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Warplanes of the Future, II. (G. Stifani, Inter. Avia., No. 812, 15/4/42, pp. 1-6.) (102/1 Italy.)

Probable Characteristics and Performances of Future First-Line Aircraft.

Mission.	Fighters. Defence.	Fighters. Heavy.	Attack.	Reconnaissance.	Short Range.	Bombers. Long Range.	Bombers. Long Range.
Span, ft.	33	59	59	59	59	82	98
Power plant... No. of engines × h.p. ...	1 × 2,000	2 × 1500	2 × 1500	2 × 1500	2 × 1500	3 × 2000	4 × 2000
Engine type... ...	In-line	In-line	Double radial	In-line	In-line	Double radial	Double radial
Coolant	Liquid	Liquid	Air	Liquid	Liquid	Air	Air
Max. speed, m.p.h....	435	435	400	370	400	370	355
Armament: No. of guns × calibre ...	4 × .5 or 2 × .5 + 1 × 20mm. or 1 × .5 + 2 × 20mm.	5 × .5 + 2 × 20mm.	2 × 37mm. or 6 × .3 + 1 × 20mm. + 3 × .50	3 × .5	3 × .5 + 3,300lb. bombs.	3 × .5 + 2 × .3 + 6,600lb. bombs.	8 × .5 + 6,600lb. bombs.
Range, miles ...	250	620	560	2200	620	1860	3100
Crew, men	1	2	2	3	3	4	6
Design	All types. All-metal monoplanes.						

In his recommendation of the liquid cooled engine, Stifani logically advocates a new *cooling system* which in the manner of the modern fuel tanks should be self-sealing and would therefore eliminate the weakest point of liquid-cooled engines, namely, the vulnerability of the cooling system. As is known, an attempt has been made by the Russians to overcome this difficulty, for example by fitting the " Stormovik " dive bomber and attack aeroplane with an armour plate that can be lowered over the radiator. It is not possible to judge to what point the Italian experimental work with self-sealing cooling systems has progressed. The adoption of such a feature would result in a weight increase, it is true, but would also augment the safety and the operational preparedness of the flying equipment.

German Radiolocation Equipment. (Inter. Avia., No. 813-814, 25/4/42, p. 13.) (102/2 Germany.)

Attention has been drawn some time ago to British and American measures and instruments to discover the approach and strength of enemy aeroplanes during night attacks by means of so called radiolocation. A few days ago the Berlin Correspondent of a Swiss newspaper reported that German night fighter aeroplanes had been equipped with radiolocation apparatus to locate approaching bomber aircraft. The equipment is designed to receive and determine the direction of the electro-magnetic waves emitted by the ignition system and other electric equipment of the enemy aeroplanes and indicates the direction and distance of the enemy aeroplane by the varying strength of a light bulb. The source, whose details have not so far been confirmed, announces, furthermore, that on principle the German Air Force is now employing only multi-seater night fighter aircraft.

Junkers Freezing Protection for Airscrew Hubs. (Inter. Avia., No. 813-814, 25/4/42, p. 11.) (102/3 Germany.)

At low atmospheric temperatures controllable-pitch airscrews are sometimes subjected to trouble due to the freezing of the lubricating oil in the hub and ice accretion on the latter. In order to eliminate these disadvantages, the German Junkers Flugzeug-und Motorenwerke A.G., of Dessau, has developed the anti-freezing spinner. The spinner consists of two co-axial shells which surround the hub and are closed by a disc at their rear end: the inner shell is provided with an opening in the forward end, and warm air fed from the engine cowling into the space between the hub and the inner shell flows through the opening into the space between the two shells, through this space to the rear and leaves through slits in the outer shell. The airscrew hub, which is surrounded by two layers of warm air, is thus protected from detrimental freezing effects.

Inflatable Rubber Bags for Emergency Buoyancy. (Arado, German Patent No. 718,206, Flugsport, Vol. 34, No. 8, 15/4/42, Patent Collection No. 27, p. 112.) (102/4 Germany.)

The rubber bag in the folded state is housed below the wing in the angular space between wing root and fuselage and covered by a quick release metal fairing. The attachment of the bag serves simultaneously for the compressed air supply for inflation after jettisoning the fairing.

Two bags are normally fitted, one on each side of the fuselage.

Fighter Armament and its Development Prospects. (C. Rougeron, Inter. Avia., No. 813-814, 25/4/42, pp. 1-5.) (102/5 France.)

It should be possible to meet the contradictory requirements which the variety of the objectives to be attacked—aircraft, tanks, armoured and unarmoured ships—is making on the aircraft armament. It should suffice to follow the development trend towards increasingly heavy guns and, beyond that, to provide suitable ammunition for every mission, to make provision for a rapid exchangeability of inner tubes, gun barrels and even entire guns between operational flights, and to leave the rest to the relative slowness of the development of the equipment to be destroyed. The ideal solution would be, naturally, to be ahead of the slow evolution of the objective. In that case all kinds of replacement combinations would be created, for example, the substitution of 0.79 in. (20 mm.) wing cannon by batteries of four 0.3 machine guns or a 1.46 in. (37 mm.) engine cannon. The latter would fire shells weighing 0.67 lb. (0.3 kg.) at a muzzle velocity of 3,000 ft./sec. (900 m./sec.), would destroy the wing of an enemy aeroplane by a single hit—and these 37 mm. cannon could in turn be exchanged for 2.56 in. (65 mm.) engine cannon, whose 8.8 lb. (4 kg.) shells with a muzzle velocity of 1,000 ft./sec. (300 m./sec.) would compromise the safety of the heaviest tanks and even armoured ships.

Testing the Ju. 88—Details of Procedure for Works Acceptance Trials (Trimming, Control Forces, Automatic Pull-Out, etc.) (Flugsport, Vol. 34, No. 8, 15/4/42, pp. 112-115.) (102/6 Germany.)

After leaving the assembly line the aircraft is thoroughly examined by the control staff of the works and subsequently by an inspection staff working under instructions of the German Air Ministry. The power plant is then run up on the ground and adjusted as regards boost, r.p.m. and fuel consumption. All fuel and oil pipes are examined. The aircraft then passes to the flight test department, where its engine is again run up before the first flight. The inspector certifying the aircraft as airworthy accompanies the test pilot on the first flight, which serves principally to check the speed at service height and adjust the trimming of the aircraft. The Ju. 88 is fitted with a neat control box for this purpose, three small handwheels for the adjustable trimming flaps on elevator, ailerons and rudder being provided together with visual indicators for each setting (permissible tolerance is about ½ turn of the adjustment. Trim in excess of this must be adjusted by moving the fixed trimming strips on the control surfaces after landing). The control forces exerted by the pilot are measured on special spring balances and the aircraft is then put into its first nose dive. The diving brake usually requires careful adjustment so as to ensure the correct diving speed being maintained. The subsequent automatic pull out device ensures that an acceleration of 3 g. is not exceeded. The device comes into operation at the instant the bomb release gear is operated and consists in deflecting the elevator trimming tab downwards, this tab having previously been deflected upwards when the diving brakes were put into operation.

After the first nose dive, the aircraft is landed and the various faults revealed are discussed with the engineering and testing staff concerned. The second test flight is mainly concerned with testing the wireless and automatic course setting equipment. A nose dive over an altitude difference of at least 10,000 feet is also carried out, as well as single engine flight with either engine.

After all the defects revealed in these tests have been remedied, the nose diving qualities of the aircraft are again checked in a final test flight.

Effect of Variable Viscosity on Boundary Layers with a Discussion of Drag Measurements. (J. G. Brainerd and H. W. Emmons, J. App. Mech., Vol. 9, No. 1, March, 1942, pp. 1-6.) (102/8 U.S.A.)

This work extends a previously reported investigation of the boundary-layer problem associated with the steady laminar flow of a perfect gas along a thin flat insulated plate. In the earlier study the viscosity was assumed constant and the distributions of velocity and temperature were obtained for a wide range of conditions. Part I of the present paper shows, for Prandtl number 0.733 (air) and Mach number of the undisturbed stream 2, the velocity and temperature distributions in the boundary layer under various assumed viscosity variations.

Part II gives the distributions for various Prandtl numbers and Mach numbers, assuming the same viscosity functions as used by von Kármán and Tsien. Part III is devoted to a discussion of the method of interpretation of traverse tests of the efficiency and flow coefficients of nozzles or other passages. The results of Part I show that the variation of viscosity with temperature does not alter the equilibrium temperature of the plate, and hence the reading of a plate thermometer. This result is extended in Part II where it is shown that θ at the plate well is equal to the same quantity when μ is taken constant to within 1 per cent. in all cases studied. Furthermore, ϕU^1 at the plate wall does not vary greatly, so that the drag coefficient C_D is equal to 1.28 $(Re)^{\frac{1}{2}}$ to within 5 per cent. for most of the cases investigated. In Part III a passage efficiency as usually calculated is found to be subject to two errors, one of which reduces and the other of which increases the test result. The net effect is to cause the standard traverse test to give a conservative estimate of the efficiency. The flow coefficient as determined by traverse tests is somewhat higher than the correct one.

The Mechanism of Cavitation Erosion. (J. C. Poulter, J. App. Mechanics, Vol. 9, No. 1, March, 1942, pp. 31-37.) (102/9 U.S.A.)

After pointing out the interrelation between corrosion resistance, caustic embrittlement, fatigue, creep, and other phenomena of metals, the author cites the results of experiments on glass and quartz rods, subjected to high liquid pressures, as indicative of the action which probably occurs in cavitation erosion. To demonstrate the mechanism of cavitation on this basis, an investigation was conducted, in which tests were made on gray cast-iron specimens in water, alcohol, glycerin, and paraffin oil, using a magnetostriction oscillator as the source of energy. The results of the tests which are reported bear out the theory. Materials and protective coatings which reduce cavitation erosion greatly, and the effect of the presence of hydrogen in the liquid are discussed.

The Stressing of Geodetic Aircraft Structures. (S. Santangelo, L'Aerotecnica, Vol. 20, No. 6, June, 1940, pp. 455-456.) (Digest.) (102/10 Italy.)

Interest in geodetic aircraft structures has come to the front recently on account of noteworthy construction of this type having been realised in Great Britain.

After having briefly discussed the fundamental properties of the geodetic line and explained the difficulty of a general treatment, the requisite equations for the stressing of a reinforced cylinder (fuselage) subjected to tension, bending, compression and extension are developed. By means of considerations based on elastic energy content, the contribution of the geodetic stiffeners to the bending and tensional stress can be estimated.

If, as generally happens, this contribution is negligible, the effect of the stiffeners is devoted mainly to taking up tensile and compressive axial stresses under load and the equations reach their simplest form.

The author next studies the behaviour of a plane lamina (wing covering) provided with stiffeners similar to the geodetic on a cylinder.

In conclusion, the behaviour of such structures under loads in excess of the critical is considered and the superiority to the geodetic design over the normal is demonstrated both above and below the critical load.

Crash Proof Fuel Tanks. (J. W. Baird, J.S.A.E., Vol. 50, No. 4, April, 1942, p. 38.) 102/11 U.S.A.)

After outlining the history of the crash proof tank development, the author laid down some of the principles to guide future construction.

A means of support that would insure low unit loading on the tank and provide some degree of flexibility, such as a padded cradle or wide padded straps, is highly desirable. Precautions would have to be taken to prevent overflowing fuel from spilling on the tank or its supports as such a condition could nullify all efforts at protection. All feed, vent, drain and other lines attaching to the tank would naturally be of suitable non-metallic flexible hose and all connections to the tank would have to be given due consideration as to the possible effects they might introduce to induce rupture of the tank. Attention would also have to be given to proper ventilation of the space surrounding the tank so as to preclude the formation of dangerous gasoline-air mixtures in the tank compartment.

Fuel Consumption from the Airlines Viewpoint. (M. G. Beard, J.S.A.E., Vol. 50, No. 4, April, 1942, pp. 37-38.) (102/12 U.S.A.)

1. Manufacturers' chart horsepowers based on r.p.m. and manifold pressure are not an accurate basis, at the present time, upon which to base specific consumptions and, until the airlines operate on a torquemeter power basis accurate comparison between various engine operating phases cannot be made.

2. Specific fuel consumptions must include additional requirements for establishing minimum rich mixture knock ratings in order to insure uniform take-off powers on all fuels purchased throughout the country and to permit airlines to obtain maximum take-off power performance from their engines and with a minimum standard mixture setting for take-off and rated power operation.

3. Instrumentation must be improved for measuring carburettor mixtures, fuel flow in lines, and fuel quantities in fuel tanks in order to increase the accuracy of fuel-consumption data and to allow the airlines to take maximum advantage of established mixture settings and procedures in scheduled operation.

Engineering Problem Associated with Air Cargo Transportation. (S.A.E.J., Vol. 50, No. 4, April, 1942, pp. 36-37.) (Digest.) (102/13 U.S.A.)

