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Colalloy Armour Plate. (Machinery, Vol. 58, No. 1,504, 7/8/41, p. 509. Also reviewed in J. Frank. Inst., Vol. 232, No. 4, Oct., 1941, p. 372.) (97/1 U.S.A.)

The outstanding characteristic of this American armour plate is that it weighs about 50 per cent. less than steel, and is thus particularly applicable to aeroplane construction. The surface of the new armour plate is claimed to have a hardness much greater than that of ordinary armour plate. It is available in any thickness up to 3 inches, with the hard surface extending to any depth from 0.001 inch to ¼ inch. One of the major factors influencing projectile penetration is the heat generated by friction when the projectile passes through the armour plate. Colalloy Armourplate is claimed to have a rate of heat dispersion which is several times greater than that of steel armour plate, thus tending materially to lessen the penetration of projectiles. Another advantage of the material is its hard, highly-polished surface, which does not deteriorate, due to resistance to corrosion and oxidation. This glassy smoothness tends to make a bullet glance or slide off, thus preventing it from " biting " into the metal. The new armour plate is also claimed to have a marked resistance to ice formation. In using Colalloy Armourplate, production bottlenecks can be avoided, it is claimed, since each aircraft factory can have its own processing plant, and heat-treating operations or expensive equipment are unnecessary. This material is intended for use in the construction of propellers, wings, fuselages, exposed engine parts, pontoons, struts, tanks, landing gear, and for other vital parts requiring armoured protection. It can be supplied in many forms, such as sheets, plates, tubes, angles, and rods, to suit individual production requirements.

(No details as to composition are given.)

Dinghies for British Fighter Pilots. (Inter. Avia., No. 782, 24/9/41, p. 20.) (97/2 Great Britain.)

When folded the dinghy forms a cushion measuring 15 in. square by 3in. in thickness, which is strapped to the seat-type parachute next to the figure. The dinghy is inflated by means of a carbon dioxide cylinder attached to it and can carry a weight of 400 lb. It is approximately rectangular in shape and takes into account the weight distribution of a seated person by means of the varying diameter of the carrying tube. Its equipment includes a sea-drogue to prevent drift, a bailer, stoppers for eventual perforations of the dinghy, an auxiliary air pump, two paddles, and a small supply of water-tight packed chocolate. To the bottom of the dinghy is attached a canvas water bucket, which, when filled with water, keeps the head of the dinghy down as the pilot climbs in. The new dinghies are of bright yellow colour and provided with complete instructions for use in English, French, Polish and Czech.

The Design of Jet Pumps. (G. Hugel, V.D.I. Forschungsheft, 395, March-April, 1939.) (R.T.P. Translation T.M. 982.) (97/3 Germany.)

The theory of jet pumps is still rather incomplete, and relatively little has been published so far. Successful designs have been developed by trial and error and information obtained in this way is naturally guarded by the various firms concerned.

The author shows that by applying both the energy and impulse theorems, the optimum throat dimension of the mixing nozzle and best shape of intake can be predicted approximately in a relatively simple manner. The necessary length of the mixing nozzle follows from Prandtl's turbulent mixing theory. The calculations are carried out for the mixing of similar and dissimilar fluids.

Temperature Recording in High-Speed Gases. (E. Eckert, Z.V.D.I., Vol. 84, No. 43, 26/10/40.) (R.T.P. Translation T.M. 983.) (97/4 Germany.)

Proper temperature recording in flowing gases always requires great care because of the potential errors involved through radiation on the adjacent walls or heat dissipation in the thermometer as a result of the comparatively low heat transfer to the instrument. These errors become continuously less at higher gas velocity and can be minimized by the use of appropriate instruments. But as soon as high speeds are involved, a new difficulty arises, namely, the gas layers immediately adjacent to the thermometer suspended in the flow are slowed down by damming or friction and become heated. The instrument now records the temperature of these layers rather than the true temperature of the flowing gas, which corresponds to the irregular motion of its molecules and would be measured with a thermometer carried along in the flow. Unfortunately, this is hardly ever possible in practice. Hence there remains, apart from optical recording methods, only the possibility of securing the true gas temperature from the reading of the stationary thermometer. This requires the knowledge of the temperature rise induced by the deceleration of the gas on the thermometer as obtained by calibration of the instrument in a gas flow of known temperature. The development of suitable thermometer shapes giving the amount of temperaure rise without calibration and affording ready repetition, is however dependent on a fundamental elucidation of this heating on a number of elementary body forms. This is carried out by the author for the cases of a plate, sphere and cylinder.

It is interesting to note that the theoretical stagnation temperature rise amounts to 5°C at 100 m/sec and 45° C at 300 m/sec.

New Frictional Resistance Law for Smooth Plates. (F. Schultz-Grunow, L.F.F., Vol. 17, No. 8, 20/8/40.) (R.T.P. Translation T.M. 986.) (97/5 Germany.)

The application of the logarithmic laws of velocity distribution for turbulent pipe flow to the free friction layer has afforded a resistance law which, after minor changes of the experimental constants contained in the velocity distribution laws, could be brought into satisfactory agreement with the plate drag measurements.

Nevertheless, this application constitutes no more than an approximation for the still unknown velocity distribution in the free friction layer, for there is no cogent necessity for an identical velocity distribution in the pipe and on the plate; one may only surmise that they differ slightly from one another. Apart from the fact that the plate drag measurements are not completely satisfactory, since they were achieved with comparatively small test plates (on which the assumption of plane flow is met only in the neighbourhood of the plate leading edge) or else obtained on plates not completely smooth in the hydraulic sense. It therefore seemed desirable to explore the velocity distribution in the free friction layers and to check the drag measurements.

From new measurements in the free boundary layer of a plate the author derives the laws governing the velocity distribution and determines a new resistance law, which leads to lower drag values than the logarithmic distribution previously adopted. The transverse velocities, the shearing stress, and the mixing path profiles are also defined.

An Investigation Concerning G. I. Taylor's Correlation Co-efficient of Turbulence. (T. E. W. Schumann, Philosophical Mag., Vol. 32, No. 215, December, 1941, pp. 471-482.) (97/6 Great Britain.)

In dealing with the theory of turbulence, Taylor introduced the important concept of the function R_ξ, which he defined as the correlation coefficient between the turbulent velocity at a given point and the velocity at the same point after an interval of time ξ.

Since R_ξ is obviously a function of the time, it may conveniently be referred to as the "time correlation coefficient" of any continuously varying quantity, for it is applicable not only to turbulent velocities, but also to varying quantities, such as temperature, pressure, etc.

The present paper is concerned with the derivation of an analytic expression for R_ξ. The author shows that Taylor's deduction that R_ξ, when developed in power series of ξ, of necessity only contains even powers of ξ, is not of universal application.

The Effect of Wind Tunnel Wall Interference on the Stalling Characteristics of Wings. (H. S. Stewart, J. of Aeron. Sci., Vol. 8, No. 11, Sept., 1941, pp. 426-428.) (97/7 U.S.A.)

In this paper it is shown that the distortion of the lift distribution of a wing in a wind tunnel caused by the wind tunnel wall interference can be considered as an induced twist in this wing. The magnitude of this twist is calculated for a wing in a circular closed wind tunnel. In numerical examples and an experimental check it is seen that this induced twist (wash in for a closed wind tunnel working section) is large enough to cause very marked changes in the stalling characteristics of a wing unless the wing span is less than eighty per cent. of the wind tunnel diameter.

Investigation of Steam Turbine Nozzle and Blading Efficiency. (F. Dollin, Inst. Mech. Eng. Proc., Vol. 144, 1940, pp. 147-164.) (With discussion.) (97/8 Great Britain.)

The reaction type nozzle tester developed by Messrs. Parsons is described and results obtained with various types of reaction blading are discussed, the working medium being compressed air. It appears that the efficiency of such blading can be expressed as a function of the Reynolds number, the efficiency rising continuously with Re. In calculating this factor, the author chooses the hydraulic mean depth of the blade passage as the characteristic linear dimension, whilst the velocity and kinematre viscosity are calculated for the throat of the passage. An interesting table shows the variation in kinematic viscosity of various fluids with pressure and temperature. It appears that low pressure steam is kinematically more viscous than a turbine only at 140°F., whilst high pressure steam is less viscous than water at 60°F.

In the case of typical reaction steam turbines, Re varies between 1×10^{-4} and 5×10^{-4}, depending mainly on fraction of total adiabatic heat drop utilised in the passage. The static nozzle tester covered roughly the same range and the experiments therefore suggest that high speeds of operatives and high-working pressures (both desirable from a mechanical point of view) are also aerodynamically efficient. Some of the nozzles tested showed increasing efficiency with increase in air speed well beyond the critical ($M>1$), and it appears that the Mach number of present designs could be increased beyond the normal value of about .7 without deleterious effects provided the Reynolds number is sufficiently high.

The Aerodynamics of the Lifting Airscrew with Hinged Blades in Curvilinear Motion. (M. L. Miehl, Trans. C.A.H.I, No. 465, 25/1/1940.) (97/9 U.S.S.R.)

The paper examines the aerodynamic forces and gyratory motion of the hinged blades of an auto-rotating autogyro or helicopter screw for the case when the axis, besides a translatory motion, has uniform rotation with respect to a system of fixed co-ordinates.

Such motion takes place when the aircraft has attained a state of uniform, curvilinear motion, e.g., when banking, looping, or rolling, or in the case of oscillations about the longitudinal or transverse axis.

Analysis shows that in the case of curvilinear motion, the gyratory motion of the rotor blades varies in the sense that the axis of the cone described by the blades in space, lags behind the axis of the rotor and is inclined to the perpendicular by an amount proportional to the ratio between the angular velocity of rotation of the aircraft Ω and the angular velocity of rotation of the rotor ω.

The position of the resultant aerodynamic force varies in accordance with this. Contrary to the established opinion, this resultant is deflected in the direction opposite to the direction of rotation, i.e., lags behind the rotor axis and thus produces a damping moment relatively to the centre of gravity of the aircraft, which opposes the rotary motion.

The direction of this lag is phase-displaced with regard to the angular velocity, as a consequence of which the angle of incidence of the rotor is changed in the case of transverse rotation of the aircraft.

The effect of this phenomenon, together with the effect of the increase in the angles of incidence of the individual blade-sections occurring in curvilinear motion is examined as far as it affects the autorotation and the manœuvrability of the aircraft.

Furthermore, the effect of the nature of the profiles and method of centring of the blades on the above phenomena is examined.

A comparison is made of the theoretical calculations with the results of wind tunnel experiments, which show good agreement.

In conclusion, data are given on the essential parameters ensuring suitability and safety of the rotor.

The special case of hovering flight is examined in greater detail in an appendix.

The Distribution of Aerodynamic Loads on the Tail Unit of an Aircraft. (I. I. Nevzorov, Trans. C.A.H.I, No. 477, 9/3/1940.) (97/10 U.S.S.R.)

The principal aim of the researches described in this paper was to afford an experimental determination of the loads on the isolated tail surfaces (empennage) of an aircraft. Two entirely different types of tail unit were examined; one uncompensated, and one with axial compensation. The aerodynamic loads have been plotted both against the span and the profile contour of the tail. The paper gives a method for determining the additional loads over the span, due to deflection of the control surfaces, and also a method for determining the pressure distribution over the profile contour at any section of the tail unit.

An Experimental Investigation of the Landing of Aircraft. (Y. M. Serebrusky, Trans. C.A.H.I, No. 479, 16/3/1940.) (97/11 U.S.S.R.)

The paper reproduces results of measurements taken of the landing characteristics of an aeroplane, obtained by self-recording instruments fitted on board the aircraft. The programme of experiments included normal landings without the use of flaps, and with fully-opened flaps, as well as of "aerial landings," i.e., flight figures copying the usual manœuvres for landing on the ground. These experiments furnished values for the angular rotational velocity of the aircraft relatively to its transverse axis, for the overloads, the angle of incidence, lift coefficient and elevator deflection at different instants of time during the landing, and enabled construction of trajectories of motion for the aircraft.

A Simplified Method for Predicting the Change in Aeroplane Performance Due to a Change in Parameter. (E. C. Posner, Vol. 8, No. 11, Sept., 1941, pp. 419-425, J. of Aer. Sci.) (97/12 U.S.A.)

A method is presented for rapidly determining the effect of small modifications in the various parameters influencing performance. The only requirements for use of this method are performance values for some basic condition and the corresponding airplane polar curve. No recourse is necessary to analytical methods of performance calculation, but only the fundamental concepts of power available and power required are used.

The resulting expressions lead to some interesting corollaries dealing with critical values of the parameters.

Thus, the lift coefficient on the aeroplane polar diagram corresponding to minimum power required satisfies the simple relation

$$\frac{dC_L}{dC_D}=\left(\frac{3}{2}\right)\left(\frac{C_D}{C_L}\right)$$

At optimum wing loading, we have

$$\frac{dC_L}{dC_D}=\frac{C_{DW}}{C_L}$$

when C_{DW} = drag coefficient of wing alone.

(This means that the slope of the aeroplane polar is equal to L/D of the wing.)

Finally, the altitutude for minimum drag,

$$\frac{dC_D}{dC_L}=C_L/C_D.$$

This corresponds to the best L/D point on the polar curve and, therefore, to minimum drag for a given weight. Below the lift coefficient corresponding to this point, an increase in altitude at constant power available results in an increase in level flight speed or rate of climb, while, above it, the reverse takes place. This critical point thus determines the intersection of power required curves for adjacent altitudes. It also locates the altitude beyond which supercharging is ineffective, that is, beyond which there is no increase in speed at constant power.

Experiments with a Family of Multi-Bladed Airscrews. (A. Eula, Alti di Guidonia, No. 49-50, 20/4/41, pp. 133-160.) (97/13 Italy.)

The experiments were carried out in the 2 m. wind tunnel on model propellers having 0.94 m. diameter, and covered assemblies of 2, 3, 4, 5 and 6 blades of identical design. Thrust, torque and efficiency were determined over a range of blade settings and V/nD values for each assembly and the results are recorded in a series of tables and curves.

Of special interest is the very large range of V/nD covered, amounting to 9.4, 7.4, 3.7, 3.7, 3.7, for the 2, 3, 4, 5 and 6-blade assemblies respectively. For most of the tests the airscrew r.p.m. varied only slightly (700 $\simeq$ 900 r.p.m.), and as a consequence the Reynolds number of the 0.7 R section increased from about 1×10^5 to 3×10^5 over the experimental range.

