No. 9, 1/11/42, pp. 26-29, 72-74.)
241	6742	Germany ...	*S.K.F. Conical Roller Bearings (Digest).* (Luftwissen, Vol. 9, No. 12, Dec., 1942, p. 355.)
242	6749	Germany ...	*Fatigue Fracture of Master Connecting Rod Due to Hypocycloidal Rotation of Bearing Sleeve (Opposing Direction of Engine Rotation).* (E. Bruder and G. Gimbel, Luftwissen, Vol. 9, No. 12, Dec., 1942, pp. 353-355.)
243	6819	U.S.A. ...	*Experiments on Bearing Performance.* (R. J. S. Pigott and others, A.S.M.E. Annual Meeting, Dec., 1942, Paper 107.)
			Compressors and Pumps.
244	6186	U.S.A. ...	*Pump with Flexible Rubber Tube Action.* (Machinery, Vol. 61, No. 1,577, 31/12/42, pp. 748-749.)
245	6557	G.B.	*A New Rotary Air Compressor.* (A. J. R. Lysholm Engineering, Vol. 155, No. 4,020, 29/1/43, pp 97-100.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
246	6771	U.S.A. ...	*The Supercharging of Two-Stroke Diesel Engines.* (F. Oederlin, Mech. Eng., Vol. 64, No. 11, Nov., 1942, pp. 779-783.)
			Fuel Tanks and Radiators.
247	6166	Germany ...	*Sub-Divided Wing Condenser for Vapour-Cooled Power Plants Incorporating Condensate Delivery Pumps.* (*Pat. Series* 44, *No.* 726,529.) (Heinkel, Flugsport, Vol. 34, No. 26, 23/12/42, p. 178.)
248	6167	Germany ...	*Air Venting System for Skin Condensers.* (*Pat. Series* 44, *No.* 726,530.) (Heinkel, Flugsport, Vol. 34, No. 26, 23/12/42, p. 178.)
249	6168	Germany ...	*Pumping Installation for Fuel or Coolant on Aircraft.* (*Pat. Series* 44, *No.* 726,496.) (Heinkel, Flugsport, Vol. 34, No. 26, 23/12/42, p. 178.)
250	6170	Germany ...	*Rubber Plastic Cover for Metal Fuel Tanks.* (*Pat. Series* 44, *No.* 725,198.) (O. Raspe, Flugsport, Vol. 34, No. 26, 23/12/42, pp. 178-179.)
251	6702	U.S.A. ...	*Calibration of Aircraft Fuel Tanks.* (R. C. Moeller, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 139-140, 263.)
			Ignition Systems.
252	6272	G.B.	*Mechanism of Creep Path Formations (Electric Leakage on Organic Insulators).* (Plastics, Vol. 7, No. 68, Jan., 1943, pp. 9-14.)
253	6715	U.S.A. ...	*Ignition Shielding Design.* (J. J. Mascuch, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 227-230, 396.)
			Fuels and Lubricants.
			Combustion Theory.
254	6176	G.B.	*Influence of Water Vapour on Flame Gas Temperature.* (W. T. David and J. Mann, Nature, Vol. 150, No. 3,809, 31/10/42, pp. 521-522.)
255	6333	Germany ...	*Flame Speed and Ignition Velocity of Coke Oven Gas/Air Mixtures.* (W. Heilegen-staedt, Gas, Vol. 14, No. 5, May, 1942, pp. 73-77.)
256	6380	G.B.	*Condition of Freshly Burnt Gases.* (W. T. David and A. G. Gaydon, Nature, Vol. 150, No. 3,813, 28/11/42, p. 636.)
257	6554	U.S.S.R. ...	*Physical Chemistry in the Soviet Union.* (Ind. and Eng. Chem., Vol. 20, No. 23, 10/12/42, pp. 1,576-1,577.)
			Knock Rating and High Octane Fuels.
259	6235	U.S.A. ...	*High Octane Fuels by Polymerisation and Alkylation of Cracking Gases.* (V. N. Ipatieff, Ind. and Eng. Chem., Vol. 20, No. 21, 10/11/42, pp. 1,367-1,368.)
			Gaseous Fuels and Gas Analysis.
260	6196	Italy	*Supercharged Gas Generators.* (l'Auto Italiana, Vol. 23, No. 32, 20/11/42, pp. 15-18.)
261	6315	G.B.	*Pressure Charged Gas Producers.* (F. C. Sheffield, Automobile Engineer, Vol. 33, No. 432, Jan., 1943, pp. 31-36.)

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262	6316	G.B. ...	... *Alternative Fuels.* (Automobile Engineer Vol. 33, No. 432, Jan., 1943, p. 36.)
263	6448	U.S.A.	... *Determination of Low Concentration of O_2 in Gases.* (J. A. Shaw, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 11, 15/11/42, pp. 891-892.)
264	6698	U.S.A.	... *Low Temperature Carbonization Coke Developments.* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 22, 25/11/42, p. 1,521.)
			Lubricating Oils.
265	6667	U.S.A.	... *Viscosity of Lubricating Oils Saturated with Natural Gases at High Pressure.* (J. S. Sibearingen and E. D. Redding, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 12, Dec., 1942, pp. 1,496-1,498.)
			Theory of Elasticity.
			General.
266	6115	G.B. ...	... *Effect of Rate of Loading on the Mechanical Properties of Some Material (Discussion). (Reference to Shock Waves in Flexible fuel Tanks.)* (R. H. Evans, J. Inst. Civil Engs., Supplement to No. 8, Oct., 1942, pp. 563-567.)
267	6218	G.B. ...	... *The Problem of Combined Stress.* (J. J. Guest, Engineering, Vol. 155, No. 4,017, 8/1/43, pp. 21-23.)
268	6348	U.S.A.	... *Rational Analysis of Tension-Field Beams.* (H. W. Sibert, J. Aeron. Sci., Vol. 9, No. 3, Nov., 1942, pp. 510-514.)
269	6423	G.B. ...	... *The Extreme Properties of Matter (Characteristics of the Solid State and Elasticity).* (C. G. Darwin, Engineer, Vol. 175, No. 4,541, 22/1/43, pp. 65-67.)
270	6425	G.B. ...	... *Extreme Strength of Metals (Probability Configuration).* (Engineer, Vol. 175, No. 4,541, 22/1/43, p. 72.)
271	6439	G.B. ...	... *Hardness and Lattice Distortion.* (Metal Industry, Vol. 62, No. 4, 22/1/43, p. 54.)
272	6489	U.S.A.	... *The Relation of Structural Mechanics to Structural Engineering.* (H. Cross, Procs. 5th International Congress for Applied Mechanics, 1939, 1-8.)
273	6491	U.S.A.	... *The Behaviour of Metallic Materials in the Range of Small Deformations.* (F. Koerber, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 20-33.)
274	6493	U.S.A.	... *On the Stress Increase in Notched Bars.* (E. Weinel, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 51-53.)
275	6496	U.S.A.	... *A Discussion of Thin Shell Theory.* (L. H. Donnell, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 66-70.)
276	6498	U.S.A.	... *A Graphical Torsion Analysis.* (H. C. Perkins, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 175-179.)

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277	6500	U.S.A. ...	*On Tension Field Theory.* (E. Reissner, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 88-92.)
278	6501	U.S.A. ...	*Generalisation of the Problem of Saint-Venant.* (C. F. F. Platrier, Procs. of the 5th International Congress of Applied Mechanics, 1939, pp. 102-106.)
279	6503	U.S.A. ...	*Gravitational Stresses in Bipolar Co-ordinates.* (R. D. Mindlin, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 112-116.)
280	6504	U.S.A. ...	*Theory of Elasticity with Large Displacements and Rotations.* (M. A. Biot, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 117-122.)
281	6561	G.B.	*Free and Forced Selections of Continuous Beams (Admittance Method).* (W. J. Duncan, Phil. Mag., Vol. 34, No. 228, Jan., 1943, pp. 49-63.)
282	6630	G.B.	*Problem of Combined Stress.* (J. J. Guest, Engineering, Vol. 155, No. 4,021, 5/2/43, pp. 101-102.)
283	6632	G.B.	*Extreme Properties of Matter (Strength Limit of the Solid State).* (C. G. Darwin, Engineering, Vol. 155, No. 4,021, 5/2/43, pp. 105-106.)
284	6688	U.S.A. ...	*Application of Maclaurin Series to Beams Under Simultaneous Transverse and Axial Loading.* (A. G. Strandhagen, J. Aeron. Sci., Vol. 9, No. 14, Dec., 1942, pp. 529-532.)
285	6763	G.B.	*Dynamic Stiffness and Effective Inertia in Modern Torsional Vibration Theory.* (R. G. Manley, J. Roy. Aeron. Soc., Vol. 47, No. 385, Jan., 1943, pp. 5-21.)
286	6764	G.B.	*The Electro-Mechanical Analogy in Oscillation Theory.* (R. G. Manley, J. Roy. Aeron. Soc., Vol. 47, No. 385, Jan., 1943, pp. 22-26.)
287	6769	Germany ...	*The Pressure Distribution Below Elastically Mounted Supports.* (G. Schubert, Ing. Archiv., Vol. 13, No. 3, 1942, pp. 132-147.)
288	6792	Germany ...	*Simplified Method of Evaluating Three-Dimensional Stress-Optical Experiments.* (A. Kuske, Z.V.D.I., Vol. 86, No. 35-36, 5/9/42, pp. 541-544.)
			Structures.
289	6347	U.S.A. ...	*Predicting Stiffener and Stiffened Panel Crippling Stresses.* (H. B. Crockett, J. Aeron. Sci., Vol. 9, No. 3, Nov., 1942, pp. 501-509.)
290	6492	U.S.A. ...	*The Buckling of a Cylindrical Tank of Variable Thickness Under External Pressure.* (C. R. Biezeno and J. J. Koch, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 34-39.)
291	6494	U.S.A. ...	*The Elastic Stability of Tee Stiffeners.* (D. F. Windenburg, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 54-61.)

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292	6499	U.S.A. ...	*Elastic Instability of Tubular and Panel-Shaped Cylindrical Shells.* (H. Reissner, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 80-87.)
294	6756	Germany ...	*Numerical Evaluation of the Efficiency of an Engineering Structure—Addendum.* (F. Kesselring, Z.V.D.I., Vol. 86, No. 49-50, 12/12/42, pp. 749-752.)
295	6823	U.S.A. ...	*A Numerical Procedure for the Calculation of the Moments in Edge-Reinforcements of Cut-Outs in Monocoques.* (N. J. Hoff, A.S.M.E. Annual Meeting, Dec., 1942, Paper No. 111.)
			Plates.
296	6495	U.S.A. ...	*Deflections and Stress in Built-up Half Diaphragm.* (D. M. Smith, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 62-65.)
297	6497	U.S.A. ...	*Thin Plates on Elastic Foundations.* (D. L. Hall, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 71-74.)
298	6505	U.S.A. ...	*Uniformly Loaded, Clamped, Rectangular Plates with Large Deflections.* (S. Way, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 123-128.)
299	6766	Germany ...	*The Centrally Loaded Thick Circular Plate.* (R. Ohlig, Ing. Archiv., Vol. 13, No. 3, 1942, pp. 155-162.)
300	6770	Germany ...	*Unsymmetrical Bending of a Circular Plate (Stiffness Varying as the Square of the Radius).* (P. O. Olsson, Ing. Archiv., Vol. 13, No. 3, 1942, pp. 147-154.)
			Beams and Columns.
301	6690	U.S.A. ...	*Notes on Some Secondary Stresses in Thin Walled Box Beams.* (E. Reissner, J. Aeron. Sci., Vol. 9, No. 14, Dec., 1942, pp. 538-542.)
302	6118	U.S.A. ...	*Perforated Cover Plates for Steel Columns.* (A. H. Stang, J. Res. Bur. of Stands., Vol. 29, No. 4, Oct., 1942, pp. 279-302.)
303	6243	U.S.A. ...	*Designing Web-Flange Rivet Connections for Shear Stresses (Tension Field Web).* (H. C. Martin, Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 116-118 and 251.)
304	6262	G.B.	*The Design of Trusses and its Influence on Weight and Stiffness.* (J. Drymael, J. Roy. Aeron. Soc., Vol. 46, No. 384, Dec., 1942, pp. 297-308.)
305	6502	U.S.A. ...	*Buckling of Web Girder Caused by Local Application of Load.* (K. Girkman, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 107-111.)