From a study of cargo aeroplane performance and design criteria, including present airline cargo handling experience, the authors conclude that present methods and equipment are totally inadequate for any great extension.

All ground time during scheduled operation is lost time and must therefore be kept to the absolute minimum. In this connection the use of standard packing merits careful attention. As a general rule more than one opening in the fuselage should be provided so that loading and unloading can take place simultaneously. The undercarriage should also be designed in such a way that the cargo space is horizontal during loading and the opening level with the truck.

The Development of Impact Resisting Wind Shield. (A. L. Morse, S.A.E.J., Vol. 50, No. 4, April, 1942, pp. 35-36.) (Digest.) (102/14 U.S.A.)

Accidents involving bird collisions have become alarmingly numerous, 61 of such collisions having been reported since 1939. Two-thirds of the accidents occurred at night and more than one-third of the collisions resulted in penetration and shattering of the wind screen. In order to obtain a large degree of protection, a special wind shield of very high impact strength has been evolved. This glass consists of a 3/16 semi heated outer layer, a $\frac{1}{4}$ in. Vinylite centre and an $\frac{1}{8}$ in. inner layer of semi tempered plate glass. It is stated that such an assembly will stand without difficulty the impact from a 25 lb. bag of lead shot dropped from a height of 10 feet, while the standard windscreen will be perforated by the same bag dropped from only 5 feet. This corresponds to an increase in impact resistance of eight to 10 times.

The Growth and Development of Aircraft Hydraulic System and Equipment. (H. J. Marx, S.A.E.J., Vol. 50, No. 4, April, 1942, p. 35.) (Digest.) (102/15 U.S.A.)

According to the authors any system for operating landing gear, flaps and brake must meet the following requirements:—

1. Light weight.
2. Reliable and not vulnerable.

3. Compact and small power loss in transmission.
4. Semi-skilled installation and maintenance.
5. Low cost.
6. Capable of storing energy for emergency use.

Compressed air or vacuum operation has not been found to be reliable. This leaves the choice between hydraulic and electrical systems. It appears that there is a definite field of application for each type, the hydraulic being best adapted to variable speed control and the application of large forces.

A drawback of the hydraulic system is its greater vulnerability in aerial combat (bullets puncturing oil lines have caused fires) whilst operating at very low temperatures (i.e. below $-60°F$) is also likely to be difficult due to the absence of suitable liquids.

Five Years of Aeronautical Progress in Retrospect. (J. B. McDonald, Aero Digest, Vol. 40, No. 1, Jan., 1942, pp. 242-247.) (102/16 U.S.A.)

A round table discussion on future developments over the period 1937-1942 was held by leading aeronautical experts in New York in December, 1936. The author recalls some of the predictions then made and it is interesting to compare them with actual achievements.

(1) On the subject of synthetic fuels, Dr. Edgar was confident that higher octane rating would lead to an important reduction in specific fuel consumption. As a matter of fact, development has been in the direction of higher boost, i.e., higher output for same weight of engine structure, the specific fuel consumption remaining at the old figure.

(2) Three speakers (Sikorsky, Klemin and Boulton) were confident that aircraft of at least 100,000 lb. gross weight would present important advantages and would come into general use before the end of the period under review. As a matter of fact, opinion is still very divided on this subject. Only two aircraft of this size have been built so far (Douglas land plane and Martin flying boat) and comprehensive flight tests are still awaited.

(3) The importance of automatic pilots and servo control was duly appreciated at the meeting. In reviewing past work by the N.A.C.A. on flaps and engine cowling, the importance of clean design (i.e. reduction of surface friction) was emphasized. This has been amply confirmed.

In discussing developments in materials and designs, Boulton predicted an extension in the use of Mg, and the employment of forgings and extrusions instead of fabricating parts.

The need of flight tests on the actual loading of aircraft structure was also duly emphasized.

The great importance of plastic bonded plywood was not foreseen, nor did any of the speakers predict the importance of keeping down the weight of so called "necessary" equipment. This question of equipment has become the bugbear of the designer and at the moment seems to absorb almost automatically every saving in weight brought about by improvement in structural design.

Operating Requirements for Air Cargo Transportation. (C. P. Graddick, 10th Annual Meeting of the Institute of Aeronautical Sciences, January, 1942.) (102/17 U.S.A.)

Commercial cargo transportation by air is still in its infancy in the U.S.A. Any further development will have to take into consideration very keen competition on the part of the rail and motor trucks and will have to be planned most carefully so as to ensure sound economic principles.

The first requirement is adequate airport facilities, the sites of many of these having been selected in the past without proper regard to complementary facilities such as warehouses and truck parking space. Feeder routes will undoubtedly play an important part in Air Cargo developments and the advantage of both feeder and truck lines being under one management over a certain territorial sphere at least is obvious. Under normal conditions, rates will be the biggest factor in determining the volume of air cargo. At the present time these rates are from 4 to 7 times rail express rates. With efficient planes and a good ground organisation this cost should be halved in the near future and the author is of the opinion that at these rates a considerable tonnage of goods would be deflected to the air. Much will depend on a judicious balance between size, speed and operating cost of the cargo plane adopted. Extensive research is being undertaken on this matter by the four major airlines which handle between 80 per cent. and 90 per cent. of the Air Cargo in the United States. For this purpose a separate company known as Air Cargo, Inc., has been formed which serves to co-ordinate the experience gained so far and initiate further development.

The importance of a sound air cargo organisation from the point of view of possible military application need not be stressed.

Load Factors Obtained on Civil Aeroplanes in Aerobatic Manœuvres. (E. I. Ryder, J. Aeron. Sci., Vol. 9, No. 6, April, 1941, pp. 195-201.) (102/18 U.S.A.)

Results of load factor measurements made by the Civil Aeronautics Administration on 38 small civil aeroplanes and the results of tests made by the N.A.C.A. for the Civil Aeronautics Administration, on five small civil aeroplanes, are presented. The maximum load factors measured in various manœuvres are summarized in Table I.

TABLE I.

MAXIMUM LOAD FACTORS IN VARIOUS MANŒUVRES.

POSITIVE LOAD FACTORS.

Manœuvre.	n	Tests by
Snap Roll	5·2	C.A.A.
Vertical Reversement	4·0	C.A.A.
Loop	4·3	C.A.A.
Immelman	4·6	C.A.A.
Abrupt Pull-up	4·22	N.A.C.A.
Dive Pull-up	5·05	N.A.C.A.
Slow Roll	4·1	C.A.A.
Half Loop	4·7	C.A.A.
Spins (Recovery)	4·0	C.A.A.
Split S	4·0	C.A.A.
Vertical Roll	4·2	C.A.A.
Half Roll	4·5	C.A.A.
NEGATIVE LOAD FACTORS.		
Inverted Stall	−1.5	C.A.A.
Inverted Pull-up	−2.0	C.A.A.
Slow Roll	−1.6	C.A.A.
Abrupt Push-down	−0.8	N.A.C.A.

The tests made by the C.A.A. were for the purpose of determining the suitability of the aeroplanes involved for use in the acrobatic phases of the Civilian Pilot Training Programme.

One particular feature of the tests by the C.A.A. was that the various manœuvres were conducted by first using a smooth technique and then by using a rough technique to simulate the action of an inexperienced student pilot. Following an analysis of the records thus obtained, the optimum entering airspeeds for the manœuvres on each particular aeroplane were determined for the purpose of placarding.

The effects of various factors such as entry speed, technique, etc., on the developed load factors are discussed.

An Investigation of the Stresses in Rotation Discs with a Number of Apertures. (J. G. Teverovsky, Sov. Kotloturbo, No. 11, Nov., 1940, pp. 402-411.) (R.T.P. Translation No. 1,493.) (102/19 U.S.S.R.)

Discarding the method of substituted static loading on the periphery, as insufficiently accurate, the author conducted experiments on rotating bakelite models to discover the effect of eccentric apertures on the distribution of the centrifugal stresses over the area of the disc. Inspection of the photoelastic patterns was by the stroboscopic method, "strain-freezing" not being used.

The conclusions from these tests are briefly as follows:—

The extent of disturbance of the stress distribution in a rotating disc by an eccentric aperture depends on the size of the latter.

The maximum strain-concentration for the case of a single aperture is governed by the ratio of radial to tangential stresses over the solid plate.

It is possible to calculate the coefficient of maximum stress-concentration by a theoretical formula, developed by the author and found to agree sufficiently with the experimental results.

Interaction between a number of apertures in the same disc, depends on their relative nearness.

With a low ratio of radial to tangential stress, an aperture of elliptical form, with the minor axis along the radius of the disc produces less disturbance of the stress-concentration, than a circular hole.

The interaction between elliptical apertures is the same as between circular holes.

Anti-Corrosion Protection of Aluminium Alloys in Aircraft Construction. (A. Von Zeerleder. Inter. Avia., No. 815, 4/5/42, pp. 1-5.) (102/20 Switzerland.)

It is generally recognised that where maximum corrosion resistance of Al-Cu-Mg alloys is required, cladding with pure Al. is required combined with anodic oxidation or dope. The thickness of cladding amounts to about 5-10 per cent. of the thickness of the parent sheet and necessarily leads to a reduction in strength. Moreover the provision of dope or anodic treatment destroys the "remote protective effect" and parts of the parent metal exposed by accidental damage to the covering thus are liable to corrode. In addition the need of dope will cause a substantial increase in the weight of the structure.

Unless great care is taken in the annealing, the anti corrosion effect of the cladding also wears off with time due to the gradual diffusion of Cu. from the parent metal into the Al. sheet. According to the author, all these drawbacks can be overcome by substituting for the ordinary pure Al. sheet special cladding alloys containing Si., Mg. and Mn. In order to obtain the maximum corrosion resistance these alloys require annealing at 500°C. and are subsequently age hardened at 150°C.

The composition and strength characteristic of these so-called Raffinal Al. alloys are given below.

	% Alloy Components.				Kg./mm.² Mechanical Properties.		
	Fe.	Si.	Mg.	Mn.	$\sigma_{.2}$	σ_B	$\delta_{13}\%$
Al. Mg_2 Si ...	0.003	0.48	0.80	—	10	19	—
Al. Mg. 7 ...	0.011	0.013	6.11	0.432	15	32	26
Al. Mg. Si ...	0.010	1.02	0.952	0.487	30	37	12
					(Yield)	(Tensile)	(Elongation)

It will be noted that the strength properties of these new cladding materials approach these of the parent metal. The anti corrosion properties of these alloys are so good that neither anodic oxidation nor dope coatings are now required. Thus the " remote " protective effect of the cladding is maintained. The good protection now afforded enables the high annealing temperature of the cladding being also applied to the parent material giving rise to an appreciable increase in the strength of the construction besides simplifying manufacture.

Wear and Friction of Sliding Contacts with Special Reference to Carbon Brushes Sliding on Copper Rings. (R. Holm and others, Wissen, Veroff. Siemens Werken, Vol. 18, No. 1, 1939, pp. 73-100.) (102/21 Germany.)

Wear and friction between carbon brushes and copper slip rings or commutators are measured as a function of several variables, such as contact pressure, circumferential speed, moisture content of air and current density. The experimental results are found to be consistent and can be expressed by means of simple formulæ. The smallness of both friction and wear is caused by the presence on the ring of very thin layers of foreign substances.

The atmosphere (water vapour, dust suspension and oxygen) as well as the electric current have a direct effect on these surface layers.

In practice, the major part of the brush, ring and commutator wear is due to vaporisation of the electrodes associated with arcing. This cathodic vapourisation can be calculated over a certain period (provided the number of sparks, their duration and current values are known) by multiplying the quantity of electricity passing through the sparks with a constant depending on the material and the surrounding atmosphere.

Uses of Rubber in War. (P. W. Drew, S.A.E.J., Vol. 50, No. 4, April, 1942, p. 41.) (Digest.) (102/22 U.S.A.)

American consumption of raw rubber is at present of the order of 800,000 tons per year, half of which is used for military purposes. Stocks amount to about 650,000 tons and synthetic production is hoped to realise 500,000 tons per year within the next 18 months.

The chief military uses of rubber are listed below:—

Aircraft—Tyres, bullet sealing tanks, de-icers, life rafts, floatation gear, engine mounting, pipes, etc.

Tanks—Rubber tracks, solid tyres for track (boggie rollers), bullet sealing tanks, sponge padding, engine mounting, etc.

Trucks—Tyres, bullet sealing tanks, engine parts, etc. (In 1941, 11¾ million tyres were required for military vehicles. The 1942 consumption is estimated at 18 million.)

Barrage Balloons—Fabric of these balloons is rubber coated.

Gas Masks.

Fire hose and fire fighting appliances.

In addition industry requires rubber for belts, hydraulic press pads, washers, commercial trucks, etc.