The following are some of the principal conclusions:—

1. With the screws turning at a fixed point ($V=0$) the thrust coefficient remains practically constant over the range of blade setting angles $\beta=30°$ to $50°$. The thrust coefficient increases almost linearly with β over the range $\beta=0$ to $20°$.
2. Under the same conditions ($V=0$) the torque coefficient increases continually with β.
3. The V/nD value corresponding to zero thrust or torque are functions of β only and independent of the number of blades.
4. The envelope of the various efficiency peaks is practically horizontal over the range $V/nD=1$ to 2, and falls off relatively slowly for larger values of V/nD. In case of the 2-bladed airscrew, an efficiency of 59 per cent. obtained at $V/nD=4.5$ ($\beta=72°$).
5. The maximum efficiency diminishes slowly with increasing number of blades (82 per cent., 2 blades, to 78 per cent., 6 blades).
6. Maximum possible efficiency occurs at $\beta \simeq 40°$ and $V/nD=1.5$ irrespective of number of blades.
7. At maximum possible efficiency, increasing the blade number from 2 to 6 increases the thrust and torque coefficients by multiples of 2.5 and 2.7 respectively.
8. It is suggested that 4-bladed propellers are likely to prove of benefit to high speed and high power operation at high altitudes.

The experiments will be continued, attention being paid to the effect of blade shapes and Mach number.

Proposal for the Development of a Towing Aircraft (Tug). (Geb. Horten, D.M.Z., Vol. 18, No. 8, Aug., 1941, pp. 305-308.) (R.T.P. Translation No. 1,378.) (97/14 Germany.)

Aircraft towing as a method for launching high-performance gliders is a relatively recent development. Up till now, no specially designed aircraft " tug " has become available, but for this purpose a number of different types of training and civil aircraft (Class A2 of the German classification), have been used indiscriminately. In these cases, the tow rope is necessarily attached to the tail of the tug, which experiences considerable pitching moments if the trailer rises much above or falls much below the level of the tug. A tendency of the glider to rise above the tug is especially difficult to avoid, if the glider pilot has been used to winch starts, where a rapid gain in altitude is essential.

Flying the tug thus requires constant attention and even then pitching oscillations of the train occasionaly arise which reach dangerous amplitudes and require a premature release of the cable.

The authors of this article, who are the designers of the well-known tailless aircraft, " Horten V " (see R.T.P. Translation No. 1,378), suggest that this type lends itself in particular for towing gliders, since the cable can be attached near the C.G. of the aircraft and all pitching moments avoided. After a short review of the special flying requirements of aircraft tugs (low landing speed, very high rate of climb at steep angles when operating near the ground, excellent field of view, etc.), the authors put forward a tentative design for a twin-engined tailless aircraft weighing about 2,000 kg., with a span of 16m. (total h.p. 500). It is claimed that such a machine would have a rate of climb of about 5 m./sec. whilst towing two gliders of 1,000 kg. each (horizontal towing speed$\simeq$150 m.p.h.).

It should be emphasised that the proposed tug is intended mainly for launching gliders (competitions, training, research). Under these conditions the actual flying time of the tug is short, the intention being to make as many launchings as possible in a given time. The proposed design is not intended for long-distance towing.

High Pressure Hydraulic Press for Large Aircraft Parts. (Luftwissen, Vol. 8, No. 10, Oct., 1941, p. 304.) (97/15 Germany.)

A photograph shows the 800 t. hydraulic press of the Henschel Aircraft works in operation, turning out fuselage parts. The useful rubber surface amounts to $3{,}700 \times 1{,}750$ mm., i.e., nearly 6.5 m.^{2}. This is increased to 12.6 m.^{2} if the pressing is carried out metal to metal without insert. The weight of the press without pumping installation amounts to 375 tons. The three electric motors deliver a total of 270 h.p. and drive two 3-stage pressure pumps. The maximum rate of operation is 6 to 8 mm./sec. at an excess pressure of 300 atmospheres. The return stroke is carried out at about 20 times this speed.

The height of the press ($\simeq$ 10m.) necessitated a special hangar, which was constructed round the press whilst the latter was being erected.

New Rayon Tyre for D.C.3 Transports. (American Aviation, Vol. 5, No. 10, 15/10/41, p. 43.) (97/16 U.S.A.)

In the new tyre, there are 30 rayon cords per inch, as against 19 cords per inch in the cotton, thus affording better load distribution per cord. The tyre diameter is 44 in.; section width $17\frac{1}{2}$ in.; total thickness at centre $\frac{3}{4}$ in.; rated 13,500 pounds; inflation pressure 45 pounds.

The " rayon tyre " is 16 pounds lighter per casing than the conventional cotton type for comparable strength and resistance to bruising from impact.

In its service tests, United Aircraft Corporation inspected the tyres closely at 100 hour intervals for cuts and any other irregularities. At each 650 hour overhaul period, the tyres were weighed to check the rubber loss, which was found to average 12 pounds for every 1,000 hours of service, as opposed to 12 pounds for every 800 hours of service with the cotton cord.

It is also claimed that rayon is more resistant to heat deterioration than the cotton cord.

Cherry Self-Plugging Rivet (incorporating Mandrel) for Blind Riveting. (American Aviation, Vol. 5, No. 12, 15/11/41, p. 47.) (97/17 U.S.A.)

The self-plugging Cherry rivet has a mandrel with an expanded section and a head on the blind side. In installation, the assembly is inserted into the rivet hole until the head of the hollow rivet takes its ordinary position relative to the material being joined. Through the use of the combination hydraulic and pneumatic gun, the expanded section on the blind side is pulled into the hollow body of the rivet, expands the shank and forms a tulip head in the back. The outside end breaks off during application and can be trimmed off with ordinary nippers. Aircraft factory tests are said to have indicated that one man (unskilled) can install and trim 540 Cherry rivets per hour.

The outstanding feature claimed for the part is its positive mechanical action. The force required to apply the rivet breaks the mandrel and accomplishes two results: it creates a clinching action, holding the two sheets together securelv, and also it expands the rivet, causing the necessary pressure fit of the shank.

Amerflex Flexible Electric Conduit. (American Aviation, Vol. 5, No. 12, 15/11/41, p. 47.) (97/18 U.S.A.)

Amerflex is the trade name of a new flexible electrical conduit for use in aircraft wiring systems, available without covering or with a synthetic rubber casing. It is claimed that this conduit, encased in synthetic (because of greater flexibility, heat resistance and oil and solvent resistance) will outlast ordinary conduit by 30 to 40%, and more than this, it is 47 to 54% lighter in weight. It is specially adaptable for use behind instrument panels, in nacelles and wherever throughout the aircraft, wiring might be exposed to external dirt and grease or mishandling. Where such protection is not required to such a degree, the flex conduit without the covering may be applied.

Tyre Profile. (Inter. Avia., No. 782, 24/9/41, p. 15.) (97/19 U.S.A.)

By providing new shapes for the tyres of main and nosewheels of aeroplanes, the Firestone Tyre and Rubber Co., of Akron O., is seeking to cope with the continuously increasing wheel pressures of modern fighter aeroplanes. In order to facilitate take-offs and landings on soft airport surfaces, the company has developed tyre profiles characterized by completely flat treads which even have projecting rims on both sides. By this means the whole tread of the tyre comes into contact with the soil without the wheel digging excessively into the soft ground; this design also prevents the occurrence of side slipping. For nosewheels the Firestone company also proposes tyres with similarly flat profiles which, in addition, are pressed together laterally by extraordinarily wide rim flanges, as a result of which the wheel does not jam the fork even when insufficiently inflated.

Condenser Discharge Welding Units. (Dodge, El. World, 20/9/41, p. 93.) (97/20 Great Britain.)

Equipment is described, which, operating on the " condenser discharge " principle, is used for spot-welding aluminium alloys. This unit stores energy for the weld by charging a capacitor bank to a predetermined voltage and then discharging it into the primary of the welding transformer as the weld is made. Since this machine is designed for 3-phase, 200 V. operation, it is claimed to be capable of performing, at nearly unity power factor, the same function as three single-phase machines. The new equipment is stated to be more compact than its predecessors, control devices and capacitors being located in a single cabinet placed alongside the welder. Operating speed is 75 spots per minute on stock 0.04 in. thick.

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

Power Losses in High-Speed Journal Bearings (with Discussion). (F. C. Linn and D. E. Irons, Trans. A.S.M.E., Vol. 63, No. 7, Oct., 1941, pp. 617-629.) (97/21 U.S.A.)

The smallest bearing tested was 3×3 in. and the largest $8 \times 6\frac{1}{4}$ in.; the over-all pressure range was 51 to 775 p.s.i. and the speed range from 3,600 r.p.m. to 12,000 r.p.m.

The most interesting result of the tests described in this paper is the power loss formula which was established.

$$L = 2.81 \times 10^{-3} d^{1.55} l^{0.55} \left(\frac{N}{1{,}000}\right)^{1.43} Z^{0.43} Q^{0.43}.$$

In the above

l = axial length of bearing, in.
d = journal diameter, in.
L = power loss, kw.
N = speed of journal, r.p.m.
Q = rate of oil flow to bearing, g.p.m.
Z = absolute viscosity, centipoises dyne sec./cm.^{2}.

A number of other interesting results were obtained as follows:—

$$(a) \quad f = \phi_1 \{ (ZN/p),\ p \}$$

for a given bearing when Q, l/d, and d are constant.

$$(b) \quad f = \phi_2 \{ (ZNQ/p)\ \rho \}$$

for a given bearing when l/d and d are constant.

$$(c) \quad f = \phi_3 \{ (ZNQ/\rho),\ ld \}$$

when ρ and l/d are constant for bearings of similar design.

(p = unit bearing load in p.s.i.)

(*d*) The loss changes only slightly with changes in unit load.

(*e*) The clearance ratio (min. clearance per inch diameter) should be increased with speed to obtain minimum power loss.

(*f*) The actual width of the groove over the top half of the bearing, so long as there is a liberal cross section, has little or no effect upon the loss.

(*g*) Curves resulting from the test data can be extrapolated to predict the loss of bearings of similar design beyond the range of those tested.

New Method of Calculating the Power at Altitude of Aircraft Engines Equipped with Superchargers on the Basis of Tests Made Under Sea-Level Conditions. (M. Sarracino, Atti di Guidonia, No. 28, June, 1940.) (R.T.P. Translation T.M. 981.) (97/22 Italy.)

The method of calculating the characteristics at altitude of supercharged engines, based on the consumption of air, is a more satisfactory procedure from a logical point of view, than the conventional correction formulas and affords a more accurate calculation of the horsepower at altitude, especially at low boost pressures.

One important value of this method is that it enables the determination, on the test engine direct, of the effect of the depression in the exhaust on the cylinder filling—which permits the exact appraisal of a factor, in respect to which greater variety of behaviour from the different engine parts may be expected.

The method can be refined after adequate research in the altitude test chamber, in order to establish a more accurate average law representing the effect of air-intake temperature on air consumption and the value to be attributed to the variation in pumping power due to the difference between boost and exhaust back pressure.

The correlation between air consumption and horsepower can be usefully applied to the determination of the power expected in flight, by observation, with suitable equipment, of the air consumption of the engine. Experiments for this purpose are under way and will be discussed in a later paper.

Explanatory Notes on the German Aero Engine Specifications. Pt. I. Definition of Fundamental Terms. (E. A. Reussner and W. Geh, Luftwissen, Vol. 8, No. 10, Oct., 1941, pp. 315-322.) (97/23 Germany.)

The " fundamental terms " discussed in the present article are dated July, 1941, and represent the final legal form of a number of proposed definitions, some of which date back to 1933, when the problem of standardising this field was first taken in hand by the German Government.

The order of treatment is such that new concepts are expressed in terms of factors already defined. At the same time an attempt has been made to make the whole scheme flexible enough to incorporate subsequent modifications rendered necessary either by experience or new dvelopments. The terms dealt with in the present article are classified under the headings :—

1. General;
2. Engine, engine parts, fuels, and oils;
3. Method of operation and design;
4. Working process and thermodynamics;
5. Performance.

Of special interest are those dealt with in sections 2 and 5.

The former contains a large number of definitions dealing with various kinds of superchargers and estimation of their efficiency. Both for the entry and exit conditions at the supercharger the concept of " total pressure " and " total temperature " is used to define the state of the gas. These temperatures and pressures are those obtained if the medium is brought adiabatically to rest.

As regards Performance (section 5), the position has been clarified by stricter definitions. The nominal power (Nennleishung) is developed at a nominal altitude (Nennhöhe), beyond which the static pressure in the induction pipe immediately before the cylinder entry will fall, the engine speed being constant and equal to the maximum take-off value. Up to the nominal altitude, the induction pipe pressure is constant and equal to maximum take-off value.

This nominal power forms the basis of engine weight/h.p. calculations.

Composite Engine Bearing. (American Aviation, Vol. 5, No. 10, 15/10/41, p. 43.) (97/24 U.S.A.)

A patent on a composite engine bearing has been granted to United Aircraft Corporation, East Hartford Conn., maker of Pratt and Whitney aircraft engines.

The bearing comprises a steel shell, which is internally lined with silver; the surface of the silver is roughened and has a layer of lead deposited on it electrolytically. The lead coating, which is only about 0.006 inches thick, may be finished by rolling.

New A.C. Aero Spark Plug. (American Aviation, Vol. 5, No. 12, 15/11/41, p. 47.) (97/25 U.S.A.)

The basic material for the insulator is aluminium oxide; it is mixed with a binder and moulded to shape under pressure and heat. Then for a period of hours, it passes through a butane-fired kiln, which is hotter than any commercial tunnel kiln ever used before. When it emerges with the binder burned away, it will scratch any substance but the diamond.

Chief features of the new plug insulator are said to be its resistance to the harmful effects of lead in the high-octane aviation fuels and its ability to withstand high heat and high compressions. Tests indicate that the insulator adds appreciably to the life of the plug, reducing plug maintenance and replacement costs and increasing availability of aircraft.

Influence of Friction Forces on the Stability of High Speed Rotors. (*In English.*) (P. Kapitza, J. of Physics, U.S.S.R., Vol. 1, No. 1, pp. 29-50.) (97/26 U.S.S.R.)

The theory of the transition through the critical speed for high-speed rotors is discussed.

It is shown that this transition can be accomplished in the actual machines only if there is damping of the lateral vibrations of the shaft. It is suggested that in the existing machines the damping is due to the oil layer in the bearings. Calculations from actual examples support this assumption.

The theory of the transition through the critical velocity for flexible shafts is given for cases when the transition through the critical point is attained by means of limiting rings (stops).

It is shown that the friction caused by the surrounding medium of the rotor has an important influence on its stability. This frictional force necessarily induces lateral instability and the axis follows a trajectory of the form of a logarithmic spiral with rotational frequency equal to that of the critical speed.

The calculations show that in the presence of a damper complete stability can be obtained. Experimental data supports the calculations put forward.

By the introduction of a damper for the lateral vibrations not only great stability is attained, but the transition through the critical speed is made easy, the rotor acquires immunity from outside shocks and the turbine no longer requires to be fixed to a rigid foundation.

The author suggests that by the introduction of a damper designed according to the theory put forward, it is possible to obtain such stability of the rotor that the clearance between the rotating parts and the casing can be made very small, thus raising the efficiency of a number of fast rotating machines.

Ball and Roller Bearings and Lubrication. (West, M.V. Gaz., Oct., 1941, pp. 210-218.) (97/27 Great Britain.)