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307	6768	Germany ...	*Elastic Buckling of Straight Rods Under Influence of Their Weight—the Cross Section Varying Experimentally (with Application to the Limiting Height of Forces).* (R. G. Olsson, Ing. Archiv., Vol. 13, No. 3, 1942, pp. 162-174.)
			Kinematics.
308	6188	G.B.	*Mechanical Movements and Their Design.* (Machinery, Vol. 61, No. 1,576, 24/12/42, pp. 712-714.)
309	6490	U.S.A. ...	*Methods of Analogy in Applied Mechanics.* (J. Peres, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 9-19.)
310	6550	U.S.A. ...	*A Brief Account of Modern Kinematics.* (A. E. Richard de Jonge, Annual Meeting of the A.S.M.E., Power Division, 30th Nov.-4th Dec., 1942, pp. 1-13.)

Materials, Testing and Working Processes.

Iron and Steel (Production and Constitution).

311	6358	G.B.	*Rotary Furnace for Steel Production.* (Machinery, Vol. 61, No. 1,574, 10/12/42, p. 659.)
312	6519	U.S.A. ...	*The Alpha Iron Lattice Parameter as Affected by Molybdenum, and an Introduction to the Problem of the Partition of Molybdenum in Steel.* (T. E. Bowman and others, 24th Annual Convention of the A.S.M., Paper No. 14, 12-16 Oct., 1942, pp. 1-8.)
313	6520	U.S.A. ...	*The Effect of Molybdenum on the Isothermal Sub-Critical Transformation of Austenite in Eutectoid and Hyper-Eutectoid Steels.* (J. R. Blanchard and others, 24th Annual Convention of the A.S.M., Paper No. 15, 12-16 Oct., 1942, pp. 1-20.)
314	6521	U.S.A. ...	*The Effect of Molybdenum on the Rate of Diffusion of Carbon in Austenite.* (J. L. Hamm and others, 24th Annual Convention of the A.S.M., Paper No. 16, 12-16 Oct., 1942, pp. 1-21.)
315	6525	U.S.A. ...	*A Metallographic Study of the Formation of Austenite from Aggregates of Ferrite and Cementite in an Iron-Carbon Alloy of 0.5 per cent. Carbon.* (T. G. Digges and S. J. Rosenberg, 24th Annual Convention of the A.S.M., Paper No. 29, 12-16 Oct., 1942, pp. 1-22.)
316	6526	U.S.A. ...	*Influence of Initial Structure and Rate of Heating on the Austenitic Grain Size of 0.5 per cent. Carbon Steels and Iron-Carbon Alloy.* (T. S. Digges and S. J. Rosenberg, 24th Annual Convention of the A.S.M., Paper No. 21, 12-16 Oct., 1942, pp. 1-39.)
317	6527	U.S.A. ...	*The Mechanism and the Rate of Formation of Austenite from Ferrite-Cementite Aggregates.* (S. A. Roberts and R. T. Mehl, 24th Annual Convention of the A.S.M., Paper No. 22, 12-16 Oct., 1942, pp. 1-37.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
318	6532	U.S.A. ...	*A Study of the Iron-Pig Iron-Manganese Alloys.* (A. R. Troiano and F. T. McGuire, 24th Annual Convention of the A.S.M., Paper No. 27, 12-16 Oct., 1942, pp. 1-20.)
319	6533	U.S.A. ...	*The Induction Furnace as a High Temperature Calorimites and the Heat of Solution of Silicon in Liquid Iron.* (J. Chipman and N. J. Grant, 24th Annual Convention of the A.S.M., Paper No. 28, 12 and 16 Oct., 1942, pp. 1-73.)
320	6535	U.S.A. ...	*The Kinetics of Austenite Decomposition in High Speed Steel.* (P. Gordon and others, 24th Annual Convention of the A.S.M., Paper No. 30, 12-16 Oct., 1942, pp. 1-37.)
321	6536	U.S.A. ...	*The Tempering of Two High Carbon High Chromium Steels.* (O. Zmeskal and M. Cohen, 24th Annual Convention of the A.S.M., Paper No. 31, 12-16 Oct., 1942, pp. 1-28.)

Iron and Steel (Machinability and Hardness).

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
322	6119	U.S.A. ...	*Simultaneous Measurement of Magnetic and Dilalometric Changes (Structural Change During Hardening of Steel).* (O. Zmeskal and M. Cohen, Rev. of Scientific Instrum., Vol. 13, No. 8, Aug., 1942, pp. 346-348.)
323	6130	G.B.	*Flame Hardening with Town Gas.* (R. F. Apter and H. W. Smith, Machinist, Vol. 86, No. 35, 5/12/42, pp. 871-874.)
324	6506	U.S.A. ...	*Effect of Elements in Solid Solution on Hardness and Response to Heat Treatment of Iron Binary Alloys.* (C. R. Austin, 24th Annual Convention of A.S.M., Preprints No. 1, Oct. 12-16, 1942, pp. 1-16.)
325	6507	U.S.A. ...	*Third Element Effects on Hardenability of a Pure Hyper-Eutectoid Iron-Carbon Alloy.* (C. R. Austin and others, 24th Annual Convention of the A.S.M., Preprints, Oct. 19, 1942, No. 2, p. 1-37.)
326	6509	U.S.A. ...	*The Effect of Hardness on the Machinability of Six Alloy Steels.* (O. W. Boston and L. V. Colwell, 24th Annual Convention of the A.S.M. (Preprints), No. 4, Oct. 12-16, 1942, pp. 1-16.)
327	6510	U.S.A. ...	*Carburizing Characteristics of 0.20 per cent. Carbon Alloy and Plain Carbon Steels.* (G. K. Manning, 24th Annual Convention of A.S.M. (Preprints), No. 5, Oct. 12-16, 1942, pp. 1-26.)
328	6516	U.S.A. ...	*The End-Quench Test, Reproducibility.* (Morse Hill, 24th Annual Convention of the A.S.M., Paper No. 11, 12-16 Oct., 1942, pp. 1-15.)
329	6517	U.S.A. ...	*The End-Quench Test: Hardenability of Aircraft Steels and its Representation.* (Morse Hill, 24th Annual Convention of the A.S.M., Paper No. 12, 12-16 Oct., 1942, pp. 1-15.)
330	6518	U.S.A. ...	*Hardenability Control of a 1 per cent. Carbon Steel.* (G. R. Barrow and G. Sole, 24th Annual Convention of the A.S.M., Paper No. 13, 12-16 Oct., 1942, pp. 1-9.)

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331	6534	U.S.A.	...	*The Hardening of Tool Steels.* (P. Payson and J. L. Klein, 24th Annual Convention of the A.S.M., Paper No. 29, 12 and 16 Oct., 1942, pp. 1-27.)
332	6537	U.S.A.	...	*Some Aspects of Strain Hardenability of Austenitic Manganese Steel.* (D. Niconoff, 24th Annual Convention of the A.S.M., Paper No. 32, 12-16 Oct., 1942, pp. 1-19.)
333	6539	U.S.A.	...	*The Effect of Moderate Cold Rolling on the Hardness of the Surface Layer of 0.34 per cent. of Carbon Steel Plates.* (H. K. Herschman, 24th Annual Convention of the A.S.M., Paper No. 34, 12-16 Oct., 1942, pp. 1-12.)
334	6613	U.S.A.	...	*Machinability Tests on Six Alloy Steels (Digest).* (O. W. Boston and L. V. Colwell, Autom. Ind., Vol. 87, No. 9, 1/11/42, p. 35.)
335	6794	Germany	...	*Scatter of Brinell Hardness Values for Steel and Cast Iron.* (F. Rolf and W. Eger, Z.V.D.I., Vol. 86, No. 35-36, 5/9/42, pp. 545-549.)
				Iron and Steel (Mechanical Properties).
336	6512	U.S.A.	...	*Bursting Tests on Notched Alloy Steel Tubing.* (G. Sachs and J. D. Lubahn, 24th Annual Convention of the A.S.M., Paper No. 7, 12-16 Oct., 1942, pp. 1-16.)
337	6513	U.S.A.	...	*Notched Bar Tensile Tests on Heat-Treated Low Alloy Steels.* (G. Sachs and J. D. Lubahn, 24th Annual Convention of the A.S.M., Paper No. 8, 12-16 Oct., 1942, pp. 1-33.)
338	6515	U.S.A.	...	*Fatigue Strength of Normalised and Tempered versus As-Forged Full Size Railroad Car Axles.* (O. J. Horger and T. V. Buckwatter, 24th Annual Convention of the A.S.M., Paper No. 10, 12-16 Oct., 1942, pp. 1-17.)
339	6529	U.S.A.	...	*Influence of Strain Rate on Strength and Type of Failure of Carbon-Molybdenum Steel at 850, 1,000 and 1,000 Degrees Fahr.* (R. F. Miller and others, 24th Annual Convention of the A.S.M., Paper No. 24, 12-16 Oct., 1942, pp. 1-29.)
				Cast Iron.
340	6263	G.B. ...	...	*Research in Cast Iron.* (Engineering, Vol. 155, No. 4,018, 15/1/43, p. 45.)
				Al. and Mg. Alloys.
341	6102	G.B. ...	...	*Constitution of Alloys Bibliography (Digest).* (Institute of Metals, Light Metals, Vol. 5, No. 59, Dec., 1942, p. 521.)
342	6103	G.B. ...	...	*Comparative Resilience of Dural and Steel.* (L. P. Dudley, Light Metals, Vol. 5, No. 59, Dec., 1942, pp. 497-500.)
343	6104	G.B. ...	...	*Electrically Heated Salt Baths.* (H. R. Smith, Light Metals, Vol. 5, No. 59, Dec., 1942, pp. 504-510.)

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344	6105	G.B. ...	... *Al. in the Canning Industry.* (Light Metals, Vol. 5, No. 59, Dec., 1942, pp. 526-540.)
345	6112	G.B. ...	... *Mechanical Testing of Al. (Digest).* (Northern Al. Co. Light Metals, Vol. 5, No. 59, Dec., 1942, p. 523.)
346	6373	G.B. ...	... *Extruding Non-Ferrous Metal Tubes.* (Machinery, Vol. 61, No. 1,568, 29/10/42, pp. 492-493.)
347	6375	G.B. ...	... *Speeding Up the Seasoning of Castings.* (Machinery, Vol. 61, No. 1,570, 12/11/42, p. 540.)
348	6437	G.B. ...	... *Quenching of Light Alloys.* (Metal Industry, Vol. 62, No. 4, 22/1/43, p. 52.)
349	6540	U.S.A.	... *The Metallography of Commercial Magnesium Alloys.* (J. B. Hess and P. F. George, 24th Annual Convention of the A.S.M., Paper No. 35, 12-16 Oct., 1942, pp. 1-22.)
350	6578	G.B. ...	... *Cold Pressing Properties of Dural Type Alloy Sheet (Discussion).* (J. C. Arrowsmith and others, J. Inst. Metals, Vol. 9, No. 12, Dec., 1942, pp. 387-395.)
351	6581	G.B. ...	... *Damping Characteristics of Some Mg. and Al. Alloys Over the Range* $-50°$ *to* $280°C$. (L. R. Stanton and F. C. Thompson, J. Inst. Metals, Vol. 10, No. 1, Jan., 1943, pp. 29-42.)
352	6624	Germany	... *Deep Drawing for Zn. and Al. Alloys.* (F. Erdmann and H. Hanemann, Metal Industry, Vol. 62, No. 6, 5/2/43, pp. 82-85.)
353	6626	U.S.A.	... *Heat Treatment of Al. (Bell Aircraft Accelerated Procedure).* (Metal Industry, Vol. 62, No. 6, 5/2/43, p. 88.)
354	6628	G.B. ...	... *The Crystal Process for the Anodic Oxidation of Al.* (A. Ensor, Metal Industry, Vol. 62, No. 6, 5/2/43, pp. 90-92.)
355	6629	G.B. ...	... *Working Stresses in Al. Alloy Structures.* (E. W. Thomas, Engineering, Vol. 155, No. 4,021, 5/2/42, pp. 101.)
356	6683	G.B. ...	... *World Production of Magnesium.* (Imperial Institute, Mineral Resources Dept., Report on Magnesium, 1939, pp. 23-24.)
357	6684	U.S.A.	... *World Production of Aluminium.* (Metal Statistics, 1939, p. 503.)
			Copper and Copper Alloys.
358	6127	G.B. ...	... *Properties of Commercial Coppers Containing Selenium, Tellurium and Bismuth.* (G. L. Bailey and A. P. Hallowes, Metal Industry, Vol. 62, No. 1, 1/1/42, pp. 6-9.)
359	6215	G.B. ...	... *Properties of Commercial Coppers Containing Se., Te. and Bi.* (G. L. Bailey and A. P. C. Hallowes, Metal Industry, Vol. 62, No. 2, 8/1/43, pp. 18-20.)
360	6266	G.B. ...	... *De-Oxidised Copper for Tube Manufacture (Effect of Se., Te. and Bi.).* (M. Cork and G. Parker, Metal Industry, Vol. 61, No. 26, 25/12/42, pp. 402-405.)