The Cold Pressing Properties of Dural Type Alloy Sheets with Special Reference to the Production of Large Pressings for Aircraft. (J. C. Arrowsmith and others, J. Inst. Metals, Vol. 68, No. 4, April, 1942, pp. 109-132.) (102/23 Great Britain.)

An account is given of the difficulties experienced in the cold pressing of Duralumin type alloy sheet. The distortion which results from the heat treatment of the material is described, together with the methods for limiting its extent and overcoming its effect. Low ductility and a high degree of " spring-back " make the Duralumin-type alloys less amenable to cold pressing than is mild steel, and methods necessary for the production of the more difficult pressings are discussed.

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Attention is drawn to the fact that maximum ductility is not obtained immediately after the water-quenching operation and a series of tests is described which shows that the ductility rises to a maximum after an interval of time which is dependent upon the temperature of storage, and then falls continuously as age-hardening proceeds. This interval of time is of the order of 10 minutes at room temperature and 2 hrs. at the normal temperature of refrigerated storage ($-6°$ to $-10°$C). The effect can be used to advantage in the production of the most difficult pressings.

Evidence is given which shows that a fairly reliable indication of the deep-drawing properties of Duralumin-type alloys is to be found in the microstructure and the value for percentage elongation obtained in the tensile test carried out on freshly solution-heat-treated material.

Mention is made of the success which has attended a deliberate attempt to produce material possessing the type of microstructure which had been found to be associated with good deep-drawing properties.

The Grain-Size of Rolled Aluminium (Numerous Plates, Graphs and Drawings, Bibliography). (H. W. L. Phillips, J. Inst. Metals, Vol. 68, No. 3, March, 1942, pp. 48-106.) (102/24 Great Britain.)

A study has been made of the grain-size of aluminium sheet and strip of commercial purity, and in particular of the effects of hot rolling, cold rolling, and annealing conditions, and of metal purity. Whilst the results obtained have not always been consistent, it may be said that a rapid rate of heating through the recrystallization range, a high temperature during hot rolling, heavy pinches during cold rolling, and a high content of iron are all factors which favour the development of a fine grain on annealing. Prolonged annealing, a high temperature of annealing, and high contents of silicon should be avoided as favouring grain coarsening. Rolling to thin gauges without intermediate annealing frequency results in the production of a comparatively coarse-grained structure, the imposition of an intermediate anneal at a point sufficiently remote from the finishing thickness is often beneficial. Minor impurities, unless present in excessive amounts, seems to have little effect on the grain-size.

Temperature and strain gradients do not appear to cause unusual grain growth in aluminium; the grain-size is normal for the degree of strain and annealing temperature employed.

The initial stages of recrystallization have been studied, and theories are advanced to account for the existence of the maximum in the grain-size-cold-work curve, and for the variation which has been found to exist between samples rolled under controlled and apparently identical conditions from duplicate rolling blocks taken from the same cast.

Rapid Chemical Analysis of Pig Iron (Mn, P, S, Si and C in Nine Minutes). (H. Kempf, Stahl and Eisen, Vol. 62, No. 7, 12/2/42, pp. 136-140.) (R.T.P. Translation No. 1,479.) (102/27 Germany.)

Details are given of the method of routine analysis of pig iron as carried out by the Thyssen Works at Duisburg. As is well known, an accurate analysis of the melt is of great importance to the steel manufacturer, especially in the Thomas process. Although recent advances in spectrographic analysis render possible an accurate determination of Mn, Si, Cn, Cr, Ni and Mo in 6 to 8 minutes S content cannot be obtained by this method and the determination of C. and P. presents serious difficulties.

By proper organisation and choice of methods, it is possible to obtain equally quick and accurate results by chemical means, with the added advantage that C. and P. can be determined without difficulty. Details for the separate analysis for Mn, P, S and Si are given. Carbon is determined by the "well-known volumetric gas analysis" method which is not described further.

The time taken for the various determinations are given below:—

Mn	... ...	$4\frac{3}{4}$ mins.
P	... ...	$6\frac{1}{4}$,,
S	... ...	$5\frac{1}{4}$,,
Si	... ...	$6\frac{1}{4}$,,
C	... ...	3 ,,

By having 4 chemists working simultaneously the complete analysis is carried out in less than 9 minutes, including time required for taking sample from melt.

The Performance of Emery Wheels as Affected by Coolants and Lubricants. (H. Opitz and W. Vits, Z.V.D.I., Vol. 86, No. 13-14, 4/4/42, p. 198.) (102/28 Germany.)

The great importance of the nature of the cutting fluids in all turning and planing processes is by now fully recognised. In the case of grinding, however, coolants as distinct from lubricants are still frequently employed. Such coolants as soda water lead to rapid wear of the wheel and the latter requires frequent cleaning in order to remove disintegrated grains adhering to the surface. Under these conditions only 70 per cent. of the total approach of the wheel is effective in removing material from the object undergoing grinding, the remaining 30 per cent. being taken up by wear of the wheel. In the presence of a suitable lubricant, however, the wear of the wheel only accounts for 5 per cent. of the total approach. The great drawback of lubricants is their small thermal conductivity and their tendency to become atomised.

The application of oils is thus restricted to cases when the material does not undergo an appreciable rise in temperature during the process. For grinding screw threads, the oil has proved very beneficial.

Determination of the Hardness of Plastic by a Modified Brinell Method. (Z.V.D.I., Vol. 84, No. 15, 13/4/40, p. 252.) (102/29 Germany.)

According to German Engineering Specification VDE 0302, the hardness of a plastic is calculated from the depth of impression of a 5 mm. steel ball whilst carrying a 50 kg. load. Erk and Holgmuller (Kunstoffe Vol. 28 (1938), pp. 109/113) have pointed out that the total deformation measured under these conditions consists partly of a permanent (plastic) set and an elastic deformation. Since the latter may amount to anything between 45 per cent. and 90 per cent. of the total, depending on type of plastic, it is obvious that the method cannot be used for a direct comparison of hardness. As is well known, the deformation of plastic is mainly controlled by the time of application of the load. For this reason, Frohlich (Kunstoffe Vo. 30 (1940), pp. 103/106) has developed a new hardness tester of the rolling type in which the time of application of the load is controlled. In this instrument a steel ball of 5 mm. diameter is caused to roll on the specimen at speeds varying between 5×10^{-6} and 50 mm./sec., the load being constant and equal to 2 kg. When plotting the 4th power of the track width against the 4th root of the time of application of the load, the resulting curves are almost straight rendering exterpolation to zero time of application easy. For these very short durations of the load plastic deformation can be neglected and it is found the track width of various plastics are roughly in the order of the respective Moduli of elasticity. This method of plotting also enables conclusions to be drawn on the plastic deformation as a function of time. The author carried out experiments on ten representative plastics for load periods of 1, 10 and 60 seconds respectively.

Under these conditions, pressed synthetic K gave the following values for the rolling hardness (Kg. sec./mm.^{3}) :—

1 sec.	... ...	9940
10 sec.	... ...	9030
60 sec.	... ...	8550

It will be noted that the change of hardness with duration of load is relatively slight, i.e. plastic flow under long period load is small for this type of synthetic substance. Similar results are obtained with the plastic "Astralon" and with ebonite.

Synthetics derived from cellulose acetate or celluloid on the other hand are subject to considerable plastic flow under load. The same applies to the synthetic "Mipolain."

Effect of Magnetic Field Distribution in Magnetic Inspection. (F. L. Fuller, J. Aeron. Sci., Vol. 9, No. 6, April, 1942, pp. 202-206.) (102/30 U.S.A.)

The present wide use of magnetic testing for flaws in parts made of magnetic metals has given rise to many problems because of the complex shape of the parts. In many instances regions of intense magnetic saturation occur in such a way that very slight variations in surface structure such as those due to forging will give very strong indications while adjacent regions not magnetically saturated are substantially free of indications. It is the purpose of this paper to describe an investigation of this phenomenon in an eccentrically cylindrical crank pin section of an aircraft engine shankcraft.

By the insertion inside of the pin of a suitable eccentric sleeve of the same material as the crankshaft, the structure can be made practically symmetrical. The field will be uniform throughout the volume and surface flaws of a given magnitude will be visible to the same degree on any part of the periphery.

Flash Butt Welding of Chrome Molybdenum Steel. (W. S. Evans and V. Netchvolodoff, J. Aeron. Sci., Vol. 9, No. 6, April, 1942, pp. 207-212.) (102/31 U.S.A.)

Flash butt welding of steel has been an established industrial process for many years. The automobile industry, in particular, has used this process to take advantage of the low cost, high rate of production and excellent physical properties of the weld.

Application of this process to chrome-molybdenum steels has been very limited, especially in the aircraft industry. Limiting factors for aircraft application have been a lack of production volume, necessary equipment and experience. A natural tendency on the part of aircraft designers has been to exercise caution in the use of processes deviating from long established practices. In recent years, with the advent of large contracts, it has become advisable to investigate the possibilities of this process in structural design.

This article will give a brief outline of the many variables involved in the process as well as part and die design. Only in recent years has any effort been made to determine the individual effect of the various factors involved with respect to aircraft steels. It should be remembered that this process as applied to chrome-molybdenum steel is in the development stage and many of the procedures used at the present time may be discarded as a result of further research and additional experience.

A Short Gauges Length Extensometer and its Application to the Study of Crankshaft Stresses. (C. W. Gadd and T. C. van Degrift, J. App. Mech., Vol. 9, No. 1, March, 1942, pp. 15-20.) (102/32 U.S.A.)

The mathematical methods of determining elastic stresses in machine elements, particularly those of irregular contour, may be excessively complex, so resort is frequently made to approximate calculations, which tend to lose accuracy while achieving simplicity. As a result a constant effort is made to supplement the mathematical treatment with experimental methods of studying stress. In this paper, the authors describe a short gauge length extensometer and explain its application in the determination of crankshaft stresses. This instrument meets the requirement of convenience in operation, which is so essential in assuring that it will be used for the study of localized stresses.

Determining Critical States of Equilibrium of Plates and Shells Under Initial Stress. (H. Hencky, J. App. Mech., Vol. 9, No. 1, March, 1942, pp. 27-30.) (102/33 U.S.A.)

The purpose of this paper is to show that Rayleigh's energy method, used by Timoshenko for the determination of critical loads in plates and shells, is capable of an important generalization. The work involved is a direct continuation of the energy method of Timoshenko and is based on the principle of virtual work. According to this principle the variation of the work of the outer forces together with the variation of the kinetic energy is equal to the variation of the elastic energy stored up in the body. The author develops a series of formulas, by means of which the stability of a cylindrical shell under various conditions of stress may be determined. The practical applications of these formulas, requiring only a fundamental knowledge of the mathematics of engineering, are illustrated by suitable examples.

Supercharging Two-Stroke Diesel Engines and the Possibility of Using a Free Piston Engine for Jet Propulsion. (Inter. Avia., No. 812, 15/4/42, pp. 14-15.) (Work carried out in Switzerland is reviewed.) (102/34 Switzerland.)