The various type of ball and roller bearings available are described, such as the deep groove ball, single row cylindrical roller, angular contact ball, ball thrust washer, and self-aligning ball and roller bearings, and brief notes are given as to their correct choice and application. The importance of proper mounting and assembly is stressed, with illustrations of apparatus for checking alignments between the cages of ball and roller bearings. The lubrication requirements to keep a bearing free from wear are discussed, and the article is concluded with descriptions and causes of bearing troubles, such as stationary vibration ("Brinelling"), dismantling damage, deficient lubrication, overloading and etching or staining. (Abstract supplied by Research Dept., Met.-Vick.)

Flexible-Sleeve Multiple-Oil-Film Radial Bearing (with Discussion). (G. Fast, Trans. A.S.M.E., Vol. 63, No. 8, 8/11/41, pp. 725-733.) (97/28 U.S.A.)

Prof. Osborne Reynolds' theoretical analysis of Beauchamp Tower's researches on journal bearings proved the necessity for a convergent wedge-shaped oil film between journal and bearing surfaces in order to create useful load-carrying pressures in the oil film. Michell and Kingsbury, working independently, applied Reynolds' theory to the development of thrust bearings, and, incidentally, of radial bearings, with surfaces divided into tilting pads, which created a multiplicity of convergent oil films instead of the single convergent film naturally present in an ordinary plain journal bearing. Later Wallgren brought out another form of pivoted-pad radial bearing, in which the pads rotate with the shaft. The multiple-oil-film radial bearing discussed in this paper accomplishes the foregoing without recourse to the use of pivoted shoes or pads. The flexing of the continuous block-sleeve-bearing member under load provides a multiplicity of wedge-shaped oil-film boundaries, which create shearing stresses in the circulating oil and produce useful load-carrying pressures in the oil films. Careful tests have been conducted on the multiple-oil-film radial bearing under different conditions of speed, load, and oil viscosity, in order to determine its operating characteristics. The paper summarises and discusses these test data.

Means of Improving Ignition Quality of Diesel Fuels. (E. M. Nygaard and others, J. Inst. Pet., Vol. 27, No. 214, Oct., 1941, pp. 348-368.) (97/29 Great Britain.)

The increasing use of high-speed Diesel engines demands fuels of improved ignition quality. The majority of straight-run fuels, excepting those derived from highly aromatic or naphthenic crudes, possess an adequate ignition quality for present-day requirements. However, the increasing demand for high anti-knock fuels for petrol engines may utilize higher proportions of these stocks in cracking processes. This, coupled with growing markets for Diesel fuels of high ignition quality, may necessitate the utilisation of stocks of as poor ignition quality as 25 cetane number in the production of Diesel fuels.

The refiner has at the present time two distinct problems in order to provide Diesel fuels of satisfactory ignition quality: one is the raising of fuels of poor ignition quality (about 25 cetane number) to 50 cetane number; the other is the increasing of fuel of slightly sub-standard ignition quality (40-49 cetane number) to 50 cetane number. A third problem may arise, that of producing premium fuels of higher than 50 cetane number. The second and last of these problems may be solved by the use of small amounts of materials added to the fuels to improve their ignition quality. It is interesting to note that the effectiveness of the most powerful of such addition agents (amyl thionitrite or tert.-Butyl thionitrite) is of the same order as that of tetraethyl lead (sign reversed). The problem of raising a 25 cetane number fuel to 50 centane number is comparable to raising a 24.5 octane number gasoline to 68 octane number with tetraethyl lead. This procedure would be both impracticable and uneconomical with either gasoline or Diesel fuel.

Since the problem of raising a 25 cetane number fuel to a minimum requirement of 50 cetaine number cannot be solved practically nor economically by the use of fuel additives alone, solvent treating, or a combination of solvent treating and utilization of fuel additives, may be a happier, but still costly, solution to the problem.

Investigation on the Suitability of Certain Heat-Resisting Materials for Employment in Internal Combustion Engines (IV). (H. Cornelius and W. Birngardt, L.F.F., Vol. 18, No. 9, 20/9/41, pp. 305-310.) (R.T.P. Translation No. 1,379.) (97/30 Germany.)

Previous tests carried out by the DVL had shown that the most suitable material for the blades of exhaust-driven turbines consisted of an austenitic alloy of Ni, Co, Cr, W and Mo, with about 2 per cent. of Ti and relatively little iron

($\simeq$13 per cent.). The present report deals with the effect of increasing the iron content at the expense of Ni, Cr or Mo. Twelve alloys were investigated in all, including 2 austenitic types of the old composition for comparison. Creep tests were carried out over the temperature range, 600°—800° C. for periods up to 300 hours, with determination of the following factors :—

σ_{D1} = stress in Kg./mm.^{2} corresponding to creep rate of 10×10^{-4} per cent./h. between 25th and 30th hour of loading (so-called DVM short period test).

σ_{D2} = stress producing a creep rate of 5×10^{-4} per cent/h. between 100th and 300th hour of loading.

(One per cent. extension after 2,000 hours if creep test remains constant).

σ 1/300 = stress producing a total extension of 1 per cent. after 300 hours.

In addition, the average creep rate between 100th and 300th hour under a stress σ_{D1} was recorded. The results show that no definite relationship between the various creep strengths can be established and that the DVM short period test is not sufficient to establish the behaviour of the material when subjected to high temperature stressing over a long period. As already pointed out in the previous papers, in addition to creep strength, both the density, as well as the resistance to scaling at high temperatures, determine the suitability of turbine blade materials. When viewed from all these aspects, the alloys investigated in the present report are found to be less suitable than the original austenitic parent alloys of lower iron content.

Indium in Age-Hardenable Aluminium Alloys. (W. H. Fraenkel, Metal Industry, Vol. 59, No. 21, 21/11/41, p. 332.) (97/31 Great Britain.)

In the course of investigations on the effect of indium on various alloys it was found that small amounts of indium have a marked influence on age hardenable aluminium alloys.

The alloys of the duralumin type which age at room temperature, do not become harder with the addition of indium, although the rate of hardening is considerably lowered.

On the other hand, alloys without magnesium show a marked increase in hardness with the addition of indium, as shown in the table.

EFFECTS OF INDIUM ON AGE-HARDENING OF ALUMINIUM-COPPER ALLOYS.

	Without Indium.			With 0.05 % Indium.		With 0.1-0.2 % Indium	
Alloy No.	Composition.	Max. B.H.N.	Increase during Ageing.	Max. B.H.N.	Increase during Ageing.	Max. B.H.N.	Increase during Ageing.
A	Al+4·4.5 % Cu.	93, 93 87, 95 86, 82	32	110	56	114, 124 109, 125 109, 125	63
		Ave. 89				Ave. 116	
			34	117	62	126	67
		113, 109	36	114	47	119	38
D	Al+4.5-5 %		38	116	42	122	41
	Cu. + 1 % Mn.	Ave. 111					

In the alloys mentioned the hardness after quenching is low, allowing easy deformation by mechanical means. The increase in hardness during ageing is remarkably high. This fact, as well as the other that hardening takes place at a slower rate in the duralumin type of alloys and at a faster rate in alloys without magnesium may be of technical interest.

Causes of Corrosion Currents. (R. B. Mears and R. H. Brown, Ind. and Eng. Chem. (Ind. Ed.), Vol. 33, No. 8, August, 1941, pp. 1,001-1,010.) (97/32 U.S.A.)

Localized attack of metal specimens is often the result of electrochemical corrosion, not of simple chemical solution. The appearance of specimens suffering this type of attack has led laymen to attribute it to the presence of impurities in the corroding metal. However, impurities are only one possible cause for this type of attack.

Other known or possible causes are: (1) Grain boundaries (2) orientation of grains, (3) differential grain size, (4) differential thermal treatment, (5) surface roughness, (6) local scratches or abrasions, (7) difference in shape, (8) differential strain, (9) differential pre-exposure to air or oxygen, (10) differential concentration or composition of the corroding solution, (11) differential aeration, (12) differential heating, (13) differential illumination, (14) differential agitation, (15) contact with dissimilar metals, (16) externally applied potentials, and (17) complex cells. In cases encountered in practice, 4, 6, 10 and 11 appear to determine the local sites of attack more frequently than do any of the others.

The magnitudes of potential differences generated by several of the causes listed have been determined experimentally and are given in the paper. In several cases examples illustrating the special attack resulting from these causes are described.

Dynamic Properties of Rubber. (S. D. Gehman and others, Ind. and Eng. Chem. (Ind. Ed.), Vol. 33, No. 8, Aug., 1941, pp. 1,032-1,038.) (97/33 U.S.A.)

A method for measuring dynamic properties is described. The rubber is driven by a loud-speaker arrangement of coil and magnetic field at a frequency of 60 cycles per second. The system is tuned to resonance by varying the mass of the vibrating system. The mass at resonance determines the dynamic modulus; the amplitude at resonance determines the internal friction. Dynamic resilience and relative rates of heat generation can be calculated. The static modulus comparable to the dynamic value can be secured by passing a direct current through the coil.

Dynamic measurements are reported for series of volume loadings of Super-spectra black, channel black, Thermatomic black, zinc oxide, clay and blanc fixe.

The results of this study of rubber in vibration bring to the fore the complex character of the phenomena, but they also show the existence of general principles which should make possible the application of vibration test results for many useful purposes.

Tables for Computing Various Cases of Beam Columns. (J. Cassens, L.F.F., Vol. 18, No. 2-3, 29/3/41.) (R.T.P. Translation T.M. 985.) (97/34 Germany.)

Column effect and its counterpart, bending tension, deals with the case of concurrent longitudinal and transverse forces acting on a member. Engineering manuals contain tables which give the transverse forces, moments, deflections and various other data for bending forces on the straight members with constant bending stiffness. These forces are supplemented by the effect of the moment Py, where P denotes the longitudinal force and y the deflection at any one point. The relation between curvature radius and bending forces reads:—

$$+\frac{i}{\rho}=\simeq\frac{d^2y}{dx^2}=-\frac{M_x}{EI}$$

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where M_x is the moment of all bending forces dependent upon beam ordinate x, EI the bending stiffness, and y the deflection of the neutral axis. Dividing the moment M_x into a portion (M_x) due solely to the transverse forces and a portion affected only by P, gives $M_x = M_x + Py$, which, posted in the foregoing relation, gives

$$k^2 y'' + y = -\frac{M_x}{P}$$

with $k^2 = EI/P$. (The investigations apply to constant bending stiffness EI and constant longitudinal force P.) The simplest way of solving the differential equation is as follows:—The homogeneous differential equation is expressed as $y = Ce^{ax}$; the values C are coefficients to be defined later and must satisfy the boundary conditions of the problem, while a establishes the connection between the formula and the original equation. The complete differential equation is solved either by power formulas, the coefficients of which are determined by comparison, or else by trigonometrical series, depending upon the character of the right side of equation.

The article deals with 23 representative cases of combined longitudinal and transverse loading, the equations being solved mainly by trigonometrical means.

Replacement Alloy Steels in Aero Engine Construction (Low Nickel and Tungsten Content). H. Wiegand and R. Scheinost, Luftwissen, Vol. 8, No. 10, Oct., 1941, pp. 305-309.) (R.T.P. Translation No. 1,380.) (97/36 Germany.)

After reviewing the effects of various alloy additions on the mechanical properties of standard steels, the authors deal with the question of replacing some of the alloying constituents by home-produced materials. It has been found possible to produce a series of Mn-Cr steels which are entirely devoid of nickel and tungsten and which yet, after suitable heat treatment, are fully up to the standard of the materials previously employed. The composition of some of these steels is given in the following table:—

German Material Specification No.	C.	Mn.	Si.	Cr.	V.	S.	P.
1310	.42	1.7	<.35	—	.15	-	—
1604	.26	1.1	<.35	.5	.20	<.02	<.02
1253	.33	.6	<.35	1.0	.10	—	—
1610	.5	.7	<.35	1.0	.20	—	—
1620 / 1473	.29	.6	<.4	2.5	.60	—	—

It has not been found possible to obviate the use of Nickel and Tungsten in the case of heat resistant steels. The replacement material, however, contains very much less of these valuable constituents, as will be seen from the following comparisons:—

	C.	Mn.	Si.	Ni.	Cr.	W.	
Standard	.3	.8	1.8	13	16	2.5	Heat Resistant Steels
Replacement	.45	1.1	2.6	9	19	1.1	

Finally, in the field of case-hardening steels, it has been found possible to eliminate Mo completely:—

	C.	Mn.	Si.	Cr.	Mo.
Standard	.15	.85	<.35	1.0	.20
Replacement	.16	1.25	<.35	.95	—

Some details of the heat treatment required by these new replacement steels are given and the mechanical properties are tabulated in comparison with previous values. It appears that the authors' contention of maintenance of quality is fully justified.

Effect of Roughness of Cast Iron Brake Drums in Wear Tests of Brake Linings. (R. A. Taylor and W. L. Holt, J. Nat. Bur. Stands., Vol. 27, No. 4, Oct., 1941, pp. 395-404.) (97/35 U.S.A.)

Five representative types of commercial brake linings were tested against centrifused cast-iron brake drums having widely different values of roughness. It was found that (1) the rate of wear of brake lining is an increasing function of the initial roughness of the drum, (2) the actual wear characteristics of a given lining are a function of the character of the surface of the drum and of the type and quality of the lining, (3) the roughness of the drums, in general, has a greater effect on the wear of woven linings than on the wear of moulded linings, and (4) the rate of wear of brake linings tested against relatively smooth drums becomes practically constant after the first few hundred stops. For relative wear tests a drum of specified type and finish having a roughness of not more than 15 microinches (root mean square) is recommended.

The effect of the roughness of brake drums in service is probably similar to that obtained on the testing machine, but less in magnitude.

The coefficient of friction appears to be slightly lower the rougher the drum, but for all practical purposes the effect of roughness on the coefficient of friction may be neglected.

An Analysis of the Milling Process (with Discussion). (M. E. Martellotte, Trans. A.S.M.E., Vol. 63, No. 8, 8/11/41, pp. 677-700.) (97/37 U.S.A.)

This analysis of the milling process shows that the path of a milling-cutter tooth is an arc of a trochoid, the parametric equation for which can be derived from known variables of the cut. As a result, the milling process is susceptible to mathematical treatment. Practically, the advantage of such analytical methods is that such elements as the radius of curvature of the tooth path, the clearance and rake angles of the length of the tooth path, the radial thickness of the chip, and their effects upon the quality of milled surface may be evaluated. The paper demonstrates the advantage of the up-milling process in achieving machined surfaces of high quality. This form of analysis will also be found useful in comparing different milling methods.

Magnetic Powder-Etching for Crack Detection. (I. and Coal T. Rev., 25/7/41, p. 73.) (97/38 Great Britain.)

Particulars are given of methods used in Germany for the magnetic testing of metallurgical objects. The article is abstracted from a report published in "Stahl and Eisen." Apparatus for the test using an oil film with iron filings in suspension and apparatus for the magnetic impulse type of testing have been developed. Considerable attention is paid to the interpretation of diagrams, magnetising conditions and to the effect of direction of magnetisation. It is finally concluded that magnetic etching or spraying should be supported by additional metallographic investigation to verify the presence of flaws and cracks.