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361	6530	U.S.A. ...	*Rupture Tests at 200 Degrees Cent. on Some Copper Alloys.* (E. R. Parker and C. Ferguson, 24th Annual Convention of the A.S.M., Paper No. 25, 12-16 Oct., 1942, pp. 1-17.)
362	6538	U.S.A. ...	*The Precipitation Reaction in Aged Cold-Rolled 1 per Cent. Cadmium-Copper. Its Effects on Hardness, Conductivity end Tensile Properties.* (R. H. Harrington and L. E. Cole, 24th Annual Convention of the A.S.M., Paper No. 33, 12-16 Oct, 1942, pp. 1-19.)
363	6542	U.S.A. ...	*Effects of Various Solute Elements on the Hardness and Rolling Textures of Copper.* (R. M. Brick and others, 24th Annual Convention of the A.S.M., Paper No. 37, 12-16 Oct., 1942, pp. 1-21.)
			Bearing Metals.
364	6126	G.B.	*Bearing Metals and Bearings for Internal Combustion Engines.* (J. W. Donaldson, Metal Industry, Vol. 62, No. 1, 1/1/43, pp. 2-4.)
365	6143	U.S.A. ...	*Friction in Intermittently Loaded Sleeve Bearings.* (R. W. Dayton and others, Mech. Eng., Vol. 64, No. 9, Sept., 1942, pp. 667-668.)
366	6228	G.B.	*Bearing Metals and Bearings for I.C. Engines.* (J. W. Donaldson, Metal Industry, Vol. 62, No. 3, 15/1/43, pp. 43-44.)
367	6301	U.S.A. ...	*Cast Iron as Bearing Material, II.* (P. Grodzinski, Machinist, Vol. 86, No. 37, 26/12/42, pp. 234-235 E.)
368	6319	G.B.	*Tin Base Bearing Metals Adhesion and Strength.* (Airc. Prod., Vol. 5, No. 51, Jan., 1943, p. 9.)
369	6558	G.B.	*Bearing Metals in Steel Mill Practice (Bronzes and Babbitts).* (H. A. White, Metal Industry, Vol. 62, No. 5, 29/1/43, pp. 71-74.)
370	6579	G.B.	*Railway Bearing Metals (Discussion).* (H. O'Neill, J. Inst. Metals, Vol. 9, No. 12, Dec., 1942, pp. 397-414.)
			Alloy Constitution.
371	6136	Germany ...	*The Stability of Mixed Crystals in Binary Systems.* (E. Schiel, Z. fur Metalk., Vol. 34, No. 10, Oct., 1942, pp. 242-246.)
372	6300	U.S.A. ...	*Influence of Crystal Size and Orientation upon the Mechanical Properties of Metals in the Cast Condition (Discussion).* (L. Northcott, J. Inst. Metals, Vol. 68, No. 8, Aug., 1942, pp. 281-282.)
373	6508	U.S.A. ...	*The Ar.″ Range in Some Iron-Cobalt-Tungsten Alloys.* (W. P. Sykes, 24th Annual Convention of the A.S.M. (Preprints), No. 3, Oct. 12-16, 1942, pp. 1-20.)
374	6528	U.S.A. ...	*The Tantalum-Carbon System.* (F. H. Ellinger, 24th Annual Convention of the A.S.M., Paper No. 23, 12-16 Oct., 1942, pp. 1-4.)

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375	6541	U.S.A. ...	*Study of Inverse Segregation Suggests New Method of Making Certain Alloys.* (M. L. Samuels and others, 24th Annual Convention of the A.S.M., Paper No. 36, 12-16 Oct., 1942, pp. 1-24.)
			Plastics.
376	6198	G.B.	*Design of Plastic Mouldings for Economic Mass Production.* (Machinery, Vol. 61, No. 1,572, 26/11/42, pp. 599-603.)
377	6208	U.S.A. ...	*Melamine Resin Treatment Gives High Wet Strength to Paper.* (Sci. Am., Vol. 167, No. 6, Dec., 1942, pp. 280-281.)
378	6234	U.S.A. ...	*Nylon.* (E. K. Bolton, Ind. and Eng. Chem., Vol. 20, No. 21, 10/11/42, pp. 1,365-1,366.)
379	6245	U.S.A. ...	*Lucite (Design Information).* (W. C. Wall, Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 122-129 and 254.)
380	6275	G.B.	*High Polymers as Colloidal Systems.* B. S. Brajnikoff, Plastics, Vol. 7, No. 68, Jan., 1943, pp. 37-46.)
381	6278	G.B.	*Metal Bonded Plastic (Plastel).* (Trade and Engineering Times, Vol. 52, No. 946, Dec., 1942, p. 44.)
382	6334	G.B.	*Review of Plastic Industry in* 1942. (British Plastics, Vol. 14, No. 164, Jan., 1943, pp. 439-447.)
383	6335	G.B.	*Hydulignum Patents.* (British Plastics, Vol. 14, No. 164, Jan., 1943, p. 447.)
384	6336	G.B.	*Metallurgical Progress and the Plastic Industry (Tools, Moulds, etc.).* (British Plastics, Vol. 14, No. 164, Jan., 1943, pp. 448-452.)
385	6338	G.B.	*The Design of Moulded Plastic Parts.* (British Plastics, Vol. 14, No. 164, Jan., 1943, pp. 456-466 and 477.)
386	6340	U.S.A. ...	*Resistance of Plastic to Chemical Reagents (from the U.S.A.).* G. M. Kline and others, British Plastics, Vol. 14, No. 164, Jan., 1943, pp. 478-487.)
387	6341	U.S.A. ...	*Plastics in Ordnance (from the U.S.A.) (Rifle Stocks, Windshields, Fuses, etc.).* (C. H. S. Tupholme, British Plastics, Vol. 14, No. 164, Jan., 1943, pp. 489-490 and 494.)
388	6342	G.B.	*Plastic Replacement for Kapok.* (British Plastics, Vol. 14, No. 164, Jan., 1943, pp. 491-492.)
389	6343	G.B.	*Amerflex Plastic Tubing for Electric Conduits.* (British Plastics, Vol. 14, No. 164, Jan., 1943, p. 494.)
390	6357	G.B.	*Design of Plastic Mouldings for Mass Production.* (Machinery, Vol. 61, No. 1,574, 10/12/42, pp. 657-659.)
391	6405	G.B.	*Permanoid Plastic (Cellulose Acetate Base).* (Canadian Aviation, Vol. 15, No. 10, Oct., 1942, pp. 118 and 120.)
392	6413	Canada ...	*Cold Setting Resin Adhesives.* (Canadian Aviation, Vol. 15, No. 10, Oct., 1942, p. 86.)

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393	6419	G.B. ...	... *Resiltex Shock-Absorbing Material (Animal and Vegetable Fibre).* (Engineering, Vol. 155, No. 4,019, 22/1/43, pp. 67-68.)
394	6435	G.B. ...	... *Abstracts (Plastics), Issued by the Controller of Chemical Research.* (Plastic Abstracts No. 40, Dec., 1942.)
395	6555	U.S.A.	... *Synthetic Ion-Exchange Resins for Removing Salts from Water.* (Ind. and Eng. Chem., Vol. 20, No. 23, 10/12/42, p. 1,588.)
396	6609	U.S.A.	... *Plastic Production in the U.S.A.* (Trade and Eng. Times, Vol. 52, No. 947, Jan., 1943, p. 44.)
397	6617	U.S.A.	... *"Bubblfil" (Aerated Cellophane) Replaces Sponge Rubber.* (Autom. Ind., Vol. 87, No. 9, 1/11/42, p. 72.)
398	6696	U.S.A.	... *Saran Plastic Pipe and Tubing (Can be Welded).* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 22, 25/11/42, pp. 1,508-1,510.)
399	6697	U.S.A.	... *Soya Bean Plastics.* (G. H. Brother, Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 22, 25/11/42, pp. 1,511-1,512.)
400	6699	U.S.A.	... *Plastic Materials for Resin-Lacquered Food Cans.* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 22, 25/11/42, p. 1,522.)
401	6736	Germany	... *Plastic Aircraft Abroad (Review of American Practice).* (G. Richter, Luftwissen, Vol. 9, No. 10, Oct., 1942, pp. 292-294.)
402	6757	Germany	... *Double Rotor Worm Gear Pump for Mixing Plastic Materials.* (Z.V.D.I., Vol. 86, No. 49-50, 12/12/42, pp. 752-753.)
403	6787	U.S.A.	... *Physical Properties of Laminated Plastics (Panelyte).* (A. M. Lennie and R. W. Barber, Mech. Eng., Vol. 64, No. 12, Dec., 1942, pp. 888-890.)
			Rubber (Synthetic and Natural).
404	6231	U.S.A.	... *Rubber Technology.* (W. C. Geer, Ind. and Eng. Chem., Vol. 20, No. 21, 10/11/42, pp. 1,358-1,360.)
405	6175	G.B. ...	... *Electrical Properties of Polystrene.* (F. T. Farmer, Nature, Vol. 150, No. 3,809, 31/10/42, p. 521.)
406	6232	U.S.A.	... *Thiokol (Synthetic Rubber).* (B. Longstreth, Ind. and Eng. Chem., Vol. 20, No. 21, 10/11/42, p. 1,362.)
407	6233	U.S.A.	... *Neoprene (Synthetic Rubber).* (Ind. and Eng. Chem., Vol. 20, No. 21, 10/11/42, pp. 1,363-1,364.)
408	6274	G.B. ...	... *Chlorinated Rubber as a Surface Protection and Stopping Leakage.* ((Plastics, Vol. 7, No. 68, Jan., 1943, p. 34.)
409	6395	G.B. ...	... *Natural and Synthetic Rubber.* (V .L. Gruberg, Flight, Vol. 43, No. 1,776, 7/1/43, pp. 13-18.)
410	6564	U.S.A.	... *The Rubber Situation in the U.S.A.* (Engineer, Vol. 175, No. 4,542, 29/1/43, p. 91.)
411	6774	U.S.A.	... *Vibration and Rubber Springs (Discussion).* (W. C. Keys, Mech. Eng., Vol. 64, No. 11, Nov., 1942, p. 808.)