Unlike the four-stroke cycle engine, the two-stroke engine in principle requires a positive air feed by means of a blower or compressor to enable it to be started; however, it is not economical to supercharge the engines to a pressure exceeding the usual, modest figure of 20 lb./sq. in. (1.4 kg./cm.^{2}), unless the exhaust energy can be recovered. The first of these two requirements can be met only with a positively driven supercharger, while the second calls for the use of an exhaust-driven turbine. The investigations conducted by Sulzer Bros. took into account both these requirements inasmuch as the supercharger was coupled to the crankshaft and the exhaust turbine was enlisted directly or by the intermediary of the engine crankshaft for the driving of power consumers outside the actual power unit. Depending upon the supercharger pressure selected, two possibilities result: For an absolute boost pressure ranging from about 21 to 70 or 80 lb./sq. in. (1.5 to 5 or 6 kg./cm.^{2}), with the exhaust turbine geared to the crankshaft (*high-pressure supercharging*), the power output of the exhaust turbine roughly equals the requirement of the supercharger, and the Diesel engine delivers a power increased in accordance with the chosen rate of supercharging. Calculations and tests have both shown that an increase in the supercharging pressure to 28 lb./sq. in. (2 kg./cm.^{2}) will raise the mean effective pressure of the engine to 170-185 lb./sq. in. (12-13 kg./cm.^{2}) which corresponds to a doubling of the engine output; when supercharging is increased to 43 lb./sq. in. (3 kg./cm.^{2}) the mean effective pressure attains 213 lb./sq. in. (15 kg./cm.^{2}); when supercharging is further increased to 85 lb./sq. in. (6 kg./cm.^{2}) the mean effective pressure rises even to 256 lb./sq. in. (18 kg./cm.^{2}). Among the experimental engines in which these improvements in performance were realized, special attention is deserved by a two-stroke cycle opposed-piston Diesel with a bore of 4.72 in. (120 mm.) and a stroke of 2 x 5.90 in. (2 x 150 mm.); the interesting feature of the engine is that its dimensions roughly correspond with those of a modern aircraft engine. At a speed of 1,500 r.p.m. and with a mean effective pressure of 256 lb./sq. in., a cylinder output of roughly 200 h.p. can be calculated; in the course of the tests the engine speed was raised to 2,400 r.p.m., the load placed on the engine being undisclosed, however. At 1,500 r.p.m. the fuel consumption amounted to between 0.40 and 0.42 lb. per effective horsepower-hour. At a supercharging pressure of 70 to 85 lb./sq. in., the power absorbed by the supercharger attains the whole of the output of the Diesel engine. In this case it would be useful to combine the Diesel engine and the supercharger into a *free-piston gas generator* and to employ, for the supply of motive power to outside consumers, solely the exhaust gas-driven turbine. The free-piston gas generator possesses, like the free-piston compressors developed among others by Pescara and Junkers, two counter-moving pistons synchronized by linkage; between the pistons is located the combustion chamber, whereas the spaces between the outer piston faces and the cylinder covers serve as working chambers for the compression of the supercharging air. Unlike the gas turbine installations with constant-volume combustion chambers, a gas generator of the type described supplies gas for the turbine drive at temperatures of only about 450 to 500 deg. C., which makes it possible to do without the uneconomic admixture of fresh air. While such installations are hardly eligible for airscrew-driven aeroplanes due to the high speed of the gas turbine, they will offer advantages for employment in jet propulsion aircraft if the turbine is omitted and the gas produced by the free-piston gas generator is directly used for propulsion. The Heinkel propulsion unit (Abstract No. 101/51) may be outclassed by the Sulzer free-piston gas generator since the latter operates at considerably higher, i.e. more economical combustion pressures than the design consisting of a centrifugal blower and an expansion turbine: this is revealed already by the fact that in stationary gas turbine installations with constant-volume combustion chambers, a thermal efficiency of only 18 per cent. is achieved, while installations featuring a free-piston gas generator show a thermal efficiency of 40 per cent.

Intake Air Filters. (Inter. Avia., No. 813-814, 25/4/42, pp. 9-10.) (American work is reviewed.) (102/36 U.S.A.)

Oil bath filters which have been found excellent on stationary installations or on heavy trucks, etc., were found unsuitable at the outset for use on aircraft due to their heavy weight. Dry type filters employing felt or fabric were turned down also because they require frequent replacement, produce a considerable amount of drag, are inflammable and must be kept in dry storage places. No allusion is made at all to what seems to be the most promising methods, namely the arrangement of specially designed impingement surfaces, whirl chambers, etc., in the path of the intake air. The American source recommends the use of filter media consisting of wire netting which is moistened with oil and must be washed in petrol after each flight. For the determination of the optimum sizes of such filters experiments were conducted in which dust-bearing air with a dust concentration of 0.03 gms. of Portland cement was passed through the filter, and measurements were taken both of the additional drag produced and of the dust caught and held. As maximum permissible limit values are considered for a period of operation of 30 mins. the elimination of at least 90 per cent. of the dust carried in the air and a drag of 4 in. w.g. Most of the filters tested were of rectangular shape. The filter media consisted on the entry side of crimped layers of knit steel wire, followed by flat but denser layers of steel wire and finally, near the exit side, still denser layers of woven copper ribbon. This filter is mounted between wide-meshed grills in a steel channel frame, its sensitivity to operational vibrations being reduced by strongly pressing against each other the individual layers. While at first it appeared that useful results would be produced most likely with filters of moderate thickness ($\frac{3}{4}$ in.) at low air flow velocities (600 ft./min.) the tests showed that filters of greater thickness (2 in.) offer no unaccepted drag even at higher air flow velocities (1,000 ft./min.) and are capable of holding much larger quantities of dust. On the whole it was shown that the efficiency of these filters after prolonged operation is impaired less by the drag they create than by the reduction of the cleansing characteristics. At the air flow velocities cited the frontal area of a filter intended for an engine of 1,800 h.p. and having a filter media of $\frac{3}{4}$ in. thickness must be about 4.5 sq. ft., while with a thickness of 2 in. only 2.7 sq. ft. is required; the dead weight of the filter is roughly identical in the two cases. It is useful to mount the filter at an angle in the air intake scoop so that the dust which is eliminated but not held by the filter can drop out of the air flow; by providing suitable openings care should be taken to remove this dust. The aircraft engine superchargers of conventional design are not usually greatly affected by penetrating dust; it is therefore possible to mount the filter after the supercharger; no heated air added to the intake air flow in the adapter should pass through the filter. Finally, emphasis is placed on the necessity of providing anti-icing protection for the intake air filter.

Symposium of Papers on Engine Production Test Equipment as Employed by Packard, Allison, Buick and Ford. (S.A.E.J., Vol. 50, No. 4, April, 1942, pp. 33-34.) (Digest.) (102/37 U.S.A.)

Modern engine test cells are very elaborate and costly. The concrete structures are 18 to 30 inches thick, control and engine room are sound proofed, whilst 2 to 3 inches of safety glass protect the operators. Elaborate control instruments, many of them automatic, are provided and the desk from which the power plant is remotely controlled forms an imposing structure.

In view of the large capital outlay, it is obvious that every attempt must be made to operate a call on useful work for the maximum possible percentage of time that it is assigned to a particular engine. All the fuel, oil, exhaust and coolant connections must therefore be specially designed to enable quick assembly. In the Packard Plant (Rolls Royce Merlin) the normal time of installing a new engine is stated to be 30 minutes, the minimum time 14 minutes. A general concensus of opinion on whether the power should be absorbed by means of a variable pitch propeller or electrically has not been reached. Ford and Buick adopt the latter method solely, whilst Allison and Packard apparently employ either method. Where utmost quietness of operation is essential (due to proximity of residences) the electrical method is generally preferred, provided the supply system fed by the generator is of sufficient capacity to absorb the load variations without difficulty. The recovery per engine averages 450 h.p. and adds appreciably to the efficiency of the electrical installation of the factory.

Power absorption by means of a V.P. airscrew on the other hand had the advantage that the engine crankshaft is subjected to lateral and torsional stresses more closely approaching those occurring in flight. Great care must however be taken in this installation to ensure a smooth air flow at the back of the propeller, as otherwise the torque readings are falsified.

Design Features of the Ju. 211B Petrol Injection Aircraft Engine. (S. Oldberg and T. M. Ball, S.A.E. Journal, Vol. 50, No. 4, April, 1942, pp. 23, 33.) (Digest.) (102/38 Germany.)

The Ju. 211 B is the standard power plant for the single and twin engined dive bombers Ju. 87 B and Ju. 88, the Focke Wulf F.W. 200 K 4 engined long range bomber and the Heinkel He 111K twin engined bomber. Although its external appearance and size resemble that of the D.B. 601 engine (60° V, inverted) the construction and materials employed differ radically from the Daimler Benz design.

Thus for example, the latter engine uses roller bearings for the connecting rods, whilst the Ju. 211 has plain bearings. The authors discuss these design features in detail, basing their remarks on a captured engine which was stripped at the Chrysler Works.

Speaking generally, the engine gave an excellent impression both as regards materials and workmanship. The extremely high Cr and relatively small Mo contents of the crankshaft are noted. Both hardness and tensile strength appear to have been kept at the low side in order to reduce notch sensitivity. Special attention is paid to the supercharge fitted. The impeller is of the fully shrouded type, of Mg. alloy (containing 7 per cent. of Al.) and weighs 3 lb. The internal surfaces of this rotor are stated to be exceptionally smooth and great care is also taken to reduce pressure losses at the delivery ports.

Although the efficiency of the Junkers supercharger taken by itself is stated to be relatively low, the complete lay out on the engine (due to the absence of carburettors) appears to be highly efficient. In this connection special attention is drawn to the relatively high lift cam (.7 in.) employed for the valve operation. The fully automatic device controlling airscrew speed, boost, mixture ratio, spark advance and supercharger gear ratio are also commented on. Their development follows the German policy of removing all possible distraction from the pilot.

Standard Oil Develops New Fuel Making Process. (Aero Digest, Vol. 40, No. 2, Feb., 1942, p. 96.) (102/39 U.S.A.)

Ordinarily, 100-octane petrol is made by blending special synthetic hydro-carbons known as alkylate and isooctane with isopentane obtained from natural gas plus special refined naphthas from crude oil. Up to now it has taken about 65 per cent. of synthetic hydro-carbons and isopentane with 35 per cent. of naphthas to make the final product.

The new process converts ordinary naphthas into an improved product for blending with synthetics to make the fuel. The quantity of synthetics can consequently be reduced to 40 per cent. and the use of isopentane can be eliminated. This increases the amount of 100-octane fuel that can be made from a given amount of synthetics by more than 50 per cent.

Commercial Vehicles and Lower Octane Fuels (Symposium of Papers from Point of View of Refiner, Engine Manufacturer and Operator—with Discussion). (S.A.E.J., Vol. 50, No. 4, April, 1942, pp. 125-136.) (102/40 U.S.A.)

After a short review of the manufacture of 100-octane and premium fuels, together with their lead susceptibilities, the reduction in the rating of commercial fuels is due to limitations in the supply of tetraethyl lead is explained.

In most cases, the reduction in rating from the present 75 rating to the new 68-70, will not require any change in compression rates, provided the mixture is made richer and the spark retarded. More frequent gear changes and less violent acceleration will also be called for. As a result the fuel economy will be down by about 10 per cent. and in spite of the lower cost of the new fuel, it is expected that on the basis of 100,000 miles per year, the extra cost per vehicle compared with a fuel of O.N. 75 will be of the order of £40. It is of the utmost importance that the engine should not be worked under detonating conditions for any length of time otherwise failure of gaskets, rings and bearings, as well as increased oil consumption will increase operating cost still further. If conditions of operation are therefore very strenuous, arrangements may have to be made to supply truck operators with higher grade fuel over certain sections of their routes.

Aircraft Engine Radio Shielding (Digest). (D. W. Randolph, S.A.E.J., Vol. 50, No. 4, April, 1942, p. 33.) (102/41 U.S.A.)

Future progress in radio ignition shielding seems to lie in the use of improved shielding having no internal air spaces, in the use of improved plastic or ceramic insulators, and in the development of new ignition systems in which low-voltage currents are carried to individual spark coils in or near the spark plugs to remove the necessity for high voltage distribution.

Most radio shielding installations are enclosures with considerable air space and a number of joints. These joints are not effective in counteracting the effect of altitude pressure differences and, consequently, breathe air and moisture. One of the most critical points of the system from the ignition standpoint is the hollow terminal well of the spark plug. Any accretion of moisture in this terminal well, and any reduction of pressure of the air contained therein to a density which no longer has good dielectric properties with high tension current promotes leakage of the current, possible tracking of insulators, and chemical action of the entrapped air and moisture with ozone created by the corona discharge. The complete exclusion of the air by filling the free space in the terminal well with a competent sealing compound has demonstrated its effectiveness. Most of the attempts to seal in the air and exclude moisture in the terminal on the ground by means of grommets, washers, and similar devices have failed.

The Stratoscope, a New Radio Aid to Navigation. (Aviation, Vol. 41, No. 1, Jan., 1942, p. 151.) (102/42 U.S.A.)

Warning of the presence of other aircraft or of obstacles, such as mountains or high towers, is given to an aeroplane pilot by the use of a new radio instrument known as the Stratoscope. This instrument when located on an aeroplane, or a mountain top, will transmit a signal whose frequency is dependent upon its altitude above sea level. The transmitted signal when received by another stratoscope will give an indication on a cathode-ray tube screen of the altitude of the transmitting instrument relative to the altitude of the receiving instrument. An indication of the approximate distance between the two instruments, or the aeroplanes in which they are mounted, is also given by the amplitude of the indication which is dependent upon the signal strength at the location of the receiver. Because signal strength decreases with distance the pilot can make a fair estimate of the distance to the transmitter or the instrument can be calibrated. This assumes that the power output of these instruments in service is standardised at some fixed value.

The usefulness of an instrument such as the stratoscope can be summed up in the following paragraphs.

1. The device is an anti-collision instrument. Each pilot can see on a screen, regardless of the weather, indications of the number of aeroplanes or fixed obstacles located within a certain distance of own aeroplane. These indications tell him the respective altitudes and distances involved.

2. It permits differentiation between fixed and mobile obstacles.

3. In the case of fixed obstacles, sharp directional indications can be received. This is useful for landing or for defining the course of an airway.

4. It is an absolute altimeter in the proximity of airports or fixed obstacles and it requires no corrections due to weather conditions.

5. It permits airport traffic control and rapid landing facilities irrespective of weather conditions.

6. It permits a continuous traffic control along airways which can, therefore, handle additional planes.

7. Vertically separated airways can be created by the use of the stratoscope.

A Cathode Ray Method of Wave Analysis. (V. O. Johnson, Electronic Engineering, Vol. 14, No. 170, April, 1942, p. 721.) (102/43 Great Britain.)