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

Light Alloys in Design. (E. W. Thomas, Engineering, Vol. 152, No. 3,962, 19/12/41, pp. 482-493.) (97/39 Great Britain.)

An important development in engineering design is the search for materials having an improved strength-weight ratio; that is, ratio of proof stress to specific gravity. An increase in the permissible working stress in the material results in the employment of thinner sections, and a consequent reduction in rigidity. Under certain conditions this may lead to instability in the designed members.

With the advent of high-strength alloys resulting in thinner sections, the metal has to be distributed to give torsional, as well as flexural, rigidity.

The basic expression for crippling stress can be applied to any light alloy the physical properties of which are known. Generally it may be stated that, apart from direct crushing, the sections of low-strength material when overloaded will fail through lack of flexual rigidity; with higher-strength resilient material may show actual torsional instability under critical load.

Parachute Descent from Great Altitudes. (H. W. Romberg, Luftwissen, Vol. 8, No. 10, Oct., 1941, pp. 310-314.) (R.T.P. Translation No. 1,381.) (97/40 Germany.)

If a parachutist opens the parachute at an altitude of 12,000 m. immediately after leaving the aircraft, his rate of descent will gradually diminish from about 13 m./sec. to 7m./sec. as he approaches the ground.

The total time of descent will be of the order of 21 minutes, an altitude of 6,000 m. being reached after about 9 minutes. When dropping freely, on the other hand, the same altitude is reached in about 1 minute, the rate of descent varying from about 100 m./sec. at 12 km. to 57 m./sec. near the ground.

It is clear, therefore, that if the parachute is opened immediately at great altitude, the parachutist is exposed to deleterious physiological effects over a considerable period of time. These effects, at any rate as far as concerns oxygen concentration, were reproduced in a high altitude chamber on specially picked personnel. It appears that a delayed rate of descent (parachute opened immediately) was accompanied by collapse of the experimental subject in each case. Grave injury and possible death could only be avoided by the immediate supply of additional oxygen. On the other hand, the physiological effects of a free drop from 12,000 to 6,000 m. were generally withstood without serious disturbances of the organism, and the author therefore strongly recommends that if high altitude jumps have to be carried out without special oxygen equipment carried by the parachutist, the parachute should not be opened till " safe " altitudes of the order of 5,000—6,000 m. have been reached.

This procedure is all the more to be recommended, since it cuts down the time of exposure to great cold and also reduces the amount of ground drift before landing.

It is thought that with delayed opening of the 'chute the carrying of special oxygen equipment can be dispensed with. Of the nine experimenters, only three experienced serious inconvenience when dropping freely from 12 to 6 km. All would have died if the rate of descent had been that corresponding to the open parachute.

Physiological Conditions of Flight at High Altitudes. (R. Margaria, Atti di Guidonia, No. 22, 22/2/40, pp. 29-36.) (97/41 Italy.)

If the partial pressure of the oxygen in the alveoli is reduced below 30 mm. Hg. (normal value at sea level$\simeq$100 mm. Hg.), grave disturbances of the central nervous system arise. The respiratory centre ceases to function properly and the individual loses consciousness. The limiting height corresponding to this partial pressure is about 14,000 m. or 7,500 m. respectively, depending on whether the individual breathes pure oxygen or air. It should be pointed out that these critical altitudes refer to special individuals, less prone to anoxemia than the average pilot. In the latter case, trouble may be experienced at lower altitudes, 12,900 m. and 4,600 m. becoming the respective limits for oxygen and air breathing.

From this it might appear that the installation of a pressure cabin is not worth while, except for flights at an altitude in excess of 12,000 m. and that the pressure in the cabin need only be maintained at the value corresponding to this altitude, provided oxygen is available.

The effects of altitude are, however, not limited to anoxemia, i.e., collapse due to a reduction in the partial pressure of the oxygen. A rapid reduction in the surrounding air pressure may give rise to severe auricular pains, whilst the liberation of dissolved nitrogen in the blood stream (embolism), may lead to partial paralysis. Both these factors can be more readily controlled if a pressure cabin is installed, and the author is of the opinion that such cabins (fully air-conditioned) will become standard practice on civil aircraft operating at great altitudes over considerable distances.

For military aircraft, on the other hand, the pressure cabin is not recommended since its weight will seriously detract from the performance of the machine, whilst its extreme vulnerability to gunfire might produce serious results.

Both present and contemplated operational altitudes of fighters and bombers are well within the region of oxygen breathing, and the author has developed a special nose mask for this purpose, which does not obstruct the mouth.

Talking, yawning and eating can thus be carried out without difficulty. In the case of nausea, vomiting is possible without soiling the mask.

Measures for Combating Icing on Aircraft. (N. V. Lebedev, Leningrad, Nov., 1939, Oborongiy Publication, 221 pages.) (97/42 U.S.S.R.)

This book is primarily intended for the use of engineering and technical staffs, but certain sections will be of interest to flying personnel.

Results of research on the forms of icing and meteorological causes of this phenomenon are discussed, as well as measures for combating this trouble as far as it affects the various parts of an aircraft (wings, airscrews, carburettors, struts and wires, vent pipes, pitot, wireless aerials, windows). This section contains nothing new, the well-known devices depending either as the application of certain chemicals or heat (electric or exhaust) being reviewed, as well as mechanical devices of the Goodrich type.

On the meteorological side, however, copious reference is made to original Russian work, covering such aspects as: Types of ice deposits, annual incidence of icing in the U.S.S.R., cloud forms promoting icing and thickness of such clouds, research with pilot balloons.

Considerable attention is paid to the possibility of flight planning so as to minimise the danger.

The bibliography covers 227 items, 49 of which refer to Russian publications.

Locating the Principal Point of Precision Aeroplane Mapping Cameras. (F. E. Washer, J. Nat. Bur. of Stands., Vol. 27, No. 4, Oct., 1941, pp. 405-412.) (97/43 U.S.A.)

The need for topographic maps is evidenced by the fact that the United States is the least thoroughly mapped of any of the great industrial nations. Such maps are of prime importance in the laying out of new road systems and in the location of proper dam sites for drainage control or power developments. With these aims in mind, various governmental agencies have interested themselves in the problems of making the negatives obtained on one project more useful for further studies of the same region.

It was soon found that negatives from different sources did not usually lend themselves readily to stereo-photogrammetric plotting of topography. Some of these difficulties were quickly traced to large values of the distortion and low resolving power, but after these factors had been minimized by the establishment of minimum performance standards for the lenses used in aerial cameras, some difficulties still remained that were traceable to the airplane mapping camera.

Chief among these difficulties were the inadequate and non-uniform methods of showing the location of the principal point of the camera on the negative. This point is the intersection of a perpendicular dropped from the rear nodal point of the lens with the focal plane, and the importance of its accurate location has been shown in a previous paper by I. C. Gardner (Bureau of Stands. Report 1177.)

The location of the principal point with respect to the intersection of lines joining opposite pairs of collimation index markers was determined for numerous precision aeroplane mapping cameras. Weak prism effect, present in most lenses, was measured with the Bureau's precision lense-testing camera and its influence on the location of the principal point considered. It was found that the camera tested required adjustments ranging from 2 to 25 times the allowable tolerance of $\pm$ 0.03 mm. in the location of the principal point.

German Society for Documentation. (Luftwissen, Vol. 8, No. 10, Oct., 1941, p. 322.) (97/44 Germany.)

The new society for documentation has been formed as a result of a suggestion by the German Standards Committee with the co-operation of the Ministry of Science and Education, the Ministry of Economics, the Ministry of Propaganda, the German Foreign Office and the Supreme Command of the Fighting Forces.

The duties of the new society cover all problems connected with the collecting and classification of documents. Sub-committees dealing with technical publications, methods of photographic reproduction and the preparation of bibliographies and abstracts have already been formed.

Membership to the society is open to corporations and individuals.

Results of the Lilienthal Prize Competition for 1940. (Luftwissen, Vol. 8, No. 10, Oct., 1941, p. 326.) (97/45 Germany.)

For the 1940 competition subjects were chosen from the fields of wireless, armaments, aero engines and aircraft construction. The present note deals with the results of the first two classes, for which the following two problems had been formulated:—

(1) Critical examination of the present state of development of the generation and propagation of ultra short wireless waves.

(2) Critical survey of published information on sights for mobile guns installed in aircraft.

(1) Two papers were submitted. The first was in the nature of a text book and constituted a survey of practically all the published information, over 184 major articles being reviewed. In the opinion of the examining body, however, the author's practical experience was not sufficient for a critical examination of the subject matter. The author of the second paper, on the other hand, has a wide practical experience, and the researches carried out by him on diurnal variations in the field strength of U.S. radiations are of interest. Nevertheless, this paper also failed to come up to the high standard expected, and the committee therefore withheld the first prize in this class, but awarded a second prize to each author.

(2) An exhaustive treatment of the second subject would have required a mathematical analysis of the problem followed by a critical examination of practical solutions so far as they are available in literature (mostly patent specifications). None of the submitted papers came up to the requirements of a balanced treatment, some over emphasizing the mathematical side, whilst others were satisfied with a more practical treatment. Four papers were, however, chosen which, taken collectively, gave a very good survey of the problem from both aspects, and the

authors were rewarded with second prizes. A fifth paper of a purely mathematical nature was acquired by the Lilienthal Society for subsequent publication. As already stated above, published information on gun sights is mostly restricted to patent specifications and a critical review of this material is of the greatest value in clarifying fundamental principles. It is interesting to note that French patents topped the list, with 34 per cent. of the total number reviewed. The other countries being in the following order: Germany, 28 per cent.; Great Britain, 18 per cent.; U.S.A., 13 per cent.; rest, 7 per cent.

The Relationship of Wind Correction to Drift Angle. (W. S. Alexander and O. M. Klose, Aeronautical Science, Vol. 8, No. 11, Sept., 1941, pp. 409-412.) (97/46 U.S.A.)

The purpose of this paper is to provide a definite and comprehensive answer to the long-standing question among aerial navigators concerning the exact nature of the relationship between wind correction angle and drift angle.

The term drift angle is defined to mean the angle measured from the heading of an aircraft to its track when the heading is in the direction of a desired course. The term wind correction angle is used to mean the angle measured from the desired course to the heading necessary in order to make the track of the aircraft coincide with the desired course.

The relationship between correction angle and drift angle is treated mathematically and a formula for the relationship is derived. It is found that the correction angle is less than, equal to, or greater than, the drift angle, according as the groundspeed (as observed when heading on the desired course) is, respectively, less than, equal to, or greater than, the airspeed.

LIST OF SELECTED TRANSLATIONS.

No. 40.

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

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

ARMAMENT AND TACTICS.

TRANSLATION NUMBER AND AUTHOR.		TITLE AND JOURNAL.
1315	Kassowitz, P. ...	*Range and Bombing Efficiency of Aircraft.* (Flugwehr und Technik, No. 5, May, 1941, pp. 107-109.)
1319	Rougeron, A. ...	*Armoured Aircraft.* (La Science et la Vie, No. 288, Aug., 1941, pp. 94-105.)
1324	Hostettler ...	*Anti-Tank Defence by Means of Aircraft.* (Flugwehr und Technik, No. 8, Aug., 1941, pp. 184-185.)
1328	Sapunov, S. D. ...	*Fire from Aircraft on Stationary and Mobile Ground Targets.* (Air Fleet News, U.S.S.R., Vol. 23, No. 2, Jan., 1941, pp. 49-56.)

AERODYNAMICS AND HYDRODYNAMICS.

1286	Polzin	*Flow Investigations in a Two-Dimensional Diffuser.* (Ing. Archiv., Vol. 11, No. 5, Oct., 1940, pp. 361-385.)
1323	Flugge-Lotz, I. ... Solf, K.	*Visual Examination of a Propeller Slip Stream Passing Over an Aerofoil.* (L.F.F., Vol. 17, No. 6, 20/6/41, pp. 161-166.)
1329	Kuchemann, D. ... Vandry, F.	*The Influence of the Nozzle (or of the Collector Cone) on the Measurements of Resistance in an Open Jet Wind Tunnel.* (Z.A.M.M., Vol. 21, No. 1, Feb., 1941, pp. 17-31.)

AIRCRAFT AND FLIGHT CHARACTERISTICS.

1316	Hoppe, F.	*Flight Characteristics at Stalling Speed.* (Z.F.F., Vol. 18, No. 5, 28/5/41, pp. 169-173.)
1317	Dietz, F.	*Aerodynamic Forces Acting on the Wing-Aileron-Tab Combination when Undergoing Harmonic Vibrations.* (L.F.F., Vol. 18, No. 4, 22/4/41, pp. 135-141.)
1333	Bock, G.	*Airscrew Gyroscopic Moments.* (Luftwissen, Vol. 8, No. 3, March, 1941, pp. 96-97.)
1334	Everling, E. ...	*The Mechanics of Horizontal Flight.* (Luftwissen, Vol. 8, No. 8, Aug., 1941, pp. 256-259.)

Turbines, Compressors and Jet Propulsion.

Translation Number and Author.		Title and Journal.
1328	Lozinsky	*Turbine Blade Losses.* (Sov. Kotlurb, U.S.S.R., No. 3, March, 1941, pp. 90-94.)
1327	Sorg	*Supersonic Flow in Turbines and Compressors.* (Forschung, Vol. 10, No. 6, Nov.-Dec., 1939, pp. 270-285.)
1330	Stemmet, J. ...	*Development of Jet or Rocket Propulsion.* (Flugwehr und Technik, No. 7, July, 1941, pp. 166-170, and No. 8, Aug., 1941, pp. 191-198.)

Materials and Welding.

1314	Bremer, F.	*Phosphate Coatings as Running in Layers for Piston Rings.* (Korrosion and Metallschutz, Vol. 17, No. 6, June, 1941, pp. 208-209.)
1318	Schulz, E. H. ... Bishof, D. W. ...	*Recent Development of Steel St. 52 for Steel Structures.* (Z.V.D.1, Vol. 84, No. 14, 6/5/41, pp. 229-235.)
1326	Kistyuk, F. I. ...	*Circuit Breakers for Automatic Control and Regulation of Contact Welding Machines.* (AV Ind., U.S.S.R., Vol. 1, No. 17, May, 1941, pp. 15-17.)

Gear Design.

1321	Ide, H.	*The Design of Aero Engine Gears.* (L.F.F., Vol. 17, No. 5, 20/5/41, pp. 130-134.)
1335	Nuebling, O. ...	*The Stresses in Gear Teeth and Their Calculation for Aero Engine Gears.* (L.F.F., Vol. 17, No. 5, 20/5/41, pp. 145-153.)

Miscellaneous.

1331	——	*Women in Industry (a Digest of a Series of Lectures held in Berlin, Feb.,* 1941). (Z.V.D.I., Vol. 85, No. 25, 21/6/41, pp. 561-562.)
1332	Knoblock, H. ...	*The Application of a Distortion Function in Nomography.* (Z.A.M.M., Vol. 21, No. 3, April, 1941, pp. 103-107.)