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412	6775	U.S.A. ...	*Houdry Process for the Manufacture of Butadiene.* (C. H. Thayer and others, Mech. Eng., Vol. 64, No. 11, Nov., 1942, pp. 777-778.)
413	*6790	Germany ...	*The Design of Spring Elements Made of Rubber.* (C. W. Kosten, Z.V.D.I., Vol. 86, No. 35-36, 5/9/42, pp. 535-538.)
			Glass.
414	6205	U.S.A. ...	*Compacted Glass for Precision Optics.* (Sci. Am., Vol. 167, No. 6, Dec., 1942, pp. 252-253.)
415	6212	U.S.A. ...	*Foam Glass as a Substitute for Cork.* (Sci. Am., Vol. 167, No. 6, Dec., 1942, p. 274.)
416	6213	U.S.A. ...	*Glass Fibre on a Wire Mesh Base for Camouflage Netting.* (Sci. Am., Vol. 167, No. 6, Dec., 1942, p. 276.)
			Diamond and Graphite.
417	6351	G.B.	*Diamond Abrasive Wheels for Sintered Metallic Carbides.* (Machinery, Vol. 61, No. 1,571, 19/11/42, pp. 567-570.)
418	6414	Canada ...	*Diamonds in Industry.* (Canadian Aviation, Vol. 15, No. 10, Oct., 1942, p. 86.)
419	6751	Germany ...	*Industrial Graphite.* (Z.V.D.I., Vol. 86, No. 49-50, 12/12/42, pp. 735-736.)
			Wood and Plywood.
420	6141	U.S.A. ...	*Urea Treatment of Lumber (Discussion).* (Mech. Eng., Vol. 64, No. 9, Sept., 1942, pp. 678-680.)
421	6192	G.B.	*Densified Laminated Woods for Jigs and Tools.* (A. E. L. Jervis, Machinery, Vol. 61, No. 1,575, 17/12/42, pp. 673-679.)
422	6271	G.B.	*Plastic Motor Car Body (High Pressure Moulding on Impregnated Plywood).* (D. W. Brown, Plastics, Vol. 7, No. 68, Jan., 1943, pp. 3-8 and 46.)
423	6337	G.B.	*Resin Impregnated Plywood Boat Hulls.* (British Plastics, Vol. 14, No. 164, Jan., 1943, pp. 454-455.)
424	6382	G.B.	*Seasoning of Timber.* (O. L. Howard, Nature, Vol. 150, No. 3,813, 28/11/42, pp. 638-639.)
425	6593	G.B.	*Electrical Resistance of Wood and Moisture Content.* (W. W. Barkas and others, Nature, Vol. 151, No. 3,820, 16/1/43, p. 83.)
426	6669	U.S.A. ...	*Susceptibility of Wood to Decay (Effect of Urea).* (F. H. Kanfert and E. A. Behr, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 12, Dec., 1942, pp. 1,510-1,515.)
			Welding.
427	6107	U.S.A. ...	*Welding in a Helenium Atmosphere (Digest).* (Light Metals, Vol. 5, No. 59, Dec., 1942, pp. 523-524.)
428	6210	U.S.A. ...	*New Resistance Welding Control "Temp. A. Trol." (Thermocouple Incorporated in Electrode).* (Sci. Am., Vol. 167, No. 6, Dec., 1942, p. 258.)

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429	6221	G.B. ...	... *Propane and Coal Gas in Welding and Metal Cutting.* (Engineering, Vol. 155, No. 4,017, 8/1/43, p. 40.)
430	6238	U.S.A.	... *Improved Spot Welding with Cooled Electrodes (Ford).* (F. M. Reck, Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 164-167 and 238-240.)
431	6256	U.S.A.	... *Heliarc Welding.* (Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 218, 241-244.)
432	6268	G.B. ...	... *Substitution of Acetylene by Propane or Coal Gas in Welding or Cutting.* (Metal Industry, Vol. 61, No. 26, 25/12/42, p. 408.)
433	6269	G.B. ...	... *Fusion Welding of Magnesium.* (T. E. Piper, Metal Industry, Vol. 61, No. 26, 25/12/42, p. 409.)
434	6317	G.B. ...	... *Spot Welding Light Alloys.* (Airc. Prod., Vol. 5, No. 51, Jan., 1943, pp. 3-5.)
435	6365	G.B. ...	... *Spot Welding Mild Steel.* (Machinery, Vol. 61, No. 1,566, 15/10/42, p. 436.)
436	6418	G.B. ...	... *Fleet-Fillet Welding (Weld Penetrates Beyond Root of Joint).* (Engineering, Vol. 155, No. 4,019, 22/1/43, pp. 66-67.)
437	6420	G.B. ...	... *Propane and Coal Gas in Welding and Metal Cutting.* (E. Christie, Engineering, Vol. 155, No. 4,019, 22/1/43, p. 76.)
438	6585	G.B. ...	... *Electron Tube Control of Resistance Welding Machines.* (B. G. Higgins, Sheet Met. Ind., Vol. 17, No. 190, Feb., 1943, pp. 315-322.)
439	6586	G.B. ...	... *Spot Welding of Aircraft Structures.* (E. S. Jenkins, Sheet Met. Ind., Vol. 17, No. 190, Feb., 1943, pp. 323-324 and 330.)
440	6587	G.B. ...	... *Conservation of Arc Welding Electrodes.* (Sheet Metal Industry, Vol. 17, No. 190, Feb., 1943, pp. 325-330.)
442	6612	U.S.A.	... *Removal of Broken Tools from Drilled Holes by Welding on Steel Rods.* (H. J. Burnett and C. E. Harding, Autom. Ind., Vol. 87, No. 9, 1/11/42, pp. 30-31, 88-90.)
443	6614	U.S.A.	... *The Unionmelt Welding Process.* (Autom. Ind., Vol. 87, No. 9, 1/11/42, pp. 36-37, 84-86.)
444	6745	Germany	... *The Determination of Welding Faults on Highly Stressed Spar Connections.* (G. Bauer, Luftwissen, Vol. 9, No. 12, Dec., 1942, pp. 343-348.)
445	6788	U.S.A.	... *"Heliarc" Welding.* (Mech. Eng., Vol. 64, No. 12, Dec., 1942, pp. 901-902.)
			Solders.
446	6230	G.B. ...	... *Use of High Lead Solders.* (Metal Industry, Vol. 62, No. 3, 15/1/43, p. 44.)
447	6364	G.B. ...	... *Modern Brazing Materials.* (Machinery, Vol. 61, No. 1,566, 15/10/42, Vol. 61, No. 1,566, pp. 433-436.)
448	6559	G.B. ...	... *Lead-Silver-Iridium Solders.* (Metal Industry, Vol. 62, No. 5, 29/1/43, p. 76.)
449	6591	G.B. ...	... *The Soldering of Aluminium (Hard and Soft).* (O. Einerl and F. Neurath, Elect. Eng., Vol. 15, No. 180, Feb., 1943, p. 388.)

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			Powder Metallurgy.
450	6128	G.B. ...	... *Production of High Density Parts by Powder Metallurgy.* (C. Hardy and V. D. Cremer, Metal Industry, Vol. 61, No. 1, 1/1/42, pp. 9-10.)
451	6182	G.B. ...	... *Powdered Metals in Machine Design.* (Machinery, Vol. 61, No. 1,577, 31/12/42, pp. 737-740.)
			Methods of Analysis and Identification.
452	6120	U.S.A.	... *Multiple Electrode High Voltage Arc for Spectrographic Analysis.* (W. D. Owsley, Rev. of Scientific Instruments, Vol. 13, No. 8, Aug., 1942, pp. 342-345.)
453	6185	G.B. ...	... *Direct Determination of Combined Carbon in "Cast Iron."* (Machinery, Vol. 61, No. 1,577, 31/12/42, p. 743.)
454	6445	U.S.A.	... *Polarographic Determination of Lead in Lead-Bearing Steels.* (G. Hain and W. Barnes, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 11, 15/11/42, p. 867.)
455	6447	U.S.A.	... *Spectrophotometric Determination of Iron.* (J. P. Mehlig and H. R. Hullett, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 11, 15/11/42, pp. 869-871.)
456	6449	U.S.A.	... *Systematic Identification of the Common Metallic Coatings.* (H. Nechamkin and A. Sanders, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 11, 15/11/42, pp. 913-914.)
457	6700	U.S.A.	... *Foam Test for Pure Mercury.* (O. H. Muller, Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 22, 25/11/42, p. 1,528.)
			Grinding, Lapping and Super Finish.
458	6181	G.B. ...	... *Grinding Bakelite Strip Material.* (Machinery, Vol. 61, No. 1,577, 31/12/42, pp. 734-735.)
459	6189	G.B. ...	... *Grinding, Polishing and Buffing of Monel, Nickel and Inconel.* (Machinery, Vol. 61, No. 1,576, 24/12/42, pp. 716-718.)
460	6193	G.B. ...	... *Thread Grinding with Electrical Control.* (L. M. Davis, Machinery, Vol. 61, No. 1,575, 17/12/42, pp. 681-684.)
461	6240	U.S.A.	... *Special Shapes of Coated Abrasives Speed Production.* (Aero. Digest, Vol. 41, No. 4, Oct., 1942, pp. 170, 176-178 and 254.)
462	6249	U.S.A.	... *Wrights' Precision Tool Grinding Process.* (Aero. Digest, Vol. 41, No. 4, Oct., 1942, pp. 134 and 244.)
463	6327	G.B. ...	... *Thread Grinding.* (Airc. Prod., Vol. 5, No. 51, Jan., 1943, pp. 48-49.)
464	6367	U.S.A.	... *Ohio Units Super-Finishing Machine.* (Machinery, Vol. 61, No. 1,566, 15/10/42, p. 444.)
465	6370	G.B. ...	... *Grinding and Lapping of Gauges.* (Machinery, Vol. 61, No. 1,565, 8/10/42, pp. 408-411.)
466	6379	G.B. ...	... *Coolants for Grinding Wheels.* (*R.T.P. Trans.* 1,643.) (*Z.V.D.I.*, 86, 1942, *p.* 198.) (Machinery, Vol. 61, No. 1,573, 3/12/42, pp. 635-636.)

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			Drawing.
467	6108	G.B.	*The Drawability of Metals, with Special Reference to the Wedge Test.* (Light Metals, Vol. 5, No. 59, Dec., 1942, pp. 514-520.)
468	6514	U.S.A. ...	*Stress-Strain Measurements in the Drawing of Cylindrical Caps.* (E. L. Bartholomew, 24th Annual Convention of the A.S.M., Paper No. 9, 12-16 Oct., 1942, pp. 1-12.)
			Surface Coatings.
469	6216	Germany ...	*Electro-Polishing of Al. Alloys.* (Metal Industry, Vol. 62, No. 2, 8/1/43, p. 20.)
470	6227	G.B.	*Tin Coatings on Copper Wires (Determination of Thickness by an Electrolytic Method).* (P. W. Seddon, Metal Industry, Vol. 62, No. 3, 15/1/43, pp. 37-38.)
471	6440	G.B.	*Westinghouse Selinium Compound Rectifiers for Electroplating.* (Metal Industry, Vol. 62, No. 4, 22/1/42, pp. 55-56.)
472	6446	U.S.A. ...	*Measurement of Thickness of Fired-on Gold Coatings (Chemical Solution).* (K. H. Ballard, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 11, 15/11/42, pp. 868-869.)
473	6576	G.B.	*Electroplating on Non-Conducting Materials (Graphite Film).* (Mech. World, Vol. 113, No. 2,925, 22/1/43, p. 98.)
474	6583	G.B.	*Zinc Coatings—Method of Testing.* (Sheet Met. Ind., Vol. 17, No. 190, Feb., 1943, pp. 243-248 and 252.)
475	6761	U.S.A. ...	*Thickness of Al. Oxide Coatings (Voltage Required to Puncture Film).* (Nature, Vol. 150, No. 3,806, 10/10/42, p. 428.)
			Dies, Extrusions and Stampings.
476	6109	U.S.A. ...	*Aeroplane Parts by Impact Extrusion (Digest) (Consolidated Aircraft Corp.).* (Light Metals, Metals, Vol. 5, No. 59, Dec., 1942, p. 523.)
477	6284	U.S.A. ...	*Forming Extrusions by Machine Methods.* (C. Coe, Aviation, Vol. 41, No. 9, Sept., 1942, pp. 108-111, 298.)
478	6318	G.B.	*Drop Stamping (Compound Curvature).* (Airc. Production, Vol. 5, No. 51, Jan., 1943, pp. 6-9.)
479	6372	G.B.	*Zinc Base Alloy Dies for Plastic Mouldings.* (Machinery, Vol. 61, No. 1,568, 29/10/42, pp. 477-480.)
480	6627	G.B.	*Dies for the Fabrication of Porous Bearings (Briquetting).* (Metal Industry, Vol. 62, No. 6, 5/2/43, p. 89.)
			Metal Foils.
481	6183	G.B.	*Mechanical Properties of Metal Foils.* (Machinery, Vol. 61, No. 1,577, 31/12/42, p. 740.)
482	6582	G.B.	*Mechanical Properties of Metal Foils (Discussion).* (B. Chalmers and P. W. Seddons, J. Inst. Metals, Vol. 10, No. 1, Jan., 1943, pp. 43-45.)