Complete periodic functions when transformed into a corresponding voltage wave, may be analysed with the use of a cathode-ray oscillograph. The complex wave is represented upon the fluorescent screen of a cathode-ray tube by a vertical displacement at the same time that a sinusoidal horizontal oscillation exists. If the frequency of the sinusoidal oscillation bears an integral relation to the fundamental frequency of the complex wave a Lissajous figure is viewed on the screen. The areas of these Lissajous figures are directly related to the coefficients of the Fourier series of the complex wave. The area is determined by measuring a photograph of the figure using a polar planimeter. The method is based on the theory developed by Chubb in connection with the Chubb Polar Analyser. Advantages of the method are that it is quick and convenient, only standard laboratory equipment is necessary and with special equipment it promises to make possible the analysis of ultra high frequency waves.

Position Finding by Waves. (The Engineer, Vol. 173, No. 4,503, 1/5/42, pp. 360-361.) (102/44 Great Britain.)

Theory indicates that for a circular reflector of diameter d, optimum echo conditions are obtained if the peripheral distance of the source from the reflector exceeds the perpendicular distance by $\lambda/4$ (λ=wavelength of radiation), provided λ is small compared with d.

If D is great compared with λ, conditions for strongest echo are thus given by

$$2\lambda D = d^2$$

$$\text{with} \quad D = 50{,}000 \text{ feet}$$

$$d = 100 \text{ feet}$$

$$\lambda \text{ opt} = 1/10 \text{ foot}$$

Ultra short electric waves thus appear suitable for the detection of aircraft by the echo method, and a review of the problem appeared as long ago as 1933 in the Proc. Inst. of Radio Engineers.

The distance of the aircraft can be obtained either directly from the time taken by the echo (provided time intervals of the order of micro seconds can be recorded) or estimated from the interference pattern (number of nodes and loops) between sender and receiver. An estimate of the total number of loops (and hence the distance of the reflector) can be made by slowly changing the wavelengths of the sender and counting the number of maximum and minimum at the receiver. British Patent No. 457737 was granted to the Telefunken Company of Germany for a device functioning on these lines, in which, however, the modulation frequency and not the carrier frequency is altered.

An interesting example of combined bearing and distance finding is provided by British Patent No. 478456, granted in 1936. This device consists of 2 rotating directional aerials, each provided with receiver, amplifier, rectifier and cathode ray tube. In each of these sets, the time base of the tube is synchronised with that of the aerial, so that the angular position of the echo can be determined. By having the 2 aerials rotating about vertical and horizontal axes respectively, the space position of the reflector is fixed.

In view of the importance of such devices and the concentrated research work carried out in many countries, it is obvious that considerable improvements must have been carried out in recent years.

Ultra Short Wireless Waves in Concentric Cable and Cavity Resonators Utilising Perforated Circular Discs. (H. Birchholz, H.F.T., Vol. 54, No. 5, November, 1939, pp. 161-173.) (102/45 Germany.)

A number of papers have been published of recent years on the conditions for and nature of the propagation of electromagnetic waves in hollow metal tubes. Such conductors, on account of their simplicity and small losses, are attractive for telecommunications. It should however be remembered that similar waves can also be propagated along concentric cables of the usual type, provided the wavelength is sufficiently short (cm. range). Although the technique of generating such waves for telecommunication is still in the development stage, the possibility of redesigning normal concentric cables for their efficient propagation is of sufficient importance to justify a more detailed examination of the problem. This has been done by the author, special attention being paid to the conditions under which the principal long waves (hitherto used) are propagated simultaneously with ultra short waves.

From a review of the laws of radiation of a transmitter placed symmetrically inside a hollow concentric conductor, it appears that two types of transmitters are possible.

The first type generates magnetic transverse waves and with one exception, the radiation field of such generation contains the principal wave of the concentric conductor as well as the ultra short wave proper.

The second type generates electric transverse waves. In this case the radiation field never contains a principal wave.

In a final section, the author deals with the wave field in a cavity resonator consisting of a flat cylinder with a central tube. Making use of the expressions obtained above for the concentric cable, analytical expressions are developed for the wave field and conditions of resonance for generators of the magnetic and electric transverse wave type respectively.

Aircraft Industrial Research. (M. Nellas, Aero Digest, Vol. 40, No. 2, Feb., 1942, pp. 201-206, 221-222.) (102/46 U.S.A.)

Contrary to all popular concepts, research today is usually defined as the process of obtaining facts, or the process of obtaining data. Usually it is confined to data that are difficult to obtain and therefore require a special technique and skill.

Once it has been decided that research is the process of obtaining data, the problem of organising and administering a research organisation becomes easier. Basically, there are four main sources of data: from personal in your own organisation; from literature, including patents; from other companies and organisations; and, by planning and conducting experiments in the laboratory. The latter method is usually the most expensive.

The most effective method of covering each subject is to assign one, or at the most two, subjects to one person so that he can concentrate his time and talents. For instance, one engineer may specialise on automatic riveting, another on transparent enclosures, another on fatigue testing, flash welding, etc. When data are needed on one of these subjects, the research engineer can usually provide the answer from his own knowledge or he will know just where to find the data desired in available literature. He knows exactly the state of the art. He knows what is needed in various applications of his special field and is able to evaluate new thoughts and suggestions. He is capable of making tests and experiments to obtain additional data if necessary.

On the other hand, research engineers are not the only essentials for a productive research group. They must be provided adequate tools with which to work, including laboratory equipment, a carefully planned technical library, opportunity to meet and have discussion with others doing the same work, and skilled assistants to carry out details of the work. In order to obtain full effectiveness, research engineers must be properly supervised so that their work will be kept in proper relationship with the work of the company as a whole.

At Lockheed Aircraft Corp. engineering research is conducted in six categories classified under two main headings—Aerodynamic and Structural Research. Because of its important relation to design, Aerodynamic Research has been set apart from the rest of the research organisation, and the chief of this division is directly responsible to the Chief Engineer. The other groups—responsible for Mechanical, Electrical, Structural, Production and Chemical Research—are under the supervision of a Director of Research, who is responsible to the Chief Structures Engineer.

The duties allocated to each of the research groups are:—

MECHANICAL RESEARCH:—Mechanical and hydraulic research on the aircraft, covering such general problems as air conditioning, hydraulic operation of landing gear and control surfaces, pressurisation of cabins, mechanical design of super-charges and similar equipment, and the study of other problems encountered in stratosphere flying. At present this group is the largest of the various research groups.

PRODUCTION RESEARCH:—Production processes such as riveting, spotwelding, sheet metal forming, metal drawing, flash welding, tooling, heat treating, arc and torch welding, casting, etc.

STRUCTURAL RESEARCH:—Strength of materials, joints and other structural components; also research on sound, vibration and flutter. This group conducts static and dynamic tests on the completed aeroplane and conducts many static and dynamic tests on aircraft components.

Electrical Research:—Develops electrical methods of obtaining data, including electrical methods of measuring and recording stresses in structures or machine members, methods of measuring and recording temperatures in many applications, such, for instance, as in the the interior of a spotwelder during the time the current is flowing. This group is also responsible for study of the electrical aspects of welding equipment, induction heat-treating equipment, etc.

Chemical Research:—Cleaning, painting, hydraulic fluids, processing plastics, fuels, etc.

Research engineers by themselves are of limited value. They must have extensive facilities and certain services available before they can function effectively. At Lockheed these facilities and services are under the supervision of a Laboratory Manager.

The problem of supervising research personnel is interesting, and special techniques are required. This is because, first, the personnel are of unusually high calibre; second, the supervisor cannot possibly know as much about individual problems as the individual research personnel; third, research engineers are of necessity honest and logical and deeply resent arbitrary decisions by superiors; and fourth, because of the nature of their work, research engineers have to have more freedom and independence of action.

However, once these facts are recognised, supervision becomes easier. The research engineer's activities can be evaluated by periodic progress reports, by completed reports of his work, and by his notes. All notebooks are arranged so that two carbon copies are made of each page. Carbon copies can be removed at the end of each day and be sent to the supervisors, for information or action. The quality and quantity of work can thereby be quite accurately gauged.

One of the most useful and interesting methods for the executive control of research activities is the process of judicious sampling. It is not necessary that an executive sample the activities of every research engineer every day. However, if he makes frequent random checks on his personnel, he will assure himself he is spending his company's money in the most efficient manner. Incidentally, most of the money spent for industrial research is spent for salaries. Therefore, the efficient use of personnel is of paramount importance.

Aircraft industrial research co-operation is accomplished by several methods. There is direct exchange of technical information by personal contacts and by the exchange of reports. One of the most general means of exchanging information is through participation in meetings and the technical committee work of engineering organisations. Information is also disseminated by technical papers.

Three typical problems which are being considered not only by Lockheed but also by many other companies and individuals, should be mentioned. Considerable progress has been made, but there is still much to be achieved. The typical problems are:—

Blind Rivets:—Although several excellent devices are now commercially available, none as yet have met all the requirements for an ideal fastening that can be inserted and driven from the outside which will fill the hole completely, pull the sheets together automatically, and will be as strong as standard rivets, yet simple in operation, easy to drive, light and inexpensive to manufacture.

Non-Destructive Test for Spot-Welds:—The apparatus must be small so that tests can be made on welds in obscure places, light so it can be readily transported, and inexpensive so it can be available to all who must inspect aircraft structures. It must be able to detect welds which are sub-standard even though they are close together, near the edge of a sheet, near large masses of other metals, covered with paint, or if they are in alloys of various grades and gauges. The development of such a device will be a real contribution to the engineering knowledge which is necessary before spot-welding can be used in many primary structural applications.

REMOTE CONTROL:—Although much has been done with hydraulic and electrical systems, further improvement is desired along the lines of reduced weight, simplicity, reliability, etc. A typical example is the "boost" required for the pilot of a large aeroplane. The ideal solution would be some method by which the pilot's strength is increased many times without any sacrifice in speed of operation or other control qualities of the small aeroplane.

Planning for Production in the Douglas Works. (D. W. Douglas, Aero Digest, Vol. 40, No. 1, Jan., 1942, pp. 132-133, 200-252.) (102/47 U.S.A.)

Planning was begun with thousands of paper models representing machines, jigs and aeroplane assemblies. Department by department, these were placed on huge charts of the plant and arranged in such a manner as to allow materials to stream down the line in the fastest and most efficient manner. Each department was studied individually and as a co-ordinated unit of the whole and its function and equipment analysed in detail, even to the manner and distance an item of material moves from position to position. On the basis of this study, a simplified and efficient routing of production through the departments was drawn up in the form of a flow chart. To meet with this, machinery, tools and jigs were relocated wherever necessary.

Parts from fabricating departments or outside production flow into major assembly departments and emerge as complete sections of wings and fuselages, thus minimising handling, storing and elapsed time. Through timed, straight line flow the number of handlings of parts and sections has been cut nearly in half. Parts which formerly travelled between floors several times now move during fabrication but a few feet in all. Process and assembly operations now are sped by mechanical means. Consolidated aircraft has developed an overhead carrier system for setting up four parallel production lines of long range bombers. The assembly lines for inner wing sections of the Douglas attack bombers are powered with electrical winches, suspended from elevated tracks, the assemblies move past the working position and finally pass directly through the spray booths for painting. A new mobile fuselage assembly line has been introduced which combines the production advantages of the "half shell" construction with the speed of the straight line assembly. In specially designed steel rails, tubular steel jigs move along, each carrying half a fuselage. With four tracks in parallel, two pairs of fuselage halves are simultaneously in each working position. The assembly is no longer set and removed from the jig, but the jig carrying the growing assembly moves down the line. Upon reaching the final position, the sub-assembly is lifted from the jig and travels on special carriers to a lower floor for interior equipment and final junction of the two halves. The various positions are subdivided into six working areas, each with its own crew performing the same task on each assembly. As each worker has only to perform a single task, the training of comparatively unskilled workers is greatly facilitated. Mechanised track assemblies for attack bombers and single fighters alone now extend nearly one mile at the Santa Monica plant and have led to reduction of as much as 50 per cent. in man hours required for certain assembly units.

Among the improved types of machinery used in aircraft production, the following are referred to:—Thread grinders, vertical shapers, hydraulic surface grinders for steel parts, centreless grinder for tubing, tube benders, die sinkers for making metal die from wood models and stretching presses converting sheet metal stock into parts without wrinkling or necessity of heat treatments. Special reference is also made to the Guerin process, making use of rubber pads to act as universal female dies in hydraulic presses. The Guerin process enables the use of semi-skilled workers in sheet metal forming operations formerly requiring high degree of skill and manual precision.

Finally, the great advantage of simplified production illustrations in accelerating output is stressed. These drawings are produced by special artist engineers and (in contradiction to the usual blue prints) are readily understood by the semi-skilled worker.