TITLES AND REFERENCES OF ARTICLES AND PAPERS SELECTED FROM PUBLICATIONS RECEIVED IN R.T.P.3 DURING NOVEMBER, 1941.

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

Theory and Practice of Warfare.

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
1	29718	U.S.A. ...	*40 mm. Anti-Aircraft Cannon.* (D. J. Martin, Army Ordnance, Vol. 22, No. 129, Nov.-Dec., 1941, pp. 386-388.)
2	29719	U.S.A./ Germany ...	*Martin Maryland I and Dornier Do. 17 Z2 (Silhouettes).* (Aeroplane, Vol. 61, No. 1,593, 5/12/41, p. 631.)
3	29720	Germany ...	*German Aeroplanes in Service, XV (Heinkel Series).* (Aeroplane, Vol. 61, No. 1,593, 5/12/41, p. 632.)
4	29730	Great Britain/ Germany ...	*Novel Ideas in Defensive Armament (Fairey Dual Turret and Dornier Fixed Rear Gun with Variable Incidence Wing).* (Flight, Vol. 40, No. 1,719, 4/12/41, pp. 402-403.)
5	29737	Great Britain	*Bristol Hydraulically Operated Aeroplane Gun Turret.* (Engineering, Vol. 152, No. 3,960, 5/12/41, pp. 446-447 and 450.)
6	29763	U.S.S.R. ...	*Military Aircraft of the U.S.S.R. (Photographs).* (Der Flieger, Vol. 20, No. 10, Oct., 1941, pp. 322.)
7	29764	Germany ...	*Do. 26 Long Range Reconnaissance Flying-Boat.* (Der Flieger, Vol. 20, No. 10, Oct., 1941, p. 325.)

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8	29769	Germany ...	*Maintenance of Aircraft Guns (Photograph).* (Dr. H. Franz, Der Adler, No. 19, Sept., 1941, p. 600.)
9	29775	U.S.A. ...	*Taylorcraft Trainer.* (F. W. Lanchester, Flight, Vol. 40, No. 1,720, Dec., 1941, b-c.)
10	29776	U.S.A. ...	*Douglas B 19 Trials.* (F. W. Lanchester, Flight, Vol. 40, No. 1,720, Dec., 1941, d-e.)
11	29777	Great Britain/ U.S.A. ...	*Blackburn Botha and Boston III (Tail Features).* (F. W. Lanchester, Flight, Vol. 40, No. 1,720, Dec., 1941, p. g.)
12	29780	Great Britain	*Aircraft Carriers in the Pacific.* (C. L. Hinings, Flight, Vol. 40, No. 1,720, Dec., 1941, pp. 428-429.)
13	29784	U.S.A. ...	*Colalloy Armour Plate.* (J. Frank. Inst., Vol. 232, No. 4, Oct., 1941, p. 372.) (Abstract available.)
14	29788	U.S.A. ...	*Glen Martin B 26 "Maurauder" (Photograph).* (Aeroplane, Vol. 61, No. 1,594, 12/12/41, p. 638.)
15	29789	U.S.A. ...	*Martin XPB2m—1 "Mars" (Photograph).* (Aeroplane, Vol. 61, No. 1,594, 12/12/41, p. 641.)
16	29790	U.S.A. ...	*Martin Maryland (Photograph).* (Aeroplane, Vol. 61, No. 1,594, 12/12/41, p. 644.)
17	29791	U.S.A. ...	*Demonstration of Recent American Types by the M.A.P. (Kittyhawk, Mustang, Boston III, etc.).* (Aeroplane, Vol. 61, No. 1,594, 12/12/41, pp. 658-659.)
18	29792	Germany ...	*German Aeroplanes in Service, XVI (Heinkel and Henschel Series).* (Aeroplane, Vol. 61, No. 1,594, 12/12/41, pp. 662-663.)
19	29798	U.S.A. ...	*Summit HM 5 Plastic Plane.* (Flugsport, Vol. 33, No. 19, 17/9/41, pp. 367-370.)
20	29799	France ...	*Morane-Sauliner 230 ET 2 Trainer.* (Flugsport, Vol. 33, No. 19, 17/9/41, p. 370.)
21	29813	U.S.A. ...	*Curtiss Hawk 87 (Kittyhawk).* (Inter. Avia., No. 781, Sept., 1941, pp. 10-11.)
22	29814	Great Britain	*Hawker Typhoon.* (Inter. Avia., No. 781, Sept., 1941, p. 11.)
23	29815	U.S.A. ...	*Curtiss Wright CW 21 B Single-Seat Fighter.* (Inter. Avia., No. 781, Sept., 1941, p. 13.)
24	29816	U.S.A. ...	*Curtiss Wright CW 22 Falcon Trainer.* (Inter. Avia., No. 781, Sept., 1941, pp. 13-14.)
25	29817	U.S.A. ...	*Douglas A-24 Dive Bomber (S.B.D. 3).* (Inter. Avia., No. 781, Sept., 1941, p. 14.)
26	29818	U.S.A. ...	*Douglas O-53 Observation and Liaison Plane.* (Inter. Avia., No. 781, Sept., 1941, p. 14.)
27	29819	U.S.A. ...	*Manta Fighter with Davis Wing.* (Inter. Avia., No. 781, Sept., 1941, pp. 14-15.)
28	29820	U.S.A. ...	*U.S.A. Dive Bombers.* (Inter. Avia., No. 781, Sept., 1941, p. 15.)
29	29824	U.S.A. ...	*U.S.A. Air Force Reorganisation.* (Inter. Avia., No. 781, Sept., 1941, pp. 18-20.)
30	29826	U.S.S.R. ...	*Russian Aircraft Types (Photographs).* (Luftwissen, Vol. 8, No. 10, Oct., 1941, pp. 302-303.)
31	29833	U.S.A. ...	*Non-Rigid Army Airship K.3.* (Am. Av., Vol. 5, No. 9, 1/10/41, p. 6.)

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32	29839	U.S.A. ...	*Organisation Charts of Defence Administration and O.P.M. (U.S.A.).* (American Aviation, Vol. 5, No. 10, 15/10/41, pp. 6-7.)
33	29854	U.S.A. ...	*Manta Long-Range Fighter (Davis Wing).* J. L. Straight, American Aviation, Vol. 5, No. 12, 15/11/41, p. 3.)
34	29856	U.S.A. ...	*Morrow "Victory" Plywood Trainer.* (American Aviation, Vol. 5, No. 12, 15/11/41, p. 19.)
35	29865	Great Britain	*Hawker II B Bomber (Photograph).* (Aeroplane, Vol. 61, No. 1,592, 28/11/41, pp. 582, 589-590.)
36	29867	U.S.A. ...	*Northrop Tailless Aeroplane.* (Aeroplane, Vol. 61, No. 1,592, 28/11/41, p. 584.)
37	29868	U.S.S.R. ...	*I 16 B Single-Seat Fighter (Photograph).* (Aeroplane, Vol. 61, No. 1,592, 28/11/41, p. 586.)
38	29869	Germany ...	*He. 111 HaE Torpedo Carrier (Photograph).* (Aeroplane, Vol. 61, No. 1,592, 28/11/41, p. 587.)
39	29871	Germany ...	*Messerschmitt Me. 110.* (Aeroplane, Vol. 61, No. 1,592, 28/11/41; p. 602.)
40	29872	Germany ...	*German Aeroplanes in Service, XIV (Heinkel Series).* (Aeroplane, Vol. 61, No. 1,592, 28/11/41, p. 603.)
41	29881	Italy	*Stick Bombing at Decreasing Speed and Constant Height Against Fixed Targets or Objectives Moving at Constant Speed.* (A. Tommasi, L'Aerotecnica, Vol. 21, No. 9-10, Sept.-Oct., 1941, pp. 615-630.) (R.T.P. Translation No. 1,369.)
42	29912	U.S.A. ...	*Lear Avia Warning Signal for Baling Out.* (Aero Digest, Vol. 37, No. 5, Nov., 1940, p. 171.)
43	29924	U.S.A. ...	*Multiple Inspection Gauge for A.A. Shells.* (Autom. Ind., Vol. 85, No. 9, Nov., 1941, p. 64.)
44	29928	Great Britain	*Bomb Bays on Stirling (Photograph).* (Autom. Ind., Vol. 85, No. 10, Nov., 1941, p. 54.)
45	29938	U.S.S.R. ...	*Organisation of Air Force Supply Services.* (V. Affanasiev, Air Fleet News, Vol. XIX, No. 1, Jan., 1937, pp. 4-8.)
46	29939	U.S.S.R. ...	*The Autogyro in Aerial Combat.* (N. I. Shaurov, Air Fleet News, Vol. XIX, No. 1, Jan., 1937, pp. 12-16.)
47	29940	U.S.S.R. ...	*Treatment of Camera Gun Films.* (A. Nikitin, Air Fleet News, Vol. XIX, No. 1, Jan., 1937, pp. 21-23.)
48	29941	U.S.S.R. ...	*Comfort as a Factor Increasing the Fighting Efficiency of an Aircraft.* (N. M. Dobrotvorsky, Air Fleet News, Vol. XIX, No. 1, Jan., 1937, pp. 24-25.)
49	29944	U.S.S.R. ...	*On the Dive-Bombing Question.* (Anon., Air Fleet News, Vol. XIX, No. 1, Jan., 1937, pp. 46-47.)
50	29948	U.S.A. ...	*Black-out Preparation in the U.S.A. (Fluorescent Dyes).* (A. E. Millson, Ind. and Eng. Chem. (News Ed.), Vol. 19, No. 22, Nov., 1941, pp. 1,266-1,272.)
51	29953	Germany ...	*Training in Aircraft Recognition.* (Luftwelt, Vol. 8, No. 21, Nov., 1941, pp. 414-415.)

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52	29954	Germany ...	*The Signals Section of the German Air Force.* (Luftwelt, Vol. 8, No. 21, Nov., 1941, pp. 404-409.)
53	29955	Germany ...	*Examination of Reconnaissance Films.* (Luftwelt, Vol. 8, No. 22, Nov., 1941, pp. 424-427.)
54	29957	Germany ...	*Messerschmitt Me. 109 F.* (Aviation, Vol. 40, No. 10, Oct., 1941, pp. 50-51.)
55	29964	U.S.A. ...	*Warplane Specification Engineering.* (P. A. Beck and R. H. Rubb, Aviation, Vol. 40, No. 10, Oct., 1941, pp. 68-69.)
56	29971	Great Britain	*Design Details of Hawker Hurricane.* (Aviation, Vol. 40, No. 10, Oct., 1941, p. 93.)
57	29972	Germany ...	*Design Details of ME. 110.* (Aviation, Vol. 40, No. 10, Oct., 1941, p. 95.)
58	29980	U.S.A. ...	*New R.A.F. Type (Airacobra, Kittyhawk).* (Airc. Eng., Vol. 13, No. 154, pp. 373-375.)
59	29987	U.S.A./ Germany ...	*Catalina and Dornier 24 (Tail Units).* (Flight, Vol. 40, No. 1,721, p. e.)
60	29991	U.S.A. ...	*Douglas DT 1 Two-Seater Dive-Bombers (Photographs).* (Flight, Vol. 40, No. 1,721, p. 454.)
61	29996	U.S.S.R. ...	*The Use of Dummies in the Camouflage of Operational Aerodromes.* (*R.T.P. Translation No. 1,271.*) (E. Z. Yassin, J. Roy. Aeron. Soc., Vol. 45, No. 372, Dec., 1941, pp. 370-377.)
62	29998	U.S.A. ...	*Twin-Engined Trainer Curtiss A.T.-9 (Photograph).* (U.S. Air Services, Vol. 26, No. 11, Nov., 1941, p. 38.)
63	30007	U.S.A. ...	*Bullet Proof Oxygen Cylinder for Airmen.* (Sci. Am., Vol. 165, No. 6, Dec., 1941, p. 337.)
64	30010	U.S.A. ...	*Windowless Bomber Factories in the U.S.A.* (A. T. Rutledge, Sci. Am., Vol. 165, No. 6, Dec., 1941, pp. 328-329.)
65	30011	U.S.A. ...	*Modern Forms of Barrage Balloons.* (Sci. Am., Vol. 165, No. 6, Dec., 1941, pp. 378-379.)
66	30015	Japan	*Japanese Air Force—Powerful Types.* (Aeroplane, Vol. 61, No. 1,595, Dec., 1941, p. 674.)
67	30016	Great Britain	*Spraying Chemicals from the Air.* (Aeroplane, Vol. 61, No. 1,595, Dec., 1941, p. 675.)
68	30019	Germany ...	*German Aeroplanes in Service (XVIII) (Henschel and Junkers Series).* (Aeroplane, Vol. 61, No. 1,595, Dec., 1941, p. 688.)
69	30020	U.S.A. ...	*Various American Trainers Equipped with Whirlwind Engines (Photographs).* (Trade Winds, Nov., 1941, pp. 10-11.)
70	30043	Switzerland ...	*From Commercial Air Service to War Transport.* (Inter. Avia., No. 782, 24/9/41, pp. 1-6.)
71	30044	U.S.A. ...	*Bell Airacobra Fighter.* (Inter. Avia., No. 782, 24/9/41, p. 9.)
72	30046	U.S.A. ...	*Vultee 72 "Vengeance."* (Inter. Avia., No. 782, 24/9/41, pp. 12-13.)
73	30047	U.S.A. ...	*Douglas B 19 Design Details.* (Inter. Avia., No. 782, 24/9/41, p. 13.)
74	30048	U.S.A. ...	*Republic P 47 "Thunderbolt" Interceptor.* (Inter. Avia., No. 782, 24/9/41, pp. 13-14.)