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			Corrosion.
483	6110	G.B. ...	... *Corrosion of Magnesium Alloys (Digest).* (Light Metals, Vol. 5, No.59, Dec., 1942, p. 524.)
484	6531	U.S.A.	... *Corrosion of Water Pipes in a Steel Mill.* (C. L. Clark and W. J. Rungester, 24th Annual Convention of the A.S.M., Paper No. 26, 12-16 Oct., 1942, pp. 1-11.)
485	6547	U.S.A.	... *Corrosion of Unstressed Specimens of Alloy Steel by Steam at Temperatures up to 1,800°F.* (G. A. Hawkins and others, Annual Meeting of the A.S.M.E., Power Division, 30th Nov., 1942, pp. 1-7.)
486	6664	U.S.A.	... *Corrosion of Metals and Alloys by Flue Gases.* (L. Shmedman and J. S. Yeaw, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 12, Dec., 1942, pp. 1,436-1,444.)
487	6716	U.S.A.	... *Protecting Magnesium Against Corrosion.* (W. G. Harvey, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 233, 273-276.)
488	6752	Germany	... *Standardisation of Corrosion Tests in the Pressure Bomb.* (Z.V.D.I., Vol. 86, No. 49-50, 12/12/42, p. 758.)
			Diffusion of Metals.
489	6106	Germany	... *Micro Hardness Study of Diffusion Process.* (Light Metals, Vol. 5, No. 59, Dec., 1942, pp. 510-513.)
490	6522	U.S.A.	... *The Method of Thin Films for the Study of Intermetallic Diffusion and Chemical Reactions at Metallic Surfaces.* (H. S. Coleman and H. L. Yeagley, 24th Annual Convention of the A.S.M., Paper 17, 12-16 Oct., 1942, pp. 1-17.)
			Testing Appliances.
491	6180	G.B. ...	... *Auto-Collimator Test for Flatness.* (W. A. Tuplin, Machinery, Vol. 61, No. 1,577, 31/12/42, pp. 729-734.)
492	6184	G.B. ...	... *Avery Pulsator Fatigue Testing Machine.* (Machinery, Vol. 61, No. 1,577, 31/12/42, pp. 742-743.)
493	6190	U.S.A.	... *Electronic Device for Measuring Creep (G.E.C. of U.S.A.).* (Machinery, Vol. 61, No. 1,576, 24/12/42, p. 718.)
494	6260	U.S.A.	... *Optical Wear Gauge (Diminution of Base of Conical Indentation).* (Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 299-300.)
495	6441	G.B. ...	... *Rapid Hand-Operated Hardness Tester for Light Alloys (Webster).* (Metal Industry, Vol. 62, No. 4, 22/1/42, p. 56.)
496	6511	U.S.A.	... *The Metallography of Galvanised Sheet Steel Using a Specially Prepared Polishing Medium with Controlled P.H.* (D. H. Rowland and O. E. Romeg, 24th Annual Convention of the A.S.M., Paper No. 6, 12-16 Oct., 1942, pp. 1-11.)
497	6553	U.S.A.	... *Wear Testing of Carpets.* (H. F. Schiefer, J. Res. Bur. Stands., Vol. 29, No. 5, Nov., 1942, pp. 333-379.)

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498	6556	G.B. ...	... *Methods of Recording Macro-Structures (Cellophane Ink Prints).* (G. A. Cottell, Engineering, Vol. 155, No. 4,020, 29/1/43, pp. 81-83.)
499	6577	G.B. ...	... *Apparatus for Carrying Out Bend Tests on Metal Sheet Strips.* (G. H. Glayshaw, J. Inst. Metals, Vol. 9, No. 12, Dec., 1942, pp. 383-385.)
500	6588	G.B. ...	... *Cathode Ray Oscillograph in Polarography.* (T. S. G. Jones, Elect. Eng., Vol. 15, No. 180, Feb., 1943, pp. 367-371.)
501	6729	Germany	... *Two New Dynamic Extensometers.* (R. Schmidt and H. Klein, Luftwissen, Vol. 9, No. 11, Nov., 1942, pp. 313-316.)
			Flaw Detection.
502	6129	U.S.A.	... *Inspection of Flaws by Sodium Light (Max. Sensitivity of Light).* (Metal Industry, Vol. 62, No. 1, 1/1/43, p. 10.)
503	6199	G.B. ...	... *Formation of Hairline Cracks.* (Machinery, Vol. 61, No. 1,572, 26/11/42, p. 604.)
504	6211	U.S.A.	... *Flaw Detection by Sodium Light.* (Sci. Am., Vol. 167, No. 6, Dec., 1942, p. 288.)
505	6415	Canada	... *Sodium Light for Surface Inspection.* (Canadian Aviation, Vol. 15, No. 10, Oct., 1942, p. 88.)
506	6523	U.S.A.	... *On the Location of Flaws by Stereo-Radiography.* (J. Rigby, 24th Annual Convention of the A.S.M., Paper 18, 12-16 Oct., 1942, pp. 1-10.)
507	6524	U.S.A.	... *The Fluorescent Penetrant Method of Detecting Discontinuities.* (T. de Forest, 24th Annual Convention of the A.S.M., Paper No. 19, 12-16 Oct., 1942, pp. 1-10.)
			Electron Microscope.
508	6134	Germany	... *The Structure of Al_2O_3 Films in Surface Structure Investigations by the Contact Point Process (Electron Microscope).* (E. Semmler, Z. fur Metalk., Vol. 34, No. 10, Oct., 1942, pp. 229/231.)
509	6135	Germany	... *Surface Structure Investigations of Al. Alloys with the Electron Microscope.* (H. Mahl and F. Pawick, Z. fur Metalk., Vol. 34, No. 10, Oct., 1942, pp. 232-235.)
510	6137	Germany	... *Comparison Between Optical and Electron Microscope Records (Proof of Identity Between Contact Point and Original Surface for Hydronalium).* (M. v. Ardenne and H. Kirchner, Z. fur Metalk., Vol. 34, No. 10, Oct., 1942, pp. 236-237.)
511	6589	G.B. ...	... *Electron Optics (III).* (D. Gabor, Elect. Eng., Vol. 15, No. 180, Feb., 1943, pp. 372-374.)
512	6663	U.S.A.	... *Electron Microscope (Calibration and Use).* (C. J. Burton and others, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 12, Dec., 1942, pp. 1,429-1,436.)
			X-Ray Examination.
513	6194	G.B. ...	... *Million Volt X-Ray Tube for Examining Large Castings (Photograph).* (Machinery, Vol. 61, No. 1,575, 17/12/42, p. 697.)

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514	6226	G.B. ...	... *Screening Equipment for X-Ray Examination of Light Alloy Castings.* (R. S. M. Payne, Metal Industry, Vol. 62, No. 3, 15/1/43, pp. 34-36.)
515	6265	G.B. ...	... *Kodak School of Engineering Radiography.* (Engineer, Vol. 175, No. 4,540, 15/1/43, p. 51.)
516	6295	U.S.A.	... *Portable X-Ray Outfit for Field Maintenance.* (Aviation, Vol. 41, No. 9, Sept., 1942, p. 210.)
517	6580	G.B. ...	... *Determination of Equilibrium Diagrams by X-Ray Method (Review of Four Papers, with Discussion).* (H. Lipson, J. Inst. Metals, Vol. 10, No. 1, Jan., 1943, pp. 1-27.)
518	6622	G.B. ...	... *Industrial X-Ray Unit.* (Engineer, Vol. 175, No. 4,543, 5/2/43, p. 118.)
519	6800	Germany	... *Rapid Determination of Magnesium Content of an Al. Mg. Alloy by X-Ray Diffraction* (20 *mins.*). (H. Kustner, Z.V.D.I., Vol. 86, No. 35-36, 5/9/42, p. 558.)
			Instruments.
520	6121	U.S.A.	... *Instrument for Measuring Electrical Field Strength in Strong High Frequency Fields.* (K. S. Lion, Rev. of Scientific Instruments, Vol. 13, No. 8, Aug., 1942, pp. 338-341.)
521	6416	Canada	... *Aircraft Instruments Manufactured in Canada.* (R. E. Crawford, Canadian Aviation, Vol. 15, No. 10, Oct., 1942, pp. 92-94.)
522	6451	U.S.A.	... *Automatic Radio Compass.* (W. L. Webb and G. O. Essex, J. Aeron. Sci. (Rev. Sect.), Vol. 1, No. 8, Nov., 1942, pp. 23-38.)
523	6738	Germany	... *Elastic Mounting of Instruments (Rubber Metal Bonding).* (W. Hollstein, Luftwissen, Vol. 9, No. 10, Oct., 1942, pp. 294-297.)
524	6740	Germany	... *The Effect of Rotary Motion on the Readings of Statically Balanced Measuring Instruments.* (E. Schmid, Luftwissen, Vol. 9, No. 10, Oct., 1942, pp. 297-299.)
525	6773	U.S.A.	... *Sound Room for Testing Quietness of Operation of Electric Motors (Units Pass on Conveyor Line).* (A. L. Atherton, Mech. Eng., Vol. 64, No. 11, Nov., 1942, pp. 799-801.)
526	*6798	Germany	... *Determination of the Friction Couple of Bodies Rotating at High Speeds (with Special Reference to Gyroscopes) (Digest).* (F. Gottwald, Z.V.D.I., Vol. 86, No. 35-36, 5/9/42, pp. 552-553.)
			Navigation.
527	6239	U.S.A.	... *The Stars in October.* (W. C. Youngclaus, Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 104 and 381.)
528	6248	U.S.A.	... *Universal Plotting Sheets for Navigation.* (Aero Digest, Vol. 41, No. 4, Oct., 1942, p. 190.)
529	6408	Canada	... *Astral Navigation.* (J. W. Melson, Canadian Aviation, Vol. 15, No. 10, Oct., 1942, pp. 51-55 and 61-63.)
530	6719	U.S.A.	... *The Stars this November.* (W. C. Youngclaus, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 295-296, 396.)

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531	6734	Germany ...	*Aircraft Compass and Radio Adjustment on the Ground.* (Luftwissen, Vol. 9, No. 10, pp. 290-291, Oct., 1942.)

Production.

Methods Applied to Named Types.

532	6131	U.S.A. ...	*Production of North American "Mustang."* (G. Stools, Machinist, Vol. 86, No. 35, 5/12/42, p. 884 a.)
533	6187	U.S.A. ...	*Production of Curtiss Wright P. 40 Aircraft.* (Machinery, Vol. 61, No. 1,576, 24/12/42, pp. 701-705.)
534	6197	G.B.	*Merlin Production (Crankshafts and Camshafts).* (Machinery, Vol. 61, No. 1,572, 26/11/42, pp. 589-596.)
535	6207	U.S.A. ...	*Electric Skin Heater Avoids Wrinkling of Aircraft Wing Cover during Riveting.* (Sci. Am., Vol. 167, No. 6, Dec., 1942, p. 253.)
536	6237	U.S.A. ...	*Curtiss Wright Production (Sub-Contracting).* (J. F. Reinhart, Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 98-103.)
537	6247	U.S.A. ...	*Degreasing Equipment of Curtiss Wright.* (Aero Digest, Vol. 41, No. 4, Oct,, 1942, pp. 131-132.)
538	6254	U.S.A. ...	*Safe Shipment of Aircraft Surfaces.* (Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 204 and 252.)
539	6320	G.B.	*Avro Lancaster Production.* (W. E. Goff, Airc. Prod., Vol. 5, No. 51, Jan., 1943, p. 10.)
540	6322	G.B.	*Machining Hispano Cannon Components.* (Airc. Prod., Vol. 5, No. 51, Jan., 1943, pp. 25-29.)
541	6323	U.S.A. ...	*Hamilton Airscrew Spray-Painting Conveyor.* (Airc. Prod., Vol. 5, No. 51, Jan., 1943, p. 29.)
542	6324	Germany ...	*Junkers Line Assembly Methods.* (Airc. Prod., Vol. 5, No. 51, Jan., 1943, pp. 31-34.)
543	6326	U.S.A. ...	*Mass Production of American Gliders.* (Airc. Prod., Vol. 5, No. 51, Jan., 1943, pp. 37-40.)
544	6349	G.B.	*Merlin Production (Machining Crankcase).* (Machinery, Vol. 61, No. 1,571, 19/11/42, pp. 531-535.)
	6353	G.B.	*Developments in Airscrew Manufacture (Rotol).* (Machinery, Vol. 61, No. 1,571, 19/11/42, p. 572.)
545	6355	G.B.	*Merlin Production (Pistons).* (Machinery, Vol. 61, No. 1,574, 10/12/42, pp. 645-649.)
546	6359	G.B.	*Line Production of the Merlin Engine.* (Machinery, Vol. 61, No. 1,567, 22/10/42, pp. 449-456.)
547	6360	U.S.A. ...	*Production of Heavy Bomber Parts (Liberator and Catalina).* (Machinery, Vol. 61, No. 1,567, 22/10/42, pp. 459-464.)
548	6363	U.S.A. ...	*Production of Flying Fortresses by the Boeing Aircraft Co.* (Machinery, Vol. 61, No. 1,566, 15/10/42, pp. 421-425.)
549	6368	G.B.	*Production of Ammunition for Aircraft Cannon.* (Machinery, Vol. 61, 8/10/42, No. 1,565, pp. 393-399.)