Maintenance Instruction in the Automotive Industry. (J. W. Lord, J.S.A.E., Vol. 50, No. 4, April, 1942, p. 40.) (102/48 U.S.A.)

The task of developing maintenance instructions is far more than that of developing a maintenance volume. It should reach out and include a complete plan for training mechanics, and keeping them informed. With the aid of able foremen, the operators can train their mechanics. First:—

By going over the job and following the maintenance instruction step by step with the mechanic.

Second:—

Placing the instruction manuals where they will be available to the mechanic for reference when wanted. The instructions should be grease proof so that the mechanic can take it to the job. It is the operator's responsibility to maintain the file.

Visualising the development of a loose-card system of 11 x 17, such files can be kept for ready-reference in the tool room or with mobile repair shop units.

These instructions would consist of plenty of large-size illustrations and drawings. They would call for the correct tools for the job; they would specify permissible wear before replacement; they would specify clearances and fittings; specify cleanliness when re-building, and particularly specify lubrication when re-building. . . . By placing the instructions in the tool room where a man can get them at the same time he calls for the tools to do that particular job, a type of instruction is established which will carry on and perform a valuable service.

Guide Vanes for the Cup Anemometer. (A. Klemin and W. C. Walling, 10th Annual Meeting of the Institute of Aeronautical Sciences, Jan. 28-30, 1942, pp. 1-11.) (102/49 U.S.A.)

The Cup Anemometer whether of the rotating or stationary (spring controlled) type cannot indicate below a certain wind speed on account of the friction torque inherent in the instrument.

If the velocity of the air stream at its point of contact with the anemometer could be increased above its free air value, it is obvious that a normal instrument will register speeds below the usual friction limit and such a device would be much simpler than trying to reduce friction by delicate and expensive design.

The author describes experiments in which a series of guide vanes were arranged radially round the anemometer thus forming the equivalent of a wind driven turbine, the anemometer taking the place of the turbine rotor.

With the optimum arrangement of Vanes (12 vanes at an angle of 15° with tangent to cup trajectory) the stopping speed of a standard Stewart 4 Cup anemometer (11 in. cup circle, $2\frac{1}{2}$ in. cup diameter) could be reduced by about 50 per cent.

List of Subjects for Lilienthal Competition, 1942. (Flugsport, Vol. 34, No. 10, 13/5/42, pp. 149-151.) (102/50 Germany.)

Aerodynamics.

Investigation of pressure distribution on aerofoils at Mach numbers for which the maximum speed at the wing approaches or slightly exceeds the velocity of sound. The methods of calculation are to be applied to high speed wings with rounded nose such as experience has shown to be efficient over this range. Simple rules for the design of such wings are required, and the method should also be capable of being applied to the corresponding pressure distribution on the fuselage. An investigation on the stability of the wing/fuselage combination at such speeds would also be welcome.

Airframe Statics.

Present day knowledge on the stressing of sheet panels in the super critical range is to be extended by theoretical or experimental investigations. The panels are to be mainly under shear, but a pressure load in one or two directions may be superposed. Of special interest are loads exceeding the buckling load by not more than 5 times, the effect of deformation of the panel frame members on the stress distribution being taken into account.

Aero Engines.

I. Present day development of aero engine controls is to be reviewed generally or one or more particular aspects are to be treated in detail. Factors influencing accuracy of control on the one hand and reliability coupled with simplicity of the device on the other are to be critically examined.

II. Present day development of aero engine design is to be reviewed generally or one or more particular aspects are to be treated in detail.

Lines of development for complete power units consisting of engine, airscrew and reduction gear are to be indicated.

Wireless and Equipment.

I. Critical examination of relative advantage of frequency and phase modulation with special reference to aeronautics. Methods of operation both for reception and transmission. Application to directional wireless and other aids to wireless navigation.

II. Vibration characteristic of aircraft as affected by automatic pilot installations. Conditions for critical vibrations and their avoidance by design features either of the aircraft or of the automatic controls.

III. Methods suitable for long distance navigation are to be reviewed and critically compared. Proposals for the improvement of present day methods or suggestions for new methods are to be given.

Armament.

The ballistic, mechanical and physical data characterising the operation of a machine gun are to be collected and their relationship studied. The basic laws determining the functioning of the complete weapon as well as governing the principal phases of operation are to be stated, special attention being given to the amplification of theoretical considerations by experiment where needed. The nature of such experiments is to be indicated.

In addition to the above competition, the Lilienthal Society will award yearly prizes for outstanding performance in aeronautics or engineering.

(1) Advances in Natural Science of importance to Aeronautics (C. Bosch Prize) [theoretical aerodynamics, materials, engines, physiology, etc.].
(2) Height, Speed and Range [E. Udet Prize].
(3) Engine Design [O. Mader Prize].
(4) Instruments and Navigation.
(5) Armament.
(6) Youth Training.
(7) Literature and Fine Arts.

Gas Exchange in the Lungs at High Altitudes. (D. B. Dill and F. G. Hall, J. Aeron. Sci., Vol. 9, No. 6, April, 1942, pp. 220-223.) (102/51 U.S.A.)

Exchange of gases in the lungs of man has been studied at pressure altitudes up to 44,000 ft. while breathing oxygen. There was considerable handicap at 44,000 ft. but four men survived six exposures lasting from 13 to 30 min. without collapse.

Breathing oxygen at 40,000 ft. involves no greater pulmonary ventilation than at ground level, but above that height anoxia leads to deeper breathing. This produces a lower partial pressure of carbon dioxide in the lungs and an associated increase in partial pressure of oxygen and in the affinity of blood for oxygen. It is these adaptive responses that enable man to survive at 44,000 ft. in a state closely resembling that produced by breathing air of ordinary composition at 18,000 ft.

Virtual equilibrium is reached between alveolar air and arterial blood. Diffusion is not a limiting factor in rest, and even in work requiring an oxygen supply of four times the resting level the arterial saturation is well maintained at 40,000 ft.

These phenomena will not surprise physiologists who have studied human respiration at lower altitudes while breathing air. There is nothing novel nor mysterious about human respiration in an atmosphere of pure oxygen at altitudes in the neighbourhood of 40,000 ft.

LIST OF SELECTED TRANSLATIONS.

No. 45.

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 THEORY OF WARFARE.

TRANSLATION NUMBER AND AUTHOR.		TITLE AND JOURNAL.
1453	Vannucci, A.	*Diagram of the Pilot's Field of View.* (Atti di Guidonia, Vol. 19, No. 42, Jan., 1941, pp. 13-20.)
1457	Gabriel, F.	*The Mathematics of Curves of Pursuit (Relative Motion of Fighter with Respect to Attacked Bomber).* (Luftwissen, Vol. 9, No. 1, Jan., 1942, pp. 21-25.)
1461	Verduzio, R.	*Delayed Parachute Drops.* (Revista Aeronautica, Vol. 17, No. 9, Sept., 1941, pp. 507-536.)
1469	Weber, T.	*Aerial Attacks on Tanks.* (Flugwehr und Technik, Vol. 3, No. 11, Nov., 1941, pp. 254-257.)

POWER PLANTS.

1451	Null, von de W. ...	*Drive and Control of Aero Engine Superchargers.* (Z.V.D.I., Vol. 85, No. 51-52 27/12/41, pp. 981-989.)
1456	Kornschild, E. ...	*Steam Power Plants for Aircraft.* (Luftwissen, Vol. 8, No. 12, Dec., 1941, pp. 336-373.)
1460	Roy, M.	*The Internal Combustion Turbine for Aircraft.* (L'Aerotecnica, Vol. 13, No. 1-2, Jan.-Feb., 1933, pp. 58-69.)

PLYWOOD AND STRUCTURE.

1454	Blumrich, S.	*The Design of Shell Structure Made of Plywood.* (L.F.F., Vol. 18, No. 9, 20/9/41, pp. 331-337.)
1466	——	*New Method of Making Glued Repairs on Plywood Wing Covering for Aircraft by Use of a Needle Clamp.* (Luftwissen, Vol. 8, No. 12, Dec., 1941, p. 374.)

SURFACE TREATMENT (LIGHT ALLOYS).

1450	Weigand, H.	*Effect of Surface Treatment on the Strength Properties of Light Alloys.* (Metallwirt, Vol. 20, No. 7, 14/2/41, pp. 165-168.)
1463	Otto, H.	*Surface Protection in Metal Aircraft Production.* (Die Dornier Post, No. 1, Jan.-Feb., 1941, pp. 10-14.)

CORROSION (MG. ALLOYS).

TRANSLATION NUMBER AND AUTHOR.		TITLE AND JOURNAL.
1467	Hitozo, E. ... ... Akira, I.	*A Study of a New Method of Preventing the Corrosion of Electrons of Various Kinds (Report No. 3).* (Nippon Kinzoku Gakkai-Si, Vol. 4, No. 5, May, 1940, pp. 127-135.)
1468	Ichizi, O. ... ... Shigehisa, H.	*The Corrosion-Resisting Alloys of Magnesium containing Manganese.* (Nippon Kinzoku Gakkai-Si, Vol. 4, No. 5, May, 1940, pp. 146-151.)

MATERIALS (TESTING AND INSPECTION).

1452	Entin, S. D.	*Electro-Magnetic Apparatus for Fault Finding and for Determining the Thickness of Non-Magnetic Coatings.* (J. Material Testing, U.S.S.R., Feb., 1941, Vol. 10, No. 12, pp. 126-129.)
1459	Rupprecht	*X-Ray Examination of Magnesium Alloy Castings.* (Luftwissen, Vol. 8, No. 9, Sept., 1941, pp. 283-286.)

WIRELESS.

1448	Vvedensky, B. A. ...	*The Height Gain Factor and Phase Relations of Ultra.* (J. Tech. Phys., U.S.S.R., Vol. 11, No. 1-2, 1941, pp. 37-43.)
1455	Bunimovitch, V. I...	*The Rectangular Resonator Use as Wavemeter for Decimetre and Centimetre Waves.* (J. Tech. Phys., U.S.S.R., Vol. 10, No. 8, 1940, pp. 633-639.)
1462	Grosskopf, J. ... ... Vogt, K.	*The Measurement of the Electric Conductivity of Stratified Ground.* (H.F. Technik, Vol. 58, No. 3, Sept., 1941, pp. 52-57.)

MISCELLANEOUS.

1447	Bock, G.	*Topical Aircraft Problems.* (Luftwissen, Vol. 9, No. 1, Jan., 1942, pp. 6-16.) (Translated by "Flight.")
1449	Ritz, W.	*Theory of the Transverse Oscillations of a Square Plate with Free Edges.* (Ann. der Physik, Vol. 28, 1909, pp. 737-786.)
1464	Numachi, F.	*Measurement of Forces on Slotted Blade Profiles Under Cavitation.* (W.R.H., Vol. 22, No. 20, 15/10/41, pp. 295-299.)

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

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.

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THEORY AND PRACTICE OF WARFARE.

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2	2172	U.S.A.	*Boeing B-17C Flying Fortress.* (Flugsport, Vol. 34, No. 8, 15/4/42, p. 111.)
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* Abstract available.