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75	30049	U.S.A. ...	*Boeing B-17 E "Flying Fortress."* (Inter. Avia., No. 782, 24/9/41, p. 14.)
76	30053	Great Britain	*Dinghies for British Fighter Pilots.* (Inter. Avia., No. 782, 24/9/41, p. 20.) (Abstract available.)
77	30058	U.S.A. ...	*American Aircraft for the R.A.F.* (Engineering, Vol. 152, No. 3,962, 19/12/41, p. 487.)
78	30059	Great Britain	*Stability of Warships After Torpedo Hits.* (Engineering, Vol. 152, No. 3,962, 19/12/41, p. 492.)
79	30063	U.S.S.R. ...	*New Types of Aircraft of the U.S.S.R.* (*Fighters, I-153, I-16 B, I-16 C, I-26, I-61, I-17, I-18, I-19; Bombers, P-2, SB-3, DB-3, DB-3 A, TB-5, TB-6*). (Inter. Avia., No. 779-780, 8-9-41, pp. 8-11.)
80	30066	U.S.A. ...	*U.S.A. Air Force Command.* (Inter. Avia., No. 779-780, 8/9/41, p. 15.)
81	30067	U.S.A. ...	*U.S.A. Air Force Information (A.R. Warning Services) Centre.* (Inter. Avia., No. 779-780, 8/9/41, p. 21.)
82	30068	U.S.A. ...	*North American B-25 Medium Bomber (Photographs).* (Inter. Avia., No. 779-780, 8/9/41, p. I.)
83	30069	France	*Cams-Potez 161 Original Flying Boat.* (Inter. Avia., 28/8/41, No. 778, p. 7.)
84	30070	France	*Holste 20 Single-Seater Monoplane.* (Inter. Avia., No. 778, 28/8/41, pp. 7-8.)
85	30071	U.S.A. ...	*Martin 187 "Baltimore."* (Inter. Avia., No. 778, 28/8/41, p. 9.)
86	30072	U.S.A. ...	*Martin PBM-2 Patrol Bomber.* (Inter. Avia., No. 778, 28/8/41, p. 10.)
87	30073	U.S.A. ...	*Martin B-26 "Marauder."* (Inter. Avia., No. 778, 28/8/41, p. 10.)
88	30074	U.S.A. ...	*Vega Model 37 "Ventura" Reconnaissance Bomber.* (Inter. Avia., No. 778, 28/8/41, pp. 12-14.)
89	30076	U.S.A. ...	*Leading Armament and Equipment Firms of the U.S.A.* (Inter. Avia., No. 778, 28/8/41, pp. 14-15.)
90	30083	Germany ...	*Storage of Ammunition Drums (Aircraft Machine Gun Post),* 709,163, *Patent Collection No.* 13. (Flugsport, Vol. 33, No. 20, 1/10/41, p. 50, Heinkel.)
91	30084	Germany ...	*Aircraft Machine Gun Post, with Gunner in Prone Position* (709,442). (Flugsport, Vol. 33, No. 20, 1/10/41, p. 50, Blume, Patent Collection No. 13.)
92	30085	Germany ...	*Aircraft Machine Gun Turret* (709,499). (Flugsport, Vol. 33, No. 20, 1/10/41, pp. 50-51, Patent Collection No. 13, Heinkel.)

Aerodynamics and Hydrodynamics.

93	29700	Germany ...	***The Compressible Potential Flow about a Family of Symmetrical Cylinders at Zero Incidence in a Wind Tunnel.*** (W. Hantzsche and H. Wendt, L.F.F., Vol. 18, No. 9, 20/9/41, pp. 311-316.) (R.T.P. Translation No. 1,354.)
94	29701	Germany ...	*The Navier-Stokes Stress Theorem for Viscous Flow.* (E. Mohr, L.F.F., Vol. 18, No. 9, 20/9/41, pp. 327-330.)

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95	29709	Great Britain	*Distribution of Velocities in a Nest of Tubes.* (R P. Wallis, Engineering, Vol. 152, No. 3,958, 21/11/41, pp. 401-403.)
96	29754	U.S.A. ...	*Liquid Film Formation (Stability and Foam) (with Discussion).* (T. A. Hazlehurst and H. A. Neville, Ind. and Eng. Chem. (Ind. Ed.), Vol. 33, No. 8, Aug., 1941, pp. 1,084-1,088.)
97	29762	Germany ...	*New Frictional Resistance Law for Smooth Plates.* (F. Schultz-Grunow, L.F.F., Vol. 17, No. 8, 20/8/40.) (R.T.P. Translation T.M. 986.) (Abstract available.)
98	29809	Germany ...	*Water Seepage with a "Free" Surface.* (H. F. Rossbach, Ing. Arch., Vol. 12, No. 4, Aug., 1941, pp. 221-246.)
99	29873	U.S.S.R. ...	*Influence of Friction Forces on the Stability of High Speed Rotors (in English).* (P. Kapitza, J. of Physics, U.S.S.R., Vol. 1, No. 1, 1939, pp. 29-50.) (Abstract available.)
100	29879	Italy ...	*The Present State of Unsteady Wing Theory (Oscillating Aerofoil).* (P. Cicala, L'Aerotecnica, Vol. 21, No. 9-10, Sept.-Oct., 1941, pp. 552-591.)
101	29921	Great Britain	*An Investigation Concerning G. I. Taylor's Correlation Coefficient of Turbulence.* (T. E. W. Schumann, Philosophical Mag., Vol. 32, No. 215, Dec., 1941, pp. 471-482.) (Abstract available.)
102	29922	Great Britain	Eckert, L.F.F., Vol. 18, No. 11, 20/11/41, pp. *Tube.* (F. J. Turton, Phil. Mag., Vol. 32, No. 215, Dec., 1941, pp. 457-470.)
103	29927	U.S.A. ...	*12 ft. Wind Tunnel for Testing Complete Motor Cars.* (A. B. Arnold, Autom. Ind., Vol. 85, No. 10, Nov., 1941, pp. 42-45.)
104	29945	U.S.S.R. ...	*On the Boundary Layer of the Wing.* (N. Sachs, Aeroplane. U.S.S.R., Vol. XVII, No. 6, March, 1940, pp. 4-6.)
105	29962	U.S.A. ...	*An Engineering Attack on Aircraft Flutter.* (J. Wyke, Aviation, Vol. 40, No. 10, Oct., 1941, pp. 62-63, 160-162.)
106	29975	U.S.S.R. ...	*The Aerodynamics of the Lifting Airscrew with Hinged Blades in Curvilinear Motion.* (M. L. Miehl, Trans. C.A.H.I., No. 465, 25/1/40.) (Abstract available.)
107	30032	U.S.A. ...	*The Effect of Wind Tunnel Wall Interference on the Stalling Characteristics of Wings.* (H. J. Stewart, J. Aeron. Sci., Vol. 8, No. 11, Sept., 1941, pp. 426-428.) (Abstract available.)
108	30061	Great Britain	*Approximate Mechanics of Falling Bodies (Subsonic Speeds).* (W. R. Crawford, The Engineer, Vol. 172, No. 4,484, 19-12-41, pp. 430-431.)
109	30094	Germany ...	*Similarity Considerations Applied to Aerodynamic Flow Machines (Turbines and Compressors).* (E. Eckert, L.F.F., Vol. 18, No. 11, 20/11/41, pp. 387-395.)
110	30095	Germany ...	*On the Stability of Laminar Flow on a Sphere.* (J. Pretsch, L.F.F., Vol. 18, No. 10, 27/10/41, pp. 341-344.)

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111	30101	Switzerland ...	*Application of Aerodynamic and Hydrodynamic Methods to the Study of Blade Flow Phenomena.* (C. Keller, Research on Turbo Machinery, Escher Wyss Special Issue, 1940, pp. 2-16.)
112	30103	Switzerland ...	*A Method of Determining the Cavitation Factor by Air Tests.* (C. Keller and D. H. Bleuber, Research on Turbo Machinery, Escher Wyss Research Publication Special Issue, 1940, pp. 19-24.)
113	30107	Switzerland ...	*Flow Phenomena in Hydraulic Butterfly Valves Subjected to Cavitation.* (H. Bleuber, Research on Turbo Machinery, Escher Wyss Research Publication Special Issue, 1940, pp. 31-35.)
114	30108	Switzerland ...	*Research on Scale Effect with Tests at Varying Pressure.* (A. Pfenniger, Research on Turbo Machinery, Escher Wyss Research Publication Special Issue, 1940, pp. 41-43.)

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115	29703	Germany ...	*The Effect of Mach Number on Airscrew Efficiency (Discussion).* (G. Cordes and H. Wolff, L.F.F., Vol. 18, No. 9, 20/9/41, pp. 338-339.)
116	29704	Germany ...	*Stability in Roll of an Aircraft Subjected to Constant Intermittent Aileron Moments Under Gyro Control.* (H. Bilharz, L.F.F., Vol. 18, No. 9, 20/9/41, pp. 317-326.)
117	29728	Great Britain	*Repairing Wooden Airscrew Blades.* (Flight, Vol. 40, No. 1,719, 4/12/41, p. 400 a-b.)
118	29767	Germany ...	*Variable Pitch Marine Propellors and Water Turbines.* (F. Kretzschmar, W.R.H., Vol. 22, No. 17, Sept., 1941, pp. 248-253.)
119	29774	Great Britain	*Contra Props—Early Types and Suggestions for Future Research.* (F. W. Lanchester, Flight, Vol. 40, No. 1,720, Dec., 1941, pp. 418-419.)
120	29779	Great Britain	*Range and Fuel Economy.* (C. L. Hinings, Flight, Vol. 40, No. 1,720, Dec., 1941, pp. 421-422.)
121	29793	Great Britain	*Early History of the Dunne Tailless Aircraft.* (Aeroplane, Vol. 61, No. 1,594, 12/12/41, p. 664.)
122	29800	Germany ...	*Methods of Clearing Snow from Aerodromes.* (Flugsport, Vol. 33, No. 19, 17/9/41, p. 372.)
123	29803	Germany ...	*Lock for Aircraft Inspection Cover Plates (Pat. No. 708,962).* (Heinkel, Flugsport (Pat. Coll. No. 12), Vol. 33, No. 19, 17/9/41, p. 45.)
124	29804	Germany ...	*Deflector Blades Situated Below Wing (Pat. No. 708,594).* (Messerschmitt, Flugsport Pat. Coll. No. 12), Vol. 33, No. 19, 17/9/41, p. 45.)
125	29805	Germany ...	*Trainer with Adjustable Main Landing Wheels (for Nose or Tail Wheel Landings) (Pat. No. 708,229).* (Möller, Flugsport (Pat. Coll. No. 12), Vol. 33, No. 19, 17/9/41, p. 47.)
126	29806	Germany ...	*Combined Tail Wheel and Arrestor Gear (Pat. No. 708,172).* (Arado, Flugsport (Pat. Coll. No. 12), Vol. 33, No. 19, 17/9/41, p. 48.)

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127	29807	Germany ...	*Cover Plate for Retractable Undercarriage Wing Space* (*Pat. No.* 708,652). (Henschel, Flugsport (Pat. Coll. No. 12), Vol. 33, No. 19, 17/9/41, p. 48.)
128	29822	U.S.A. ...	*Platt-La Page Helicopter.* (Inter. Avia., No. 781, Sept., 1941, p. 15.)
129	29823	Switzerland ...	*"Unimatic" Airscrew, General Motors Corp.* (Inter. Avia., No. 781, Sept., 1941, p. 16.)
130	29835	U.S.A. ...	*Strength Tests on Martin XPB2M-1 Flying Boat.* (American Aviation, Vol. 5, No. 9, 1/10/41, p. 21.)
131	29836	U.S.A. ...	*South Atlantic Air Routes.* (American Aviation, Vol. 5, No. 9, 1/10/41, p. 39.)
132	29837	U.S.A. ...	*Northrop Flying Wing.* (American Aviation, Vol. 5, No. 10, 15/10/41, p. 4.)
133	29842	U.S.A. ...	*Weight Control Factors.* (E. J. Foley, American Aviation, Vol. 5, No. 10, 15/10/41, pp. 41 and 45.)
134	29845	U.S.A. ...	*Further Flight Tests of B 19.* (American Aviation, Vol. 5, No. 10, 15/10/41, p. 36.)
135	29846	U.S.A. ...	*Self-Sealing Fuel Tanks for Aircraft.* (American Aviation, Vol. 5, No. 10, 15/10/41, p. 41.)
136	29848	U.S.A. ...	*Northrop "Flying Wing" Aircraft.* (American Aviation, Vol. 5, No. 11, Nov., 1941, p. 3.)
137	29849	U.S.A. ...	*Plastic Gliders.* (American Aviation, Vol. 5, No. 11, Nov., 1941, p. 6.)
138	29851	U.S.A. ...	*Propeller Production in the U.S.A.* (American Aviation, Vol. 5, No. 11, Nov., 1941, pp. 23-29.)
139	29866	U.S.A. ...	*American Names for Certain Types of Aircraft.* (Aeroplane, Vol. 61, No. 1,592, 28/11/41, p. 583.)
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142	29929	U.S.A. ...	*Northrop Flying Wing (Photograph).* (Autom. Ind., Vol. 85, No. 10, Nov., 1941, p. 62.)
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145	29947	U.S.S.R. ...	*Flying Boats.* ((N. Hahn, Aeroplane, U.S.S.R., Vol. XVII, No. 6, March, 1940, pp. 18-19.)
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147	29959	U.S.A. ...	*Simplified Cruising Controls (Constant B.M.E.P. Operation).* (A. A. Barrie and J. B. Cutting, Aviation, Vol. 40, No. 10, Oct., 1941, p. 56-57.)
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149	29974	U.S.A. ...	*Everel Constant Speed Propeller for Light Engine.* (Aviation, Vol. 40, No. 10, Oct., 1941, p. 120.)

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151	29977	U.S.S.R. ...	*An Experimental Investigation of the Landing of Aircraft.* (Y. M. Serebrüsky, Trans. C.A.H.I., No. 479, 16/3/40.) (Abstract available.)
152	29978	Great Britain	*Dynamic Balancing of Airscrews (from Aero Digest, U.S.A.).* (Airc. Eng., M. C. Beebe, Vol. 13, No. 154, pp. 330-338.)
153	29979	Great Britain	*Airscrew Blade Stall during Take-off.* (Airc. Eng., E. T. Andrews, Vol. 13, No. 154, pp. 339-343.)
154	29983	Great Britain	*German Report on Allied Aircraft Fittings. (R.T.P. Translation No. 1,189.)* (H. Cornelius, Airc. Eng., Vol. 13, No. 154, pp. 352-353.)
155	29986	U.S.A. ...	*Curtiss Wright CW 20 Transport.* (Flight, Vol. 40, No. 1,721, pp. 441-442.)
156	29990	Great Britain	*Aircraft near the Pacific (American and Japanese Types).* (Flight, Vol. 40, No. 1,721, pp. 448-451.)
157	29997	U.S.A. ...	*Northrop Flying Wing.* (U.S. Air Services, Vol. 26, No. 11, Nov., 1941, pp. 15-16.)
158	30017	Great Britain	*New De Havilland Airscrews.* (Aeroplane, Vol. 61, No. 1,595, Dec., 1941, pp. 676-677.)
159	30018	U.S.A. ...	*Curtiss CW 20 Transport.* (Aeroplane, Vol. 61, No. 1,595, Dec., 1941, p. 685.)
160	30030	U.S.A. ...	*A Simplified Method for Predicting the Change in Aeroplane Performance Due to a Change in Parameter.* (E. C. Posner, J. Aeron. Sci., Vol. 8, No. 11, Sept., 1941, pp. 419-425.) (Abstract available.)
161	30031	U.S.A. ...	*Discussion on Aileron Flutter.* (F. Nagel, J. of Aeron. Sci., Vol. 8, No. 11, Sept., 1941, p. 425.)
162	30051	U.S.A. ...	*Tyre Profiles.* (Inter. Avia., No. 782, 24/9/41, p. 15.) (Abstract available.)
163	30064	France	*Potez Scan 161 B Six-Engined Flying Boat.* (Inter. Avia., No. 779-780, 8/9/41, pp. 11-12.)
164	30065	Great Britain	*Rotol "Contra Prop" Propeller.* (Inter. Avia., No. 779-780, 8/9/41, p. 12.)
165	30075	U.S.A. ...	*Leading Aircraft Design Firm of the U.S.A.* (Inter. Avia., No. 778, 28/8/41, pp. 12-14.)
166	30081	Germany ...	*Junkers V.P. Airscrew with Governor Details.* (Flugsport, Vol. 33, No. 20, 1/10/41, p. 393.)
167	30082	Germany ...	*High Altitude Aircraft with Two or More Separate Pressure Cabins* (678,516, *Patent Collection* 13). (Flugsport, Vol. 33, No. 20, 1/10/41, p. 49, Focke Wulf.)
168	30086	Germany ...	*Interconnection of Tail Skid or Tail Wheel with Rudder Control for Aircraft* (709,443). (Flugsport, Vol. 33, No. 20, 1/10/41, pp. 51-52, Henschel, Patent Collection No. 13.)
169	30087	Germany ...	*Spring Leg for Undercarriage* (709,444). (Flugsport, Vol. 33, No. 20, 1/10/41, p. 52, Focke Wulf, Patent Collection No. 13.)
170	30088	Germany ...	*Aircraft Wheels Retracting in a Longitudinal Direction* (709,557). (Flugsport, Vol. 33, No. 20, 1/10/41, p. 52, Heinkel, Patent Collection No. 13.)