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550	6369	U.S.A. ...	*Manufacturing Methods at the New Douglas Airplane Works.* (Machinery, Vol. 61, No. 1,565, 8/10/42, pp. 404-406.)
551	6374	G.B.	*Merlin Production—Machining Cylinder Blocks.* (Machinery, Vol. 61, No. 1,570, 12/11/42, pp. 533-538.)
552	6376	G.B.	*Ford Method in Rolls Royce Merlin Production (Inlet and Exhaust Valves).* (Machinery, Vol. 61, No. 1,569, 5/11/42, pp. 505-510.)
553	6377	G.B.	*Merlin Production (Connecting Rods).* (Machinery, Vol. 61, No. 1,573, 3/12/42, pp. 617-623.)
554	6709	U.S.A. ...	5,000 *Ton Press for Production of Airacobras.* (Aero Digest, Vol. 41, No. 5, Nov., 1942, p. 192.)
555	6762	G.B.	*New Metals and New Methods.* (C. H. Desch, Nature, Vol. 150, No. 3,806, 10/10/42, pp. 419-421.)
556	6789	U.S.A. ...	*Airplane Skin Heaters for Wrinkle-Free Wing Covering.* (Mech. Eng., Vol. 64, No. 12, Dec., 1942, p. 903.)
			Gears.
557	6178	G.B.	*Gear Tooth Profile, I.* (C. G. Pfeffe, Machinist, Vol. 86, No. 38, 2/1/42, pp. 240-242 E.)
558	6356	G.B.	*Gear Shaping and Shaper Cutters.* (C. R. Staub, Machinery, Vol. 61, No. 1,574, 10/12/42, pp. 651-655.)
559	6566	G.B.	*The Production of High Speed Helical Gears.* (S. A. Couling, Engineer, Vol. 175, No. 4,542, 29/1/43, pp. 9-100 and 88-90 Discussion.)
560	6623	G.B.	*Production of High Speed Helical Gears.* (S. A. Couling, Engineer, Vol. 175, No. 4,543, 5/2/42, pp. 119-120.)
561	6634	G.B.	*Production of High Speed Helical Gears, with Special Reference to Elimination of Noise (Discussion).* (S. A. Couling, Engineering, Vol. 155, No. 4,021, 5/2/43, pp. 113-115.)
562	6728	Germany ...	*Increasing the Fatigue Strength of Gear Wheels by Design, Hardness and Machining of the Base of the Tooth.* (M. Ulrich, Luftwissen, Vol. 9, No. 11, Nov., 1942, pp. 311-313.)
			Jigs and Tools.
563	6133	G.B.	*Conservation of War Materials, with Special Reference to Tools.* (Machine Tool Review, Vol. 30, No. 18, pp. 34-36.)
564	6191	G.B.	*Recommended Tool Angles for Carbide Tools.* (Machinery, Vol. 61, No. 1,576, 24/12/42, p. 719.)
565	6298	G.B.	*Magnetic Filter for Machine Tool Lubricants.* (Electrical Review, Vol. CXXXI, No. 3,388, 30/10/42, p. 564.)
566	6339	G.B.	*Alternative Methods and Materials for Tool Construction.* (J. Hofton, British Plastics, Vol. 14, No. 164, Jan., 1943, pp. 473-477.)

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567	6361	U.S.A. ...	*Reclaiming High Speed Steel Tools (Suttonizing Process).* (Machinery, Vol. 61, No. 1,567, 22/10/42, p. 466.)
568	6371	G.B.	*Automatic Electrical Control of Machine Tools.* (Machinery, Vol. 61, No. 1,565, 9/10/42, pp. 400-403.)
569	6565	G.B.	*Jigs of Fusible Alloy for Small Quantity Production.* (T. Baldwin and B. Swindells, Engineer, Vol. 175, No. 4,542, 29/1/42, p. 98.)
570	6653	Germany ...	*Jigs for Testing Castings Prior to Final Machining.* (Der deutsche Sportflieger, Vol. 9, No. 12, Dec., 1942, pp. 258.)
571	6683	G.B.	*Double-Ended Broaching Machines.* (Engineering, Vol. 155, No. 4,021, 5/2/43, pp. 106-107.)
572	6750	Germany ...	*Increased Production by Proper Tooling.* (H. Schaumann, Z.V.D.I., Vol. 86, No. 49-50, 12/12/42, pp. 729-735.)
573	6753	Germany ...	*Hydraulic Gearing for Machine Tools.* (H. Krug, Z.V.D.I., Vol. 86, No. 49-50, 12/12/42, pp. 739-748.)
574	6786	U.S.A. ...	*Drilling Deep Holes in Al. Alloys.* (W. W. Gilbert, Mech. Eng., Vol. 64, No. 12, Dec., 1942, pp. 877-887.)
575	6801	Germany ...	*Band Filing as an Alternative to Planing and Shaping Machines (Adv.).* (E. Grob, J.V.D.I., Vol. 86, No. 35-36, 5/9/42, p. 38.)
			Quality, Control, Standardisation and Inspection.
576	6111	G.B.	*Inspection and Rectification of Light Alloy Pressure Castings (Determination of Pressure Tightness).* (Light Metals, Vol. 5, No. 59, Dec., 1942, pp. 520-522.)
577	6140	U.S.A. ...	*Statistical Quality Control (Discussion).* (Mech. Eng., Vol. 64, No. 9, Sept., 1942, p. 678.)
578	6142	U.S.A. ...	*Quality Control in Ordnance Inspection.* (G. D. Edwards, Mech. Eng., Vol. 64, No. 9, Sept., 1942, pp. 673-675.)
579	6393	G.B.	*International Systems and Standards.* (R. Gregory, Nature, Vol. 150, No. 3,813, 28/11/42, pp. 620-622.)
580	6421	G.B.	*Wartime Standardisation.* (C. Le Maistre, Engineering, Vol. 155, No. 4,019, 22/1/43, pp. 76-77.)
581	6575	G.B.	*Wartime Standardisation.* (C. C. Maistre, Mech. World, Vol. 113, No. 2,925, 22/1/43, pp. 96-98.)
582	6635	G.B.	*Wartime Standardisation.* (C. Le Maistre, Engineering, Vol. 155, No. 4,021, 5/2/43, pp. 117-118.)
583	6730	Germany ...	*German Standard Specifications (D.I.N.) Over the Last 25 Years.* (Luftwissen, Vol. 9, No. 11, Nov., 1942, pp. 316-317.)
584	6797	Germany ...	*New Application of Statistics to Engineering Production.* (K. Daeves, Z.V.D.I., Vol. 86, No. 35-36, 5/9/42, p. 556.)

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			Lofting, Templates and Blue Prints.
585	6200	G.B. ...	... *Blue Print Delivery by Compressed Air in Douglas Plants.* (Machinery, Vol. 61, No. 1,572, 26/11/42, p. 612.)
586	6259	U.S.A.	... *Producing Templates by a New Process (Sensitized Metal Plate).* (Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 217 and 252.)
587	6288	U.S.A.	... *Northrops Engineering-Loft. Technique.* (F. M. Gilian, Aviation, Vol. 41, No. 9, Sept., 1942, p. 124.)
588	6307	G.B. ...	... *Preparation of Perspective Diagrams.* (G. D. Hobson, Nature, Vol. 149, No. 3,773, 21/2/42, pp. 209-213.)
589	6682	G.B. ...	... *Bibliography of Published Information on Lofting and Associated Problems: 1, Lofting Problems; 2, Template Production; 3, Photo Templates; 4, Template Production by Electrolytic Transfer; 5, Drawings (Equipment, etc.).* (R.T.P.3, Bibliography No. 80, Feb., 1943, Ministry of Aircraft Production.)
590	*6772	U.S.A.	... *Photographic Templates.* (E. C. Jewett and C. D. Tate, Mech. Eng., Vol. 64, No. 11, Nov., 1942, pp. 787-792.)
591	6828	Germany	... *Etching Tool for Marking Edges of Steel Templates (Wear Control).* (Flugsport, Vol. 35, No. 2, 20/1/43, p. 18.)
			Infra-Red Heating.
592	6100	G.B. ...	... *Anodized Al. Reflectors for Infra Red Heating Plant.* (Light Metals, Vol. 5, No. 59, Dec., 1942, pp. 492-496.)
593	6350	G.B. ...	... *Uses of Infra Red Rays (Paint Drying and Shrink Fitting).* (Machinery, Vol. 61, No. 1,571, 19/11/42, p. 566.)
594	6362	U.S.A.	... *Infra Red Heat for Shrinkage Fits.* (Machinery, Vol. 61, No. 1,567, 22/10/42, p. 472.)
			Industrial Training and Research.
595	6179	G.B. ...	... *Teaching Aids for Inspectors.* (C. B. Stanton, Machinist, Vol. 86, No. 38, 2/1/43, pp. 1,015-1,017.)
596	6264	G.B. ...	... *Training for Administration.* (Engineering, Vol. 155, No. 4,018, 15/1/43, p. 52.)
597	6620	G.B. ...	... *Industrial Research in Great Britain.* (P. Dunsheath, Engineer, Vol. 175, No. 4,543, 5/2/43, pp. 106-109 and 112.)
598	6737	Germany	... *Research Organisation in G.B. and the U.S.A.* (Luftwissen, Vol. 9, No. 10, Oct., 1942, p. 305.)
599	6782	U.S.A.	... *Training Women for Jobs in Engineering.* (R. H. Baker and M. L. Reinold, Mech. Eng., Vol. 64, No. 12, Dec., 1942, pp. 853-855.)
600	6783	U.S.A.	... *Women in Engineering.* (L. M. Gilbrath, Mech. Eng., Vol. 64, No. 12, Dec., 1942, pp. 856-857, 859.)

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601	6784	U.S.A. ...	*Women in Shops (Montreal Locomotive Works).* (L. L. Park, Mech. Eng., Vol. 64, No. 12, Dec., 1942, pp. 858-859.)
			Welfare and Factory Layout.
602	6177	G.B. ...	*Mixed Light and Machine Colour Combinations (Shop Illumination).* (Mech. World, Vol. 112, No. 2,920, 1/1/43, pp. 6-7.)
603	6309	G.B. ...	*Electrical Installation Problems in War Factories (Discussion).* (J. Inst. Elect. Engs., Vol. 89, Pt. II, No. 12 and Index, Dec., 1942, pp. 521-527.)
604	6310	G.B. ...	*Wartime Maintenance of Electrical Installation and Equipment (Discussion).* (J. Inst. Elect. Engs., Vol. 89, Pt. II, No. 12 and Index, Dec., 1942, pp. 528-532.)
605	6352	G.B. ...	*Danger in the Misuse of Air Hose (Cleaning Workers Clothes).* (Machinery, Vol. 61, No. 1,571, 19/11/42, p. 570.)
606	6366	G.B. ...	*Maintenance of Oil-filled Hydraulic Systems Employed in the Factory.* (Machinery, Vol. 61, No. 1,566, 15/10/42, pp. 438-439.)
607	6442	G.B. ...	*Black-out Ventilation.* (Metal Industry, Vol. 62, No. 4, 22/1/42, p. 56.)
608	6471	G.B. ...	*Protection of Skin from Cleaning Compounds (J. American Med. Ass., Vol. 6, No. 10, Sept. 6th, 1941, p. 903).* (Bull. of War Med., Vol. 2, No. 4, March, 1942, pp. 328-329.)
609	6472	G.B. ...	*Welfare Work Outside the Factory. (Min. of Lab. and National Service, CmD. 6,310, 15 pp. 1941, H.M. Stat. O. (3d.).)* (Bull. of War Med., Vol. 2, No. 4, March, 1942, p. 329.)
610	6479	G.B. ...	*Skin Hazards in Airplane Manufacture. (Pub. Health Rep., Wash., Vol. 56, No. 32, Aug. 8th, 1941, pp. 1,581-1,593.)* (L. Schwartz and J. P. Russell, Bull. of War Med., Vol. 2, No. 3, Jan., 1942, p. 239.)
611	6483	G.B. ...	*Industrial Lighting for War Conditions. (Trans., Illuminating Eng. Soc., Vol. 6, No. 4, 1941, pp. 49-59.)* (R. Maxted, Bull. of War Med., Vol. 2, No. 2, Nov., 1941, p. 147.)
612	6488	G.B. ...	*Principles of Factory Ventilation and Heating. Their Applications in Wartime. (Occupational Psychology, Vol. 15, No. 2, April, 1941, pp. 77-78.)* (T. Bedford, Bull. of War Med., Vol. 2, No. 1, Sept, 1941, p. 62.)
613	6584	G.B. ...	*Colour Contrasts in the Factory Speed Production.* (Sheet Met. Ind., Vol. 17, No. 190, Feb., 1943, pp. 311-312.)
			Scrap.
614	6201	G.B. ...	*Scrap Disposal.* (Machinery, Vol. 61, No. 1,572, 26/11/42, p. 597.)
615	6229	G.B. ...	*Magnetic Separation of Scrap.* (H. H. Thompson, Metal Industry, Vol. 62, No. 3, 15/1/43, p. 44.)