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6	2182	U.S.A. / G.B.	*British and American Warplanes (Photographs and Performance Data of Representative Types).* (Luftwissen, Vol. 9, No. 3, March, 1942, pp. 82-87.)
7	2186	G.B.	*Aircraft Spotting by Means of Wireless Echoes. (Review of Available Patents.)* (Engineer, Vol. 173, No. 4,503, 1/5/42, pp. 360-361.)
8	2187	G.B.	*Handley Page Halifax (II).* (Engineer, Vol. 173, No. 4,503, 1/5/42, pp. 364-366.)
9	2192	G.B.	*Handley Page Halifax.* (Engineering, Vol. 153, No. 3,981, 1/5/42, pp. 347-348, 350.)
10	2198	U.S.A.	*The Influence of Aircraft on Naval Warfare.* (C. P. Burgess, U.S. Air Services, Vol. 27, No. 2, Feb., 1942, pp. 18-21, 40.)
11	2205	Germany ...	*Automatic Sound Lag Calculation for Acoustical Aircraft Spotters (Addendum to the Author's Article in Z.V.D.I., Vol. 84 (1940), pp. 845-851).* (E. Kutzscher, Z.V.D.I., Vol. 86, No. 15-16, 18/4/42, p. 230.)
12	*2214	France	*Fighter Armament and its Development Prospects.* (C. Rougeron, Inter. Avia., No. 813-814, 25/4/42, pp. 1-5.)
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19	2225	G.B.	*The Cases of the Dive Bomber and Torpedo Bomber.* (Inter. Avia., No. 813-814, 25/4/42, pp. 20-23.)
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21	*2229	Italy	*Warplanes of the Future—II.* (G. Stifani, Inter. Avia., No. 812, 15/4/42, pp. 1-6.)
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29	2245	U.S.A.	*Growth of Fire Power in Navy Planes (II) (Aerial Bombs).* (J. B. Hancock and E. Burton, Aero Digest, Vol. 40, No. 3, March, 1942, pp. 64-65, 312.)
30	2248	U.S.A.	*Douglas C.54 Troop Transport (Photograph of Military Version of D.C. 4).* (Aero Digest, Vol. 40, No. 3, March, 1942, p. 172.)
31	2250	U.S.S.R. ...	*Tactical Requirements of Pursuit Aircraft Design. (R.T.P. Translation No. 1,418.)* (M. P. Stroyev, Aero Digest, Vol. 40, No. 3, March, 1942, pp. 204-206, 311.)
32	2257	U.S.A.	*Manta Long Range Fighter.* (Aero Digest, Vol. 40, No. 3, March, 1942, pp. 248, 312.)
33	2261	U.S.A.	*Aerostructor. A New Type of Ground Instructor Simulates Flight Conditions.* (Aero Digest, Vol. 40, No. 3, March, 1942, p. 342.)
34	2279	U.S.A.	*Troop Carrying Gliders.* (Aero Digest, Vol. 40, No. 1, Jan., 1942, p. 299.)
35	2280	Japan	*The Japanese Air Force.* (C. H. Day, Aero Digest, Vol. 40, No. 1, Jan., 1942, pp. 58-59.)
36	2283	Germany/ U.S.A. ...	*Aircraft Recognition Details (F.W. 190 and Curtiss Mohawk IV).* (Aeroplane, Vol. 62, No. 1,615, 8/5/42, pp. 534-535.)
37	2290	G.B.	*Power Units of the Future.* (J. W. Morrison, Flight, Vol. 41, No. 1,741, 7/5/42, pp. 447-451.)
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40	2822	U.S.A.	*Pyrene G-1 Powder for Extinguishing Mg. Fire.* (Review of Scient. Instruments, Vol. 13, No. 1, Jan., 1942, p. 43.)
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43	2336	G.B.	*Fairey Swordfish.* (Aeroplane, Vol. 62, No. 1,614, 1/5/42, p. 493.)
44	2339	G.B.	*Dive Bombers—A Review of Policy.* (F. C. Sheffield, Flight, Vol. 41, No. 1,740, 30/4/42, pp. 425-429.)
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54	2394	Germany ...	*How the Luftwaffe Functions (Organisation and Control).* (Aeroplane, Vol. 62, No. 1,616, 15/5/42, pp. 554-555.)
55	2395	Japan	*Aeroplanes of Japanese Army and Navy Air Force —I.* (Aeroplane, Vol. 62, No. 1,616, 15/5/42, p. 561.)
56	2414	G.B.	*Air Raid Precaution and the Engineering Industry (Effect of High Explosives of Structures; Design of Protection Structures; Gas Contamination).* (Various authors, J. Inst. Elect. Engs., Vol. 89, Pt. 1, No. 16, April, 1942, pp. 171-174.)
57	2416	Germany ...	*The Signal Corps in the German Luftwaffe.* (E.T.Z., Vol. 63, No. 11-12, 26/3/42, p. 146.)
58	2437	U.S.A.	*Curtiss P. 40 Series "Warhawk" Fighter (Photograph).* (Flight, Vol. 41, No. 1,742, 14/5/42, pp. 468, 474.)
59	2438	U.S.S.R. ...	*Russian Medium Bomber SB. 3 (Photograph).* (Flight, Vol. 41, No. 1,742, 14/5/42, p. 471.)
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62	2442	U.S.A.	*Vought Sikorsky V.S. 44A "Excalibur."* (H. W. Perry, Flight, Vol. 41, No. 1,742, 14/5/42, pp. 479-480.)
63	2443	Germany ...	*Dornier Do. 18 (Photograph).* (Flight, Vol. 41, No. 1,742, 14/5/42, p. 493.)
64	2447	U.S.A.	*Vought Sikorsky "Excalibur" (Photograph).* (U.S. Air Services, Vol. 27, No. 3, March, 1942, p. 12.)
65	2458	G.B.	*New R.A.F. Type (Boulton Paul Defiant and Westland Whirlwind).* (Airc. Eng., Vol. 14, No. 158, April, 1942, pp. 97-103.)
66	2463	U.S.A.	*North American N.A. 40-B. 25 Bomber (Photograph).* (Airc. Eng., Vol. 14, No. 158, April, 1942, p. 115.)
67	2471	Germany ...	*Blacking Out of Converter Chimneys Combined with Dust Recovery (Pat. 712,494).* (Krupp, Stahl und Eisen, Vol. 62, No. 12, 19/3/42, p. 253.)
68	2474	U.S.A.	*Consolidated B. 24 (Liberator).* (R. H. Fleet, Aviation, Vol. 41, No. 1, Jan., 1942, pp. 66-69, 222-228.)

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69	2475	Germany ...	*Tail Structure of Me.* 110. (Aviation, Vol. 41, No. 1, Jan., 1942, p. 101.)
70	2485	Germany ...	*Parallel Link Motion for Aircraft Gun Mounting (Pat. No.* 718,997). (Arado, Flugsport, Vol. 34, No. 9 (Pat. Coll. No. 28), 29/4/42, pp. 113-114.)
71	2492	Germany ...	*F.W.* 190 *Fighter (Designed by Dip. Eng. Tank).* (Flugsport, Vol. 34, No. 9, 29/4/42, p. 127.)
72	2497	Germany ...	*Installation of Cannon and Machine Guns on Inverted V Engine (Pat. No.* 719,217). (Argus, Flugsport, Vol. 34, No. 9 (Pat. Coll. No. 28), 29/4/42, p. 113.)
73	2500	U.S.A.	*Military Uses of Light Aeroplanes.* (I. H. Taylor, Aero Digest, Vol. 40, No. 4, April, 1942, pp. 96-100.)
74	2505	U.S.A.	*Boeing B-17E Heavy Bomber.* (Aero Digest, Vol. 40, No. 4, April, 1942, p. 138.)
75	2506	U.S.A.	*Fire Power of Allied Planes.* (J. I. Waddington, Aero Digest, Vol. 40, No. 4, April, 1942, pp. 142-143, 154.)
76	2522	U.S.A.	*Military Aeroplanes of the Future.* (Aero Digest, Vol. 40, No. 2, Feb., 1942, pp. 52-56.)
77	2524	U.S.A.	*Growth of Fire Power in Navy Planes.* (J. B. Hancock and E. Burton, Aero Digest, Vol. 40, No. 2, Feb., 1942, pp. 70-71, 271-272.)
78	2526	U.S.A.	*Boeing B. 17E Flying Fortress (Photograph).* (Aero Digest, Vol. 40, No. 2, Feb., 1942, p. 102.)
79	2542	U.S.A.	*Magnesium Fire Extinguisher.* (Aero Digest, Vol. 40, No. 2, Feb., 1942, p. 210.)
80	2545	G.B.	*Handley Page Halifax II (Photograph).* (Aeroplane, Vol. 62, No. 1,617, 22/5/42, p. 575.)
81	2546	Germany ...	*Focke Wulf F.W.* 190 *(Action Photographs).* (Aeroplane, Vol. 62, No. 1,677, 22/5/42, p. 576.)
82	2547	Germany ...	*Focke Wulf F.W.* 189 *(Photograph).* (Aeroplane, Vol. 62, No. 1,617, 22/5/42, p. 577.)
83	2548	Japan	*Aeroplanes of the Japanese Army and Navy Air Forces—II.* (Aeroplane, Vol. 62, No. 1,617, 22/5/42, p. 589.)
84	2549	U.S.A./ Germany ...	*Aircraft Recognition—North American B. 25C (Mitchell) and Dornier Do.* 217 *E1.* (Aeroplane, Vol. 62, No. 1,617, 22/5/42, p. 591.)
85	2563	U.S.A.	*Curtiss Warhawk (Photograph).* (Flight, Vol. 41, No. 1,744, 28/5/42, p. 525.)
86	2564	G.B.	*Air Support in Battle.* (Flight, Vol. 41, No. 1,744, 28/5/42, pp. 527-528.)
87	2565	G.B.	*Trans-African Air Services.* (Flight, Vol. 41, No. 1,744, 28/5/42, p. 530.)
88	2566	G.B.	*The Carthom Ground Trainer.* (Flight, Vol. 41, No. 1,744, 28/5/42, pp. a-b.)
89	2567	U.S.A.	*Lockheed Electra (Identification Details).* (Flight, Vol. 41, No. 1,744, 28/5/42, p. 541.)
90	2568	France ...	*Potez 63 (Identification Details).* (Flight, Vol. 41, No. 1,744, 28/5/42, p. 541.)
91	2569	Germany/ Japan ...	*Berlin-Tokio Air Link.* (Flight, Vol. 41, No. 1,744, 28/5/42, p. 543.)

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92	2570	U.S.A.	*Douglas Devastator (Photograph).* (Flight, Vol. 41, No. 1,744, 28/5/42, p. 523.)
93	2571	U.S.S.R. ...	*Wooden Containers for Dropping Supplies by Parachute.* (Flight, Vol. 41, No. 1,744, 28/5/42, p. 524.)
94	2572	Germany ...	*Do. 217.* (Flight, Vol. 41, No. 1,744, 28/5/42, p. 532.)
95	2573	Germany ...	*German Underground Factories.* (Flight, Vol. 41, No. 1,744, 28/5/42, p. 532.)
96	2574	U.S.S.R. ...	*Russian P.E. 2 Twin-Engined Medium Bomber (Photograph).* (Flight, Vol. 41, No. 1,744, 28/5/42, p. 533.)
97	2575	Germany ...	*Hot Air Muff for Hs. 126 (Photograph).* (Flight, Vol. 41, No. 1,744, 28/5/42, p. 535.)
98	2576	Germany ...	*Blohm and Voss B.V. 141 (Off-set Motor and Nacelle).* (Aeroplane, Vol. 62, No. 1,618, 29/5/42, p. 598.)
99	2577	U.S.A.	*Lockheed Vega Ventura (Photograph).* (Aeroplane, Vol. 62, No. 1,618, 29/5/42, p. 599.)
100	2578	U.S.A.	*Curtiss P. 40F Warhawk (Photograph).* (Aeroplane, Vol. 62, No. 1,618, 29/5/42, p. 601.)
101	2579	U.S.A.	*North American B-25C Mitchell III Bomber (Photograph).* (Aeroplane, Vol. 62, No. 1,618, 29/5/42, p. 602.)
102	2580	Germany ...	*Do. 24 (Photograph).* (Aeroplane, Vol. 62, No. 1,618, 29/5/42, p. 604.)
103	2581	G.B.	*Hurricane IIc (Photograph).* (Aeroplane, Vol. 62, No. 1,618, 29/5/42, p. 604a.)
104	2582	Germany ...	*Strength and Disposition of the Luftwaffe.* (Aeroplane, Vol. 62, No. 1,618, 29/5/42, pp. 606-609.)
105	2583	Germany ...	*Do. 217 E2 (Photograph).* (Aeroplane, Vol. 62, No. 1,618, 29/5/42, p. 607.)
106	2584	G.B.	*The R.A.F. and Dive Bombers.* (Aeroplane, Vol. 62, No. 1,618, 29/5/42, pp. 610-612.)
107	2585	U.S.S.R. ...	*Russian Stormovik Low Attack Bomber (Photograph).* (Aeroplane, Vol. 62, No. 1,618, 29/5/42, p. 612.)
108	2586	G.B.	*Handley Page Halifax.* (Aeroplane, Vol. 62, No. 1,618, 29/5/42, pp. 613 and 618.)
109	2587	U.S.A.	*Brewster SB2A-1 Buccaneer Dive Bomber (Photograph).* (Aeroplane, Vol. 62, No. 1,618, 29/5/42, p. 612.)
110	2588	Japan	*Aeroplanes of the Japanese Army and Navy Air Force—III.* (Aeroplane, Vol. 62, No. 1,618, 29/5/42, p. 619.)
111	2592	Sweden ...	*Swedish Life Saving Raft.* (Engineer, Vol. 173, No. 4,507, 29/5/42, p. 449.)
112	2593	G.B.	*The Air Umbrella.* (Engineer, Vol. 173, No. 4,507, 29/5/42, pp. 450-451.)
113	2595	U.S.A.	*Curtiss Warhawk Fighter.* (Engineer, Vol. 173, No. 4,507, 29/5/42, p. 458.)
114	2602	G.B.	*Light Dimming Equipment for A.R.P. Signalling.* (Engineering, Vol. 153, No. 3,984, 22/5/42, p. 406.)