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172	30090	Italy	*Experiments with Families of Multi-Bladed Airscrews.* (A. Eula, Atti di Guidonia, No. 49-52, 20/4/41, pp. 133-160.) (Abstract available.)
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174	30093	Germany ...	*Airscrew Blade Stresses Due to Periodic Displacement of the Airscrew Shaft.* (J. Meyer, L.F.F., Vol. 18, No. 11, 20/11/41, pp. 383-386.)
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180	29731	U.S.A. ...	*Barrel Engines.* (E. S. Hall, Flight, Vol. 40, No. 1,719, 4/12/41, pp. 404-408.)
181	29733	U.S.A. ...	*Engine Test Cells of the Wright Aeron. Corp.* (Trade Winds, Oct., 1941, pp. 8-9 and 18.)
182	29734	Great Britain	*Visual Experimentation with Centrifugal Pumps (Discussion).* (Various authors, Engineer, Vol. 172, No. 4,482, 5/12/41, pp. 395-396.)
183	29735	Great Britain	*Hercules 14-Cylinder Two-Bank Radial Aero Engines.* (Engineer, Vol. 172, No. 4,482, 5/12/41, pp. 398-400.)
184	29741	Germany ...	*Blade Control on Contra Rotating Turbine Wheels of the Curtiss Type (German Patent No. 703,504).* (R. Voight, W.R.H., Vol. 22, No. 16, 15/8/41, pp. 244-245.)
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187	29744	Great Britain	*The Strauss Heavy Oil Rotary Atomiser for Spark Ignition Engines (Engine Driven).* (Autom. Eng., Vol. 31, No. 417, Nov., 1941, p. 408.)
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194	29863	U.S.A. ...	*New A.C. Aero Spark Plug.* (American Aviation, Vol. 5, No. 12, 15/11/41, p. 47.) (Abstract available.)
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228	29853	U.S.A. ...	*Automatic Flight Board (Tele-Register) for Air Traffic Controls.* (American Aviation, Vol. 5, No. 11, Nov., 1941, pp. 35-42.)
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237	30098	Germany ...	*Direct Reading Electrical Torsional Oscillation Recorder Based on the Method of Opposed Inductance.* (K. Staiger, L.F.F., Vol. 18, No. 10, Oct., 1941, pp. 356-367.)
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241	29746	Great Britain	*Gas Producer Tests.* (Autom. Eng., Vol. 31, No. 417, Nov., 1941, pp. 418-420.)
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256	29710	Great Britain	*The Rolling of a Mg. Alloy.* (W. R. D. Jones, Engineering, Vol. 152, No. 3,958, 21/11/41, pp. 405-406.)
257	29712	Great Britain	*Rapid Construction of Sheet Templates (Westland Aircraft).* (Engineering, Vol. 152, No. 3,958, 21/11/41, pp. 407-408.)
258	29713	Great Britain	*Report Issued by British Cast Iron Research Association.* (Engineering, Vol. 152, No. 3,958, 21/11/41, p. 414.)
259	29714	Great Britain	*Temperature Indicating Paints.* (Engineering, Vol. 152, No. 3,958, 22/11/41, p. 416.)
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271	29750	U.S.A. ...	*Symposium on Phenol Formaldehyde Resins and Plastics.* (Various authors, Ind. and Eng. Chem., Vol. 33, No. 8, Aug., 1941, pp. 965-983.)
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273	29752	U.S.A. ...	*Causes of Corrosion Currents.* (R. B. Mears and R. H. Brown, Ind. and Eng. Chem. (Ind. Ed.), Vol. 33, No. 8, Aug., 1941, pp. 1,001-1,010.) (Abstract available.)
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275	29761	Germany ...	*Tables for Computing Various Cases of Beam Columns.* (J. Cassens, L.F.F., Vol. 18, No. 2-3, 29/3/41.) (R.T.P. Translation T.M. 985.) (Abstract available.)
276	29766	Germany ...	*Elomag Process for Anodic Oxidation of Mg.* (G. Eissner, Der Flieger, Vol. 20, No. 10, Oct., 1941, pp. 326-327.)
277	29770	Great Britain	*Plastic Insulating Sleeving.* (W. Cornelius, Plastics, Vol. 5, No. 55, Dec., 1941, pp. 236-237.)
278	29771	Great Britain	*Coating Plastics with Metal.* (Plastics, Vol. 5, No. 55, Dec., 1941, pp. 240-241.)
279	29782	U.S.A. ...	*Testing Wood for Aircraft Construction.* (E. T. Clarke and S. A. Korff, J. Frank. Inst., Vol. 232, No. 4, Oct., 1941, p. 356.)
280	29783	U.S.A. ...	*Electrical Properties of Neoprene Compositions (Synthetic Rubber).* (J. Frank. Inst., Vol. 232, No. 4, Oct., 1941, p. 364.)
281	29786	U.S.A. ...	*Effect of Roughness of Cast Iron Brake Drums in Wear Tests of Brake Linings.* (R. A. Taylor and W. L. Holt, J. Nat. Bur. of Stands., Vol. 27, No. 4, Oct., 1941, pp. 395-404.) (Abstract available.)
282	29808	Germany ...	*Pressure Distribution in the Elastic Foundations of a Loaded Beam.* (E. Pflanz, Ing. Arch., Vol. 12, No. 4, Aug., 1941, pp. 201-221.)
283	29810	Germany ...	*Natural Oscillations Under Conditions of Positive and Negative Damping in the Presence of Constant Friction Forces.* (K. Bogel, Ing. Arch., Vol. 12, No. 4, Aug., 1941, pp. 247-254.)
284	29811	Germany ...	*The Stressing of Prismatic Plate Assemblies.* (R. Ohlig, Ing. Arch., Vol. 12, No. 4, Aug., 1941, pp. 254-258.)
285	29812	Germany ...	*The Stressing of Cylindrical Tanks Filled with Liquid and Standing on an Elastic Foundation.* (K. Wolf, Ing. Arch., Vol. 12, No. 4, Aug., 1941, pp. 259-264.)
286	29828	Germany ...	*Low Alloy (Home Produced Replacement) Steels in Aero Engine Construction.* (Luftwissen, Vol. 8, No. 10, Oct., 1941, pp. 305-309, by Drs. H. Wiegand and R. Scheinost.)
287	29834	U.S.A. ...	*Magnesium Output in the U.S.A.* (American Aviation, Vol. 5, No. 9, 1/10/41, pp. 13 and 21.)
288	29844	U.S.A. ...	*New Rayon Tyre for D.C.3 Transports.* (American Aviation, Vol. 5, No. 10, 15/10/41, p. 43.) (Abstract available.)

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289	29855	U.S.A. ...	*Latest Development in Plywood for Aircraft.* (American Aviation, Vol. 5, No. 12, 15/11/41, pp. 18-19 and 27.)
290	29858	U.S.A. ...	*Cherry Self-Plugging Rivet (Incorporating Mandrel) for Blind Riveting.* (American Aviation, Vol. 5, No. 12, 15/11/41, p. 47.) (Abstract available.)
291	29859	U.S.A. ...	*G.E. Arc Welder for Thin Gauge Metals.* (American Aviation, Vol. 5, No. 12, 15/11/41, p. 49.)
292	29860	U.S.A. ...	*Oil Resistant Sponge Rubber "Ameripol."* (American Aviation, Vol. 5, No. 12, 15/11/41, p. 47.)
293	29861	U.S.A. ...	*Plastic Wireless Mast on Airacobra.* (American Aviation, Vol. 5, No. 12, 15/11/41, p. 50.)
294	29862	U.S.A. ...	*Amerflex Flexible Electric Conduit.* (American Aviation, Vol. 5, No. 12, 15/11/41, p. 47.) (Abstract available.)
295	29874	Great Britain	*Surface Treatment of Metals (Stewart, Mech. World,* 14/11/41, *pp.* 335-337.) (Abstract in Met. Vic. News Bull., No. 790, 28/11/41, p. 6.)
296	29875	Great Britain	*Fatigue Test Results. (Hartmann, Machinist,* 1/11/41, *pp.* 250-251.) (Abstract in Met. Vick. News Bull., No. 790, 28/11/41, p. 7.)
297	29877	Great Britain	*Spot Welding (Testing, Control and Supervision). (Various authors, Welding J., Oct.,* 1941, *pp.* 478-482, 491-498, 673-677 *and* 687-693.) (Abstract in Met. Vick. News Bull., No. 790, 28/11/41, pp. 10-12.)
298	29880	Italy	*Weldability—Definition and Practical Determination.* (G. C. Cao, L'Aerotecnica, Vol. 21, No. 9-10, Sept.-Oct., 1941, pp. 592-614.)
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300	29883	U.S.A. ...	*Recommended Welding Electrode Materials (Chart).* (Metal Progress, Vol. 40, No. 4, Oct., 1941, pp. 663.)
301	29884	U.S.A. ...	*Symposium of Stainless Steels (Conservation and Substitutes).* (Various authors, Metal Progress, Vol. 40, No. 4, Oct., 1941, pp. 675-690.)
302	29885	U.S.A. ...	*Engineering Properties of Monel Metal (Chart).* (Metal Progress, Vol. 40, No. 4, Oct., 1941, p. 685.)
303	29887	U.S.A. ...	*Welding Symbols (Chart).* (Metal Progress, Vol. 40, No. 4, Oct., 1941, pp. 658.)
304	29888	U.S.A. ...	*Composition and Designation Chart for American Mg. Alloys.* (Metal Progress, Vol. 40, No. 4, Oct., 1941, p. 436.)
305	29889	U.S.A. ...	*Al. Bronzes Commonly Used in Aircraft (Chart).* (Metal Progress, Vol. 40, No. 4, Oct., 1941, p. 437.)
306	29890	U.S.A. ...	*Tool Steels Classified by Wear Toughness Ratio (Chart).* (Metal Progress, Vol. 40, No. 4, Oct., 1941, p. 461.)
307	29891	U.S.A. ...	*Specific Effects of Alloys in Steel (Chart).* (Metal Progress, Vol. 40, No. 4, Oct., 1941, p. 464.)
308	29892	U.S.A. ...	*Machinability of Hot Rolled Steels (Chart).* (Metal Progress, Vol. 40, No. 4, Oct., 1941, p. 469.)

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310	29895	U.S.A. ...	*Chief Trends of Instrumentation in Metallurgy.* (M. F. Behar, Metal Progress, Vol. 40, No. 4, Oct., 1941, pp. 623-642.)
311	29896	U.S.A. ...	*Welding Alclad.* (Metal Progress, Vol. 40, No. 4, Oct., 1941, pp. 656.)
312	29903	U.S.A. ...	*Moulding and Casting Al. Alloy Cylinder Heads.* (Aero Digest, Vol. 37, No. 5, Nov., 1940, pp. 114-115.)
313	29906	U.S.A. ...	*The Use of Rubber for Producing Sheet Metal Parts.* (C. J. Frey and S. S. Kogut, Aero Digest, Vol. 37, No. 5, Nov., 1940, pp. 129-134.)
314	29917	Great Britain	*Heavy Alloys of Tungsten.* (C. H. S. Price, Metal Industry, Vol. 59, No. 24, Dec., 1941, pp. 372-374, and G. T. O. Gerrard.
315	29918	Great Britain	*Statistics in Corrosion and Fatigue (American Tests).* (Metal Industry, Vol. 59, No. 24, Dec., 1941, p. 374.)
316	29919	Great Britain	*Electro-Deposition of Cadmium.* (G. Soderberg and L. R. Westbrook, Metal Industry, Vol. 59, No. 24, Dec., 1941, pp. 377-380.)
317	29931	Great Britain	*Recent Developments in Alloy Steels.* (Autom. Eng., Vol. 31, No. 418, Dec., 1941, pp. 451-454.)
318	29932	Great Britain	*New Synthetic Material (Neoprene, Nylon, Cordura Rayon, Lucite).* (C. P. Ridder, Aut. Eng., Vol. 31, No. 418, Dec., 1941, pp. 455-458.)
319	29933	Great Britain	*Temperature Sensitive Paints.* (Autom. Eng., Vol. 31, No. 418, Dec., 1941, p. 458.)
320	29960	U.S.A. ...	*Structural Features of Beads (in Metal Sheets).* (F. R. Shanley, Aviation, Vol. 40, No. 10, pp. 58, 164-168, Oct., 1941.)
321	29961	U.S.A. ...	*Hydro-Pressed Beads in Sheet Metal.* (J. A. Petrie, Aviation, Vol. 40, No. 10, Oct., 1941, pp. 59, 170.)
322	29967	U.S.A. ...	*Metal Casting by the Antioch Process.* (E. J. Weinheimer, Aviation, Vol. 40, No. 10, Oct., 1941, pp. 78, 162, 188.)
323	29969	U.S.A. ...	*Surface Preparation for Painting Al. Alloys in Aircraft.* (R. I. Wray, Aviation, Vol. 40, No. 10, Oct., 1941, pp. 83, 144-146.)
324	29984	U.S.A. ...	*Designing for Machinability (III) (from Aero Digest, U.S.A.).* (J. E. Thompson, Airc. Eng., Vol. 13, No. 154, pp. 354-355.)
325	29985	Great Britain	*Polarographic Analysis of Alloys.* (W. C. Davis, J. Chem. and Industry, Vol. 60, No. 50, pp. 883-884.)
326	30001	U.S.A. ...	*An Analysis of the Milling Process (with Discussion).* (M. E. Martellotti, Trans. A.S.M.E., Vol. 63, No. 8, 8/11/41. pp. 677-700.) (Abstract available.)