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616	6267	G.B. ...	... *Al. Alloy Scrap (Melting and Refining).* (E. Fener, Metal Industry, Vol. 61, No. 26, 25/12/42, pp. 406-408.)
617	6270	G.B. ...	... *Salvage of Al. and Mg. Castings.* (Metal Industry, Vol. 61, No. 26, 25/12/42, p. 409.)
618	6625	G.B. ...	... *Magnetic Separation of Non-Ferrous Scrap.* (Metal Industry, Vol. 62, No. 6, 5/2/43, pp. 87-88.)
			Miscellaneous Problems.
619	6132	U.S.A.	... *Design of Threaded Parts for Production.* (Machine Tool Review, Vol. 30, No. 18, April-July, 1942, p. 64.)
620	6209	U.S.A.	... *Industrial Use of Ammonia.* (Sci. Am., Vol. 167, No. 6, Dec., 1942, p. 255.)
621	6236	U.S.A.	... *Conveyor Belt with Steel Wire Foundation (Photo).* (Ind. and Eng. Chem., Vol. 20, 10/11/42, p. 1,392.)
622	6548	U.S.A.	... *Practical Aspects of Making Expanded Joints.* (C. A. Maxwell, Annual Meeting of the A.S.M.E., Power Division, 30 Nov. - 4 Dec., 1942, pp. 1-8.)
623	6670	U.S.A.	... *Shattering and Cracking of Artificial Ice During Freezing Prevented by CO_2.* (P. W. West, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 12, Dec., 1942, pp. 1,515-1,518.)
624	6707	U.S.A.	... *Automatic Control of Riveting.* (Aero Digest, Vol. 41, No. 5, Nov., 1942, p. 184.)
			Road Transport and Tanks.
625	6195	Germany	... *German Tanks on the Russian Front (Photographs),* (l'Auto Italiana, Vol. 23, No. 32, 20/11/42, pp. 8 and 11.)
626	6204	U.S.A.	... *Wooden Tyres for Heavy Transport.* (Sci. Am., Vol. 167, No. 6, Dec., 1942, p. 276.)
627	6644	G.B. ...	... *British Tanks (from the British Ministry of Information).* (Motor Schaw., Vol. 6, No. 8, Aug., 1942, pp. 315-317.)
628	6645	Germany	... *War Experiences with German Synthetic Rubber Tyres (Photograph).* (Motor Schau., Vol. 6, No. 8, Aug., 1942, pp. 322-325.)
629	6647	Germany	... *12-Wheeled Trolley for Road Transport of Railway Trucks.* (I. Culemeyer, Motor Schau., Vol. 6, No. 8, Aug., 1942, pp. 326-330.)
630	6723	Germany	... *Road Design Based on Kinematic Requirements of Vehicles.* (P. Brauer, Ing. Archiv., Vol. 13, No. 1, Feb., 1942, pp. 9-14.)
631	6759	Germany	... *The Design of the Engine Cooling Installation for Transport Vehicles (Digest).* (Z.V.D.I., Vol. 86, No. 49-50, 12/12/42, pp. 755-756.)
			Wireless and Electricity.
			Wireless (General).
632	6306	G.B. ...	... *Future of Trans-Oceanic Telephony.* (Nature, Vol. 150, No. 3,793, 11/7/42, pp. 60-62.)
633	6596	G.B. ...	... *Repeater Circuit for a Relay Station.* (Elect. Eng., Vol. 15, No. 180, Feb., 1943, p. 387.)

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634	6656	G.B. ...	... *Frequency Modulation (Nature of F.M. Carrier).* (C. Tibbs, Wireless World, Vol. 49, No. 1, Jan., 1943, pp. 2-5.)
635	6657	G.B. ...	... *C.R. Tuning Indicator (Magic Eye).* (G. A. Hay, Wireless World, Vol. 49, No. 1, Jan., 1943, p. 9.)
636	6662	U.S.S.R.	... *The Reflection of an Electromagnetic Impulse from the Heavyside Layer.* (V. L. Guisburg, J. of Physics, Vol. 6, No. 344, 1942, pp. 167-174.)
			Short Waves.
637	6303	Peru ...	... 30 *KW. Short Wave Radio Transmitter at Lima (Peru).* (Nature, Vol. 150, No. 3,793, 11/7/42, pp. 52-53.)
638	6311	G.B. ...	... *A Study of Propagation Over the Ultra Short Wave Link between Guernsey and England (5 and 8 m.).* (R. L. Smith and A. E. Stickland, J. Inst. Elect. Eng., Vol. 89, Pt. 1, No. 24 and Index, Dec., 1942, pp. 538-539.)
639	6386	G.B. ...	... *Short Wave Broadcasting.* (Nature, Vol. 151, No. 3,818, 2/1/43, pp. 17-18.)
640	6387	G.B. ...	... *Ultra Short Wave Propagation.* (Nature, Vol. 151, No. 3,818, 2/1/43, pp. 31-32.)
641	6658	G.B. ...	... *Velocity Modulation U.H.F. Generators (Klystron and Monotron).* (G. Bocking, Wireless World, Vol. 49, No. 1, Jan., 1942, pp. 16-18.)
642	6659	G.B. ...	... *Modified Views on Propagation of Short Waves (E. and F. Layer Phenomena).* (Wireless World, Vol. 49, No. 1, Jan., 1943, pp. 30-31.)
			Magnetism and Electricity.
643	6312	G.B. ...	... *A Differential Electronic Stabilizer for A.C. Voltages.* (A. Glynne, J. Inst. Elect. Engs., Vol. 89, Pt. 1, No. 24 and Index, Dec., 1942, pp. 538-539.)
644	6595	G.B. ...	... *Eddy Current Losses in Single Conductor Load Covered Cables.* (Nature, Vol. 151, No. 3,820, 16/1/43, p. 88.)
645	6660	U.S.S.R.	... *Theory of Magnetization and Hysteresis of Polycrystalline Ferromagnetics.* (E. Kondousky, J. of Physics, U.S.S.R., Vol. 6, No. 3 and 4, 1942, pp. 93-110.)
646	6668	U.S.A.	... *Liquid Dielectrics (Power Factor, Conductivity and Polar Contents).* (J. D. Piper and others, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 12, Dec., 1942, pp. 1,505-1,509.)
			Light.
647	6214	U.S.A.	... *Contact Lenses.* (A. Callahan, Sci. Am., Vol. 167, No. 6, Dec., 1942, pp. 267-269.)
648	6304	G.B. ...	... *Optics Applied to Engineering.* (Nature, Vol. 150, No. 3,792, 11/7/42, p. 53.)
649	6552	U.S.A.	... *Fresnel Reflection of Diffusing Incident Light.* (D. B. Judd, J. Res. Bur. Stands., Vol. 29, No. 5, Nov., 1942, pp. 329-332.)

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650	6592	G.B. ...	... *Luminescence and Colour.* (Nature, Vol. 151, No. 3,820, 16/1/43, pp. 73-75.)
651	6661	U.S.S.R.	... *The Mechanism of Luminescence of Phosphors.* (V. V. Antonov-Romanovsky, J. of Physics, U.S.S.R., Vol. 6, No. 3 and 4, 1942, pp. 120-140.)

Heat (Boilers and Heaters).

652	6438	G.B. ...	... *Industrial Fuel Efficiency—Heat Insulation and Lagging.* (Metal Industry, Vol. 62, No. 4, 22/1/43, pp. 53-54.)
653	6543	U.S.A.	... *1,825 lb. Pressure Topping Unit, with Special Reference to Forced Circulation Boiler (and Supplement).* (F. S. Clarke and others, Annual Meeting of the A.S.M.E., Power Division, 30 Nov.-4 Dec., 1942, pp. 1-12.)
654	6545	U.S.A.	... *Development and Performance of a Coal-Fired Unit Heater.* (R. M. Rush, Annual Meeting of the A.S.M.E., Power Division, 30 Nov.-4 Dec., 1942, pp. 1-8.)
655	6820	U.S.A.	... *Some Ways to Avoid High Stoker Maintenance and Retain Good Combustion.* (A. R. Mumford, A.S.M.E. Annual Meeting, Dec., 1942, Paper No. 108.)
656	6822	U.S.A.	... *The Influence of Non-Uniform Development of Heat upon the Temperature Distribution in Electrical Coils and Similar Heat Sources of Simple Form.* (Max Jakob, A.S.M.E. Annual Meeting, Dec., 1942, Paper No. 110.)

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657	6562	G.B. ...	... *The Separation of Electricity in Clouds.* (J. A. Chalmers, Phil. Mag., Vol. 34, No. 228, Jan., 1943, pp. 63-67.)
659	6605	U.S.A.	... *Thunderstorm Characteristics and Flight Procedure.* (J. A. Browne, J. Aeron. Sci. (Rev. Sect.), Vol. 1, No. 9, Dec., 1942, pp. 5-19.)

Physiology (Aviation Medicines).

660	6332	Germany	... *CO Content of Tobacco Smoke.* (J. G. de Vorgd, Gas, Vol. 14, No. 5, May, 1942, pp. 89-90.)
661	6384	G.B. ...	... *The Physiological Theory of Colour Perception.* (R. Grant, Nature, Vol. 151, No. 3,818, 2/1/43, pp. 11-14.)
662	6453	G.B. ...	... *Problems in the Medical Examination of Recruits. (Med. J., Australia, 1941, Aug., 2, Vol. 2, No. 5, pp.* 108-110.) (A. B. Anderson, Bull. of War Medicine, Vol. 2, No. 5, May, 1942, p. 420.)
663	6454	G.B. ...	... *Modifications of Resistance to Anoxia, with Especial Reference to High Altitude Flying. (Amer. J. Med. Sci., Sept., 1941, Vol. 202, No. 3, pp.* 336-341.) (A. L. Barach and others, Bull. of War Med., Vol. 2, No. 5, May, 1942, p. 420.)

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664	6455	G.B.	*The Effect of Low and High Oxygen Tensions on Mental Functioning. (J. Aviation Med., March 1941, Vol. 12, No. 1, pp, 30-35.)* (A. L. Barach, Bull. of War Med., Vol. 2, No. 5, May, 1942, p. 420.)
665	6456	C.B.	*Combat of Fatigue by Active Substances. (Deut. Med. Woch., April 12th, 1940, Vol. 66, p. 398.)* (T. Morell, Bull. of War Med., Vol. 2, May, 1942, pp. 420-421.)
666	6457	G.B.	*Eye Protection for Aviators. (U.S. Nav. Med. Bull., Oct., 1941, Vol. 39, No. 4, pp. 565-567.)* (S. E. Flynn, Bull. of War Med., Vol. 2, No. 5, May, 1942, p. 421.)
667	6458	G.B.	*"Night Blindness"—a Psycho-Physiological Study. (Brit. Med. J., Oct. 25th to Nov. 1st, 1914, pp. 571-575 and 607-611.)* (E. Wittkower and T. F. Rodger, Bull. of War Med., Vol. 2, No. 5, May, 1942, pp. 421-422.)
668	6459	G.B.	*The Nature of Dark Adaptation. (Brit. J. Psychol., Vol. 32, Pt. 1, July, 1941, pp. 62-81.)* (K. J. W. Craik and M. D. Vernon, Bull. of War Med., Vol. 2, No. 5, May, 1942, p. 422.)
669	6460	G.B.	*Manœuvre for the Relief of Acute Aero-Otitis Media, (J. Aviation Med., Vol, 12, No. 2, June, 1941, pp. 163-168.)* (H. Lamport, Bull. of War Med., Vol. 2, No. 5, May, 1942, pp. 422-423.)
670	6461	G.B.	*Measurements of the Tension of the Tympanic Membrane and of the Resistance of the Eustachian Tube. (Arch. Otolaryngol, Vol. 34, No. 3, Sept., 1941, pp. 596-602.)* (H. A. E. van Dishoeck, Bull. of War Med., Vol. 2, No. 5, May, 1942, pp. 423-424.)
671	6462	G.B.	*Combined Electro-Cardiography, Stethography and Cardioscopy in the Selection of Pilots. (J. Aviat. Med., Vol. 12, No. 1, March. 1941, pp. 2-27.)* (L. M. Bartlett and J. B. Carter, Bull. of War Med., Vol. 2, No. 4, March, 1942, p. 325.)
672	6463	G.B.	*Testing Night Vision. (Brit. Med. J., Sept., 1941, pp. 347-349.)* (N. B. Harman, Bull. of War Med., Vol. 2, No. 4, March, 1942, p. 326.)
673	6464	G.B.	*Effects of Reduced Atmospheric Pressures on the Electro-Encephalogram. (J. Aviation Med., Vol. 12, No. 2, June, 1941, pp. 115-125.)* (R. S. Lyman and others, Bull. of War Med., Vol. 2, No. 4, March, 1942, p. 326.)
674	6465	G.B.	*Certain Observations in Low-Nitrogen, Normal-Oxygen Atmospheres Related to the Problems of High Altitude Flying. (New England J. of Med., Vol. 225,. No. 7, Aug. 14th, 1914, pp. 255-258.)* (A. M. Butler and others, Bull. of War Med., Vol. 2, No. 4, March, 1942, pp. 326-327.)

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675	6466	G.B.	*Fundamental Principles in the Adjustment Reactions of the Organism to Anoxia.* (*Am. Intern. Med., Vol. 14, No. 9, March, 1941, pp.* 1,518-1,532.) (E. Gellhorn, Bull. of War Med., Vol. 2, No. 4, March, 1942, pp. 327.)
676	6467	G.B.	*Prophylaxis Against Lethal Effect of High Altitude by Means of a Digitalis Glycoside (Gitalin).* (*American Heart J., Vol. 21, No. 5, May, 1941, pp.* 545-550.) (E. Fisher, Bull. of War Med., Vol. 2, No. 4, March, 1942, p. 327.)
677	6468	G.B.	*Necessity of Emergency Oxygen Unit for Use in Parachute Escapes at High Altitudes.* (*J. Aviation Med., Vol. 12, No. 2, June, 1941, pp.* 126-130.) (W. M. Boothby, Bull. of War Med., Vol. 2, No. 4, March, 1942, p. 327.)
678	6469	G.B.	*Recent Developments in Aviation Medicine.* (*New Eng. J. of Med., Vol. 225, No. 7, Aug. 14, 1941, pp.* 263-268.) (J. F. Fulton, Bull. of War Med., Vol. 2, No. 4, March, 1942, p. 327.)
679	6470	G.B.	*The Protection of Hearing.* (*J. Laryngol and Otology, Vol. 56, No. 7, July, 1941, pp.* 225-242.) (E. D. Dickens and A. L. Ewing, Bull. of War Med., Vol. 2, No. 4, March, 1942, pp. 327-328.)
680	6473	G.B.	*Physiological Effects of High Altitude.* (*U.S. Nav. Med. Bull., Vol. 39, No. 2, April, 1941, pp.* 163-178.) (H. R. Behnke and T. L. Willman, Bull. of War Med., Vol. 2, No. 3, Jan., 1942, pp. 236-237.)
681	6474	G.B.	*Changes in Intracranial Volume on Ascent to High Altitudes and Descent in Diving.* (*Proc., Staff Meeting of Mayo Clinic, Vol. 16, No. 14, 1941, pp.* 220-221.) (M. N. Walsh, Bull. of War Med., Vol. 2, No. 3, Jan., 1942, p. 237.)
682	6475	G.B.	*Altitude Tolerance in Hyper and Hypo-Tonia.* (*Luftfahrtmed., 1941, p.* 11.) (Kriemberg and Winter, Bull. of War Med., Vol. 2, No. 3, Jan., 1942, p. 237.)
683	6476	G.B.	*Nature of Pain in High Flights.* (*Klinicheskaya Med., Moscow, Vol. 18, No. 9, 1940, p.* 42.) (Streltsav, Bull. of War Med., Vol. 2, No. 3, Jan., 1942, pp. 237-238.)
684	6477	G.B.	*The Influence of Altitude Flying on Gastric Function.* (*Luftfahrtmed., Vol. 4, Pt. 2, 1940.*) (Bull. of War Med., Vol. 2, No. 3, Jan., 1942, p. 238.)
685	6478	G.B.	*Transportation of Patients by Airplane.* (*Procs., Staff of Mayo Clinic, Vol. 16, No. 14, 1941, pp.* 221-223.) (L. R. Lovelace, Bull. of War Med., Vol. 2, No. 3, Jan., 1942, pp. 238-239.)
686	6480	G.B.	*Hypotension in Aviation. With a Review of* 159 *Fatal Crashes.* (*U.S. Nav. Med. Bull., Vol. 39, No. 2, April, 1941, pp. 222-235.*) (C. A. Young, Bull. of War Med., Vol. 2, No. 2, Nov., 1941, p. 145.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
687	6481	G.B. ...	... *Acclimation to High Altitudes. A Review of Physiological Observations.* (*U.S. Nav. Med. Bull, Vol.* 39, *No.* 2, *April*, 1941, *pp.* 178-187.) (C. L. Gemmill, Bull. of War Med., Vol. 2, No. 2, Nov., 1941, p. 145.)
688	6482	G.B. ...	... *Aero-Otitis Media in Compressed Air Workers. Treatment with Helium-Oxygen Mixtures.* (*J. American Med. Ass., Vol.* 116, *No.* 6, *April* 19*th*, 1941, *pp.* 1,766-1,769.) (W. H. Requarth, Bull. of War Med., Vol. 2, No. 2, Nov., 1941, pp. 145-146.)
689	6484	G.B. ...	... *Testing Night Vision.* (*Brit. Med. J., April* 26*th*, 1941, *pp.* 636-637.) (N. B. Harman, Bull. of War Med., Vol. 2, No. 1, Sept., 1941, pp. 59-60.)
690	6485	G.B. ...	... *A New Dark Adaptation Tester.* (*British J. Ophthalm., Vol.* 25, *No.* 5, *May*, 1941, *pp.* 231-236.) (S. Yudkin, Bull. of War Med., Vol. 2, No. 1, Sept., 1941, p. 60.)
691	6486	G.B. ...	... *Nutritional Factors in Dark Adaptation.* (*Edinburgh Med. J., Vol.* 48, *No.* 4, *April*, 1941, *pp.* 217-237.) (C. P. Stewart, Bull. of War Med., Vol. 2, No. 1, Sept., 1941, pp. 60-61.)
692	6487	G.B. ...	... *Hearing Among Experienced Aviators.* (*Proc., Staff Meeting, Mayo Clinic, Vol.* 16, *No.* 14, 1941, *pp.* 214-217.) (P. A. Pastore, Bull. of War Med., Vol. 2, No. 1, Sept., 1941, p. 61.)
693	6601	Germany	... *On the Neurologic and Characterlogic Assessment of Flying Fitness.* (*A Study Based on the Medical Examination of* 2,000 *Flying Candidates.*) (R. Lemke, Luftfahrtmedizin, Vol. 3, No. 2, 1938-1939, pp. 73-81.)
694	6602	Germany	... *The Capacity of the Human Organism to Endure Centrifugal Forces in the Direction of Back to Chest.* (O. Gauer and S. Ruff, Luftfahrtmedizin, Vol. 3, No. 2, 1938-1939, pp. 225-230.)
695	6603	Germany	... *Changes in the Optical Reaction Time in Human Beings Subjected to High Centrifugal Forces.* (H. Burmeister, Luftfahrtmedizin, Vol. 3, No. 2, 1938-1939, pp. 277-284.)
696	6604	Germany	... *On the Use of Stimulants to Promote Gaseous Exchanges in the Body Under Condition of Work at Low Pressure.* (A. Rühl and others, Luftfahrtmedizin, Vol. 3, No. 2, 1938-1939, pp. 285-301.)
697	6665	U.S.A.	... *Insecticidal Aerosol Production* (*Spraying Solutions in Liquefied Gases*). (L. D. Goodhice, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 12, Dec., 1942, pp. 1,456-1,459.)
698	6691	U.S.A.	... *Oxygen Requirements at High Altitudes.* (W. A. Wildhack, J. Aeron. Sci., Vol. 9, No. 14, Dec., 1942, pp. 543-547.)
699	6741	Germany	... *The Problem of Aero Embolism* (*Effect of Reduced Pressure at High Altitudes*). (W. Hornberger, Luftwissen, Vol. 9, No. 12, Dec., 1942, pp. 339-341.)

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700	6747	Germany ...	*On the Visibility of Ground Targets for Heights of Approach of the Order of 2,000-3,000 m.* (F. Löhle, Luftwissen, Vol. 9, No. 12, Dec., 1942, pp. 349-352.)
701	6748	Germany ...	*Physiological Research in Aid to Aircraft Development* (*Digest of Lilienthal Lecture*). (P. Rein, Luftwissen, Vol. 9, No. 12, Dec., 1942, pp. 363-364.)

Mathematics and Physics (including Refrigeration).

702	6305	G.B.	*Raman's Theory of the Specific Heat of Crystals.* (Nature, Vol. 150, No. 3,793, 11/7/42, p. 55.)
703	6560	G.B.	*An Extension of Nomography.* (C. W. Hansel, Phil. Mag., Vol. 34, No. 228, Jan., 1943, pp. 1-26.)
704	6594	G.B.	*Absolute Time end Space.* (B. Brown, Nature, Vol. 151, No. 3,820, 16/1/43, pp. 85-86.)
705	6631	G.B.	*Newton Physics* (*Historical Survey*). (H. Buckley, Engineering, Vol. 155, No. 4,021, 5/2/43, pp. 103-104.)
706	6724	Germany ...	*Indefinite Integrals Containing Products of Cylindrical Functions.* (R. Straubel, Ing. Archiv., Vol. 13, No. 1, Feb., 1942, pp. 14-20.)
707	6725	Germany ...	*The Damping of Non-Linear Vibrations* (*the General Case of Amplitude Modulation*). (T. Zech, Ing. Archiv., Vol. 13, No. 1, Feb., 1942, pp. 21-33.)
708	6726	Germany ...	*The Accuracy of Various Methods of Integration of Ordinary Differential Equations of the First and Second Order* (*Interpolation and Extrapolation*). (L. Collatz and R. Zurmuhl, Ing. Archiv., Vol. 13, No. 1, Feb., 1942, pp. 34-36.)
709	6765	Germany ...	*A Novel Treatment of the Equation of Motion of a Gyroscope Supported at One Point* (*Eulerian Co-ordinates*). (E. Schneller, Ing. Archiv., Vol. 13, No. 3, 1942, pp. 113-118.)
710	6795	Germany ...	*Friction of Wire Ropes on Pulleys* (*Digest*). (L. Klein, Z.V.D.I., Vol. 86, No. 35-36, 5/9/42, p. 554.)

Documentation.

711	6314	G.B.	*The Industrial Library and Information Service.* (B. J. Ledaux, Automobile Engineer, Vol. 33, No. 432, Jan., 1943, pp. 29-30.)
712	6381	G.B.	*A.S.L.I.B. 17th Annual Conference.* (Nature, Vol. 150, No. 3,813, 28/11/42, pp. 637-638.)