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327	30004	U.S.A.	...	*Progress Report on Tubular Creep Tests and Their Interpretation (with Discussion).* (F. H. Norton and C. R. Sodenberg, Trans. A.S.M.E., Vol. 63, No. 8, 8/11/41, pp. 735-748.)
328	30005	U.S.A.	...	*Effect of Grain Size and Structure on C-Mo. Steel Pipe (High Temperature Steam Service).* (A. E. White and S. Crocker, Trans. A.S.M.E., Vol. 63, No. 8, 8/11/41, pp. 749-764.)
329	30006	U.S.A.	...	*Increasing Safety of Operation of Machine Tools by Contrast Painting.* (A. P. Peak, Sci. Am., Vol. 165, No. 6, Dec., 1941, pp. 318-321.)
330	30008	U.S.A.	...	*Photographic Location of Radio Active Phosphorus in Steel.* (Sci. Am., Vol. 165, No. 6, Dec., 1941, p. 322.)
331	30009	U.S.A.	...	*Refrigerated Electrode for Spot Welding.* (Sci. Am., Vol. 165, No. 6, Dec., 1941, p. 344.)
332	30014	U.S.A.	...	*Plastic Coils to Modify Fluorescent Tubes.* (Sci. Am., Vol. 165, No. 6, Dec., 1941, p. 336.)
333	30022	U.S.A.	...	*Honing Tools and Related Equipment.* (L. S. Martz, Mech. Eng., Vol. 63, No. 12, Dec., 1941, pp. 865-869.)
334	30023	U.S.A.	...	*Material Specification Principles.* (F. C. Jenkins, Mech. Eng., Vol. 63, No. 12, Dec., 1941, pp. 900-903.)
335	30027	U.S.A.	...	*The Compression of Wood.* (Mech. Eng., Vol. 63, No. 12, Dec., 1941, pp. 916-918.)
336	30035	Germany	...	*Wires and Cables with Insulation by Very Thin Foils.* (E.T.Z., Vol. 61, No. 8, 2/2/40, pp. 163-165.) (W. Fischer, The Engineer's Digest, Vol. 2, No. 7, July, 1941, pp. 252-253.)
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338	30039	U.S.S.R.	...	*Apparatus for Mechanical Testing of Metals at the Russian State Testing Machine Works, Zavods Kaja Laboratories, Moscow, No.* 2, 1941, *pp.* 131-133. (D. M. Tanchenko, Engineers' Digest, Vol. 2, No. 7, July, 1941, pp. 268-270.)
339	30040	U.S.S.R.	...	*Radiographic Studies of the Structural Change of Steel at High Temperatures. (Zavods Kaja Lab., Moscow, No.* 2, 1941, *pp.* 188-191.) (P. N. Peredisty, Engineers' Digest, Vol. 2, No. 7, July, 1941, pp. 270-274.)
340	30041	Germany	...	*Influence of the Kind of Melting Furnace on the Quality of Cast Iron. (Die Giesserei, Vol.* 28, *No.* 9, 2/4/41, *pp.* 193-197.) (E. Piwowarsky, Engineers' Digest, Vol. 2, No. 7, July, 1941, pp. 274-276.)
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342	30054	Great Britain	*Condenser Discharge Welding Unit.* (*Dodge, El. World*, 20/9/41, *p.* 93.) (Met. Vick. Tech. News Bull., No. 787, 7/11/41, p. 9.) (Abstract available.)
343	30055	Great Britain	*Magnetic Powder Etching for Crack Detection.* (*I. and Coal T. Rev.*, 25/7/41, *p.* 73.) (Met. Vick. Tech. News Bull., No. 773, 1/8/41, p. 7.) (Abstract available.)
344	30056	Great Britain	*Light Alloys in Design.* (E. W. Thomas, Engineering, Vol. 152, No. 3,962, 19/12/41, pp. 482-483.) (Abstract available.)
345	30060	Great Britain	*Temperature Indicating Paints as a Check on Heat Treatment.* (A. Tremain, Engineering, Vol. 152, No. 3,962, 19/12/41, p. 494.)
346	30099	Germany ...	*The Fatigue Strength of Chromium Plated Dural for Various Thicknesses of Deposit.* (A. Beerwald, L.F.F., Vol. 18, No. 10, Oct., 1941, pp. 368-371.)

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348	29840	U.S.A. ...	*Measurement of Cloud Heights in Daylight.* (American Aviation, Vol. 5, No. 10, 15/10/41, p. 44.)
349	29852	U.S.A. ...	*Physiological Effect of Parachute Jumping.* (American Aviation, Vol. 5, No. 11, Nov., 1941, p. 33.)
350	29966	U.S.A. ...	*Atmospheric Haze and False Horizon.* (V. Finch, Aviation, Vol. 40, No. 10, Oct., 1941, pp. 73, 158.)
351	30080	Germany ...	*Modern Views on Cloud Formation and Sailing Flight.* (Flugsport, Vol. 33, No. 20, 1/10/41, p. 404, H. Friche.)

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352	29705	Great Britain	*Bristol Aero Engine Dept. Technical Abstracts and Information.* (Vol. 5, No. 47, 25/11/41, pp. 1-17.)
353	29706	Great Britain	*Rotol Digest.* (Vol. 2, No. 46, 26/11/41.)
354	29707	Great Britain	*Rolls-Royce Technical Abstracts and Information.* (Vol. 2, No. 11, Nov., 1941.)
355	29715	Great Britain	*Abstracts and References Compiled by the Radio Research Board.* (Wireless Engineer, Dec., 1941.)
356	29716	Great Britain	*Bristol Aero Engine Dept. Abstracts and Information.* (Vol. 5, No. 48, 2/12/41.)
357	29717	Great Britain	*Rotol Digest.* (Vol. 2, No. 46, 3/12/41,)
358	29732	Great Britain	*Abstracts Issued by I.A.E. Automobile Research Committee.* (*Oct.*, 1941.)
359	29755	Great Britain	*Bristol Aero Engine Dept. Technical Abstracts and Information.* (Vol. 5, No. 49, 10/12/41.)
360	29801	Germany ...	*German Society for Documentation.* (Flugsport, Vol. 33, No. 19, 17/9/41, p. 374.)
361	29831	Germany ...	*German Society for Documentation.* (Luftwissen, Vol. 8, No. 10, Oct., 1941, p. 322.)

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362	29832	Germany ...	*Results of the Lilienthal Prize Competitions for 1940.* (Luftwissen, Vol. 8, No. 10, Oct., 1941, p. 326.)
363	29886	U.S.A. ...	*Conversion Table for Length and Temperature (British and Metric Systems).* (Metal Progress, Vol. 40, No. 4, Oct., 1941, pp. 409 and 421.)
364	29923	U.S.A. ...	*American Passenger Car Specifications for 1942.* (Autom. Ind., Vol. 85, No. 9, Nov., 1941, pp. 33-43.)
365	29973	U.S.A. ...	*Visual Teaching Methods.* (Aviation, Vol. 40, No. 10, Oct., 1941, p. 96.)
366	29992	Great Britain	*Bristol Aero Engine Dept. Technical Abstracts and Information.* (Vol. 5, No. 50, 17/12/41.)
367	29994	Great Britain	*Rotol Digest.* (Vol. 2, No. 47, 10/12/41.)
368	29995	Great Britain	*Rotol Digest.* (Vol. 2, No. 48, 17/12/41.)
369	30012	U.S.A. ...	*New Treatment for Burns (Sulfadiazine).* (Sci. Am., Vol. 165, No. 6, Dec., 1941, p. 332.)
370	30026	U.S.A. ...	*Storing Liquid CO_2.* (Mech. Eng., Vol. 63, No. 12, Dec., 1941, pp. 909-910.)
371	30052	U.S.A. ...	*Changes in N.A.C.A. Personnel.* (Inter. Avia., No. 782, 24/9/41, pp. 15-16.)

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372	29739	U.S.S.R. ...	*The Industrial History of Russia.* (E. C. Smith, Engineering, Vol. 152, No. 3,959, 28/11/41, pp. 424-425.)
373	29765	France	*French Plans for the Mass Production of S.E. 200 Aircraft.* (Der Flieger, Vol. 20, No. 10, Oct., 1941, p. 325.)
374	29772	Germany ...	*Mass Production of Ju. 88 (Stuka) (Photographs).* (Luftwelt, Vol. 8, No. 20, Oct., 1941, pp. 396-397.)
375	29802	Germany ...	*Some Recent D.I.N. Specifications (Collection No. 8).* (Flugsport, Vol. 33, No. 19, 17/9/41, pp. 33-36.)
376	29821	U.S.A. ...	*U.S.A. Bomber Production.* (Inter. Avia., No. 781, Sept., 1941, p. 15.)
377	29827	Germany ...	*High Pressure Hydraulic Press for Large Aircraft Parts.* (Luftwissen, Vol. 8, No. 10, Oct., 1941, p. 304.)
378	29841	U.S.A. ...	*Pictorial Education Methods for Training New Workers in the Aircraft Industry.* (American Aviation, Vol. 5, No. 10, 15/10/41, p. 15.)
379	29843	U.S.A. ...	*X-Ray Photo Template System.* (American Aviation, Vol. 5, No. 10, 15/10/41, p. 16.)
380	29850	U.S.A. ...	*Mass Production of Airacobras.* (American Aviation, Vol. 5, No. 11, Nov., 1941, p. 20.)
381	29908	U.S.A. ...	*Production Methods and Planning.* (Aero Digest, Vol. 37, No. 5, Nov., 1940, pp. 138-141.)
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383	29970	U.S.A. ...	*Mass Production of Aircraft Clamps.* (R. R. Harrison, Aviation, Vol. 40, No. 10, Oct., 1941, pp. 84, 169.)

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384	29982	Great Britain	*Airacobra Production Methods.* (H. W. Perry, Airc. Eng., Vol. 13, No. 154, pp. 349-351.)
385	29988	Great Britain	*Assembly of American Aircraft in Great Britain (Photos of Representative Types).* (Flight, Vol. 40, No. 1,721, pp. f-h.)
386	30021	U.S.A. ...	*Role of Induction Heating in War Production.* (F. T. Chestnut, Mech. Eng., Vol. 63, No. 12, Dec., 1941, pp. 861-864.)
387	30050	U.S.A. ...	*Production of Turbo Superchargers in the U.S.A.* (Inter. Avia., No. 782, 24/9/41, p. 15.)
388	30077	Canada ...	*Canadian Aircraft Production.* (Inter. Avia., No. 778, 28/8/41, pp. 15-16.)

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389	29785	U.S.A. ...	*Locating the Principal Point of Aeroplane Mapping Cameras.* (J. Frank. Inst., Vol. 232, No. 4, Oct., 1941, pp. 378-379.)
390	29876	Great Britain	*High Speed Photography Applied to Machinery Operations.* (Weller and Watson, Machinist, 1/11/41, pp. 689-692.) (Abstract in Met. Vick. News Bull., No. 790, 28/11/41, p. 8.)
391	29999	Germany ...	*New Definitions of Some Fundamental Photogrammetrical Concept.* (W. Ross, Aerial Photography and Survey, Vol. 16, No. 3, Sept., 1941, pp. 85-96.)
392	30000	Germany ...	*Problem of Aerial Surveying with Special Reference to Mountainous Regions.* (M. Schober, Aerial Photography and Survey, Vol. 16, No. 3, Sept., 1941, pp. 98-104.)

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393	29725	U.S.A. ...	*Cooling Tower Progress.* (L. J. Mart, Mech. Eng., Vol. 63, No. 11, Nov., 1941, pp. 791-797.)
394	29787	U.S.A. ...	*Locating the Principal Point of Precision Aeroplane Mapping Cameras.* (F. E. Washer, J. Nat. Bur. of Stands., Vol. 27, No. 4, Oct., 1941, pp. 405-412.) (Abstract available.)
395	29894	U.S.A. ...	*Psychrometric Chart.* (Metal Progress, Vol. 40, No. 4, Oct., 1941, pp. 570-571.)
396	29920	Great Britain	*Viscosity-Temperature Function of Fluids.* (Philosophical Magazine, A. H. Nissan, Vol. 32, No. 215, Dec., 1941, pp. 446-456.)
397	29935	Germany ...	*The Nature of a Flame.* (K. Rummel, Kraftstoff, Vol. 17, Aug., 1941, pp. 233-235.)
398	29950	Great Britain	*"Threshold" Treatment for Scale Prevention in Hot Water System.* (Engineering, Vol. 152, No. 3,961, Dec., 1941, pp. 467-468.)
399	30013	U.S.A. ...	*Hydrofluoric Acid Treatment reduces Glare of Glass Surfaces (Light from Reflection).* (Sci. Am., Vol. 165, No. 6, Dec., 1941, p. 335.)

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400	29708	U.S.A. ...	*Five Years of Industrial Electronics.* (R. A. Powers, Electronics, July, 1941, pp. 17-20 and 89.)
401	29778	Germany ...	*German Aircraft Radio (American Opinions).* (F. W. Lanchester, Flight, Vol. 40, No. 1,720, Dec., 1941, h.)
402	29781	U.S.A. ...	*The Radiosonde as a Stratosphere Laboratory.* (By E. T. Clarke and S. A. Korff, J. Frank. Inst., Vol. 232, No. 4, Oct., 1941, pp. 339-355.)
403	29897	U.S.A. ...	*New Trends in Aircraft Radio.* (H. W. Roberts, Aero Digest, Vol. 37, No. 5, Nov., 1940, pp. 50-53 and 134.)
404	29899	U.S.A. ...	*Ten-Frequency Combined Transmitter and Receiver Radio Communication Unit, Model R.T.A.-1.* (Aero Digest, Vol. 37, No. 5, Nov., 1940, p. 89.)
405	29900	U.S.A. ...	*R.C.A. Omnidirectional Radio Beacon.* (Aero Digest, Vol. 37, No. 5, Nov , 1940, pp. 89-90.)
406	29901	U.S.A. ...	*Lear Radio Automatic Station Seeking Radio Direction Finder.* (Aero Digest, Vol. 37, No. 5, Nov., 1940, p. 90.)
407	29907	U.S.A. ...	*Electrical Equipment on Aircraft.* (Aero Digest, Vol. 37, No. 5, Nov., 1940, pp. 137-138.)
408	29915	Great Britain	*The Generation and Amplification of Microwaves (Part 4).* (C. E. Lockhart, Electronic Engineering, Vol. 14, No. 166, Dec., 1941, pp. 530-533.)
409	29916	Great Britain	*Frequency Modulation (Part II).* (K. R. Sturley, Electronic Engineering, Vol. 14, No. 166, Dec., 1941, pp. 336-337.)
410	29958	U.S.A. ...	*D/F Loop—Navigational Techniques.* (C. H. McIntosh, Aviation, Vol. 40, No. 10, Oct., 1941, pp. 54-55.)
411	29981	Germany ...	*Messerschmitt Me. 109 Radio Installation (American Report).* (W. P. Lear, Airc. Eng., Vol. 13, No. 154, pp. 346-348.)
412	30024	U.S.A. ...	*Million Volt X-Ray Tube (Photo 5 in. Steel in Two Mins.).* (Mech. Eng., Vol. 63, No. 12, Dec., 1941, pp. 906-908.)
413	30042	Italy	*Measurement of Power Loss at Radio Frequencies in Dielectric Insulating Materials.* (F. Bocci, Atti di Guidonia, No. 51-52, 20/5/41, pp. 161-204.)