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115	2607	Germany ...	*F.W.* 190 (*Photographs*). (Flugsport, Vol. 34, No. 10, 13/5/42, pp. 143-144.)
116	2608	Germany ...	*Do.* 217. (Flugsport, Vol. 34, No. 10, 13/5/42, pp. 144-145.)
117	2642	Switzerland ...	*American, German and British Opinions on Japanese Aeronautics.* (Inter. Avia., No. 816-817, 13/5/42, pp. 1-9.)
118	2643	Germany ...	*Dornier Do.* 217 (*Photograph*). (Inter. Avia., No. 816-817, 13/5/42, p. II.)
119	2645	U.S.A.	*Vought Sikorsky V.S.* 44 (*Photograph*). (Inter. Avia., No. 816-817, 13/5/42, p. II.)
120	2647	U.S.A.	*Blohm and Voss B.V.* 141 (*Unsymmetrical Design*). (Inter. Avia., No. 816-817, 13/5/42, pp. 14-15.)
121	2649	G.B.	*Handley Page Halifax.* (Inter. Avia., No. 816-817, 13/5/42, pp. 20-21.)
122	2650	G.B.	*Avro Lancaster.* (Inter. Avia., No. 816-817, 13/5/42, p. 21.)
123	2651	Switzerland ...	*Some Remarks on the Dufrenois-Lhaste Method of Determining the Ballistic Air Density (Trajectory Calculations).* (O. Kihm and R. Sanger, Schweizer Archiv. fur Ang. Wiss. and Technik, Vol. 7, No. 5, May, 1941, pp. 121-129.)
124	2656	Germany ...	*Ju.* 88 *Level and Dive Bomber.* (Inter. Avia., No. 815, 4/5/42, pp. 7-8.)
125	2658	Germany ...	*Do.* 217 (*Level and Dive Bomber*). (Inter. Avia., No. 815, 4/5/42, pp. 9-10.)
126	2659	U.S.A.	*North American Bombers N.A.* 40 *B and C* (*B*-25 *B and C*). (Inter. Avia., No. 815, 4/5/42, pp. 10-11.)
127	2660	U.S.A.	*Military Inventions in the U.S.A.* (Inter. Avia., No. 815, 4/5/42, p. 11.)
128	2661	U.S.A.	*Lockheed L*49 "*Constellation.*" (Inter. Avia., No. 815, 4/5/42, p. 12.)
129	2662	U.S.A.	*Lockheed Hudson (American and British Models).* (Inter. Avia., No. 815, 4/5/42, p. 12.)
130	2663	U.S.A.	*Douglas DB.* 7 (*Boston and Havoc*). (Inter. Avia., No. 815, 4/5/42, pp. 12-13.)
131	2666	U.S.A.	*U.S.A. Navy Blimps.* (Inter. Avia., No. 815, 4/5/42, p. 19.)
132	2667	Germany ...	*German Air Defences.* (Inter. Avia., No. 815, 4/5/42, pp. 21-22.)
133	2678	Germany ...	*Dornier* 217 (*Photograph*). (Flight, Vol. 41, No. 1,743, 21/5/42, p. 499.)
134	2679	U.S.A.	*Commentary on American Aircraft in Active Service.* (G. Geoffrey Smith, Flight, Vol. 41, No. 1,743, 21/5/42, pp. 501-507.)
135	2681	Germany ...	*Junkers Ju.* 88 (*Photograph*). (Flight, Vol. 41, No. 1,743, 4/5/42, p. 508.)
136	2782	G.B.	*The Avro "Manchester" Heavy Bomber.* (Engineer, Vol. 173, No. 4,508, 5/6/42, p. 474.)

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137	2735	Germany ...	*Winter Operation of the Air Force in Russia (Photograph).* (Luftwissen, Vol. 9, No. 2, Feb., 1942, pp. 33-36.)
138	2737	Japan	*Japan's Air Arm.* (Luftwissen, Vol. 9, No. 2, Feb., 1942, pp. 42-43.)
139	2739	Germany ...	*German Views on the British Spitfire.* (T. Kranzle, Luftwissen, Vol. 9, No. 2, Feb., 1942, pp. 48-55.)
140	2740	G.B.	*The Undercarriage of the Spitfire.* (H. Schrode, Luftwissen, Vol. 9, No. 2, Feb., 1942, pp. 56-58.)

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141	2197	G.B.	*Roughened Hull Surface (Tank Tests).* (R. W. L. Gawn, Engineering, Vol. 153, No. 3,982, 8/5/42, pp. 378-379.)
143	2267	U.S.A.	*"The Galcit" (Guggenheim Aeronautical Laboratory, California Inst. of Technology).* (C. B. Millikan and E. W. Robischon, Aero Digest, Vol. 40, No. 1, Jan., 1942, pp. 146-150, 312-313.)
144	2409	Germany ...	*Laminar Boundary Layers—Critical Review of Literature. Part I. Basis of Boundary Layer Theory (43 References).* (H. Schmidt and K. Schroder, Z.F.F., Vol. 19, No. 3, 26/4/42, pp. 65-97.) (R.T.P. Translation No. 1,511.)
145	2430	G.B.	*Flow of Liquids in the Critical Region (Laminar Turbulence).* (A. H. Nissau, Nature, Vol. 149, No. 3,783, 2/5/42, pp. 501-502.)
146	2543	U.S.A.	*Variable Speed Drive Wright Field Wind Tunnel.* (A. M. Dickey and others, Aero Digest, Vol. 40, No. 2, Feb., 1942, pp. 212, 216-218.)
147	2551	G.B.	*Audible Wing Tip Vortices.* (Aeroplane, Vol. 62, No. 1,617, 22/5/42, p. 596.)
148	2557	Italy	*The Scientific Work of N. E. Joukowsky.* (L'Aerotecnica, Vol. 21, No. 7-8, July-Aug., 1941, pp. 477-482.)
149	2589	U.S.A.	*New Model Basins for U.S. Navy (II).* (Engineer, Vol. 173, No. 4,507, 29/5/42, pp. 441-442.)
150	2604	G.B.	*Roughened Hull Surface (Effect on Ship Propulsion).* (R. L. Gawn, Engineering, Vol. 153, No. 3,984, 22/5/42, pp. 417-418.)
151	2682	G.B.	*Vapour Trail Phenomena.* (Various authors, Flight, Vol. 41, No. 1,743, 21/5/42, p. 516.)
152	2684	Germany ...	*A New Linearisation of the Fundamental Equation of Two-Dimensional Adiabatic Compressible Potential Flow.* (H. Behrbohm and M. Pinl, Z.A.M.M., Vol. 21, No. 4, Aug., 1941, pp. 193-203.)
153	2685	Germany ...	*On the Stability of Laminar Flow in a Straight Pipe of Circular Cross Section.* (J. Pretsch, Z.A.M.M., Vol. 21, No. 4, Aug., 1941, pp. 204-217.)
154	2691	Germany ...	*The Instability of Laminar Boundary Layers on Concave Walls Towards Certain Three-Dimensional Disturbances.* (H. Gortler, Z.A.M.M., Vol. 21, No. 4, Aug., 1941, pp. 250-252.)

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155	2693	Germany ...	*Effect of Wind Tunnel Boundaries on the Resistance, with Special Reference to Compressibility Effect.* (C. Wieselsberger, L.F.F., Vol. 19, No. 4, 6/5/42, pp. 124-138.)
156	2694	Germany ...	*Velocity Profiles in the Neighbourhood of a Wall of Discontinuous Curvature.* (A. Betz, L.F.F., Vol. 19, No. 4, 6/5/42, pp. 129-131.)
157	2695	Germany ...	*The Effect of the Density Gradient of the Atmosphere on the Longitudinal Motion of an Aircraft.* (F. N. Scheubel, L.F.F., Vol. 19, No. 4, 6/5/42, pp. 132-136.)
158	2696	Germany ...	*Supersonic Conical Flow with Axial Symmetry.* (A. Busemann, L.F.F., Vol. 19, No. 4, 6/5/42, pp. 137-144.)
159	2697	Germany ...	*Vortex Theorem of Steady Iso-energetic Gas Flow.* (W. Tollmien, L.F.F., Vol. 19, No. 4, 6/5/42, pp. 145-147.)
160	2698	Germany ...	*Supersonic Flow Around Projectile Heads of Arbitrary Shape at Small Incidence.* (R. Saner, L.F.F., Vol. 19, No. 4, 6/5/42, pp. 148-152.)
161	2700	Germany ...	*On the Flow Resistance of the Heated Flat Plate.* (W. Linke, L.F.F., Vol. 19, No. 4, 6/5/42, pp. 157-160.)
162	2744	Germany ...	*Researches on the Effect of the Wake on the Forces Acting on a Ship's Hull.* (Z.V.D.I., Vol. 85, No. 26, 28/6/41, p. 580.)
163	2745	Germany ...	*Heat Transfer in Turbulent Flow.* (E. Eckert, Z.V.D.I., Vol. 85, No. 26, 28/6/41, pp. 581-583.)
164	*2757	U.S.A.	*Effect of Variable Viscosity on Boundary Layers with a Discussion of Drag Measurements.* (J. G. Brainerd and H. W. Emmons, J. App. Mechanics, Vol. 9, No. 1, March, 1942, pp. 1-6.)
			AIRCRAFT AND AIRSCREWS.
165	2162	G.B.	*Aerodrome Abstracts Compiled by D.S.I.R. (Road Research Laboratory), Abstract Nos.* 40-63. (Vol. 1, No. 3, 1942.)
166	2174	Germany ...	*List of Holders of High Performance Gliding Certificates (No.* 1,693-1,869). (Flugsport, Vol. 34, No. 8, 15/4/42.)
167	2175	Germany ...	*Flap Fitted with Suction Slots (Pat. No.* 718,658). (A.V.A. (Goettingen), Pat. Coll. No. 27, Flugsport, Vol. 34, No. 8, 15/4/42, p. 109.)
168	2176	Germany ...	*Twin-buckle with Automatic Tension Regulator (Pat. No.* 718,109). (Heinkel, Pat. Coll. No. 27, Flugsport, Vol. 34, No. 8, 15/4/42, p. 110.)
169	2178	Germany ...	*Aircraft Skis (Pat. No.* 717,141). (Heine, Pat. Coll. No. 27, Flugsport, Vol. 34, No. 8, 15/4/42, pp. 110-111.)
170	2181	Germany ...	*The Hamilton Carbon Resistance Method for Stress Determinations and its Application to Airscrew Vibration Measurements.* (R. Schmidt and H. Klein, Luftwissen, Vol. 9, No. 3, March, 1942, pp. 75-81.)
171	2206	Germany ...	*Esher-Wyss Three-Blade V.P. Airscrew.* (Z.V.D.I., Vol. 86, No. 15-16, 18/4/42, pp. 249-250.)

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172	*2221	Germany ...	*Junkers Freezing Protection for Airscrew Hubs.* (Inter. Avia., No. 813-814, 25/4/42, p. 11.)
173	2234	France ...	*S.E. 200 French 66 Ton Flying Boat* (*Le.* 0.49). (Inter. Avia., No. 812, 15/4/42, p. 13.)
174	2235	France ...	*Latécoère 631 Giant Flying Boat.* (Inter. Avia., No. 812, 15/4/42, pp. 13-14.)
175	2249	U.S.A.	*Curtiss Wright Tell-Tale Panel* (*Quick Check on 47 Details of Control*). (Aero Digest, Vol. 40, No. 3, March, 1942, pp. 235-238, 311.)
176	2251	U.S.A.	*Controllable Pitch Propellers for Light Aeroplanes.* (W. E. Burnham, Aero Digest, Vol. 40, No. 3, March, 1942, pp. 224-228.)
177	2254	U.S.A.	*Aircraft Speed and Engine Characteristics.* (W. Stepniewski, Aero Digest, Vol. 40, No. 3, March, 1942, pp. 214-215, 312-313.)
178	2264	U.S.A.	*Northrop Flying Wing* (*Photograph*). (Aero Digest, Vol. 40, No. 1, Jan., 1942, p. 104.)
179	2265	U.S.A.	*Hydraulic System Installations, Part 3* (*Control and Actuating Circuits*). (J. E. Thompson and R. B. Campbell, Aero Digest, Vol. 40, No. 1, Jan., 1942, pp. 136-145, 248.)
180	2273	U.S.A.	*Five Years in Retrospect.* (J. B. MacDonald, Aero Digest, Vol. 40, No. 1, Jan., 1942, pp. 242-252.)
181	2272	U.S.A.	*Welding in Construction and Maintenance of Aircraft.* (A. K. Seemann, Aero Digest, Vol. 40, No. 1, Jan., 1942, pp. 187-195.)
182	2298	Germany ...	*Testing and Evaluation of Brake Linings.* (W. Buckle and J. Busch, A.T.Z., Vol. 45, No. 5, 10/3/42, pp. 119-128.)
183	2337	G.B.	*Seadromes.* (C. G. Grey, Aeroplane, Vol. 62, No. 1,614, 1/5/42, pp. 494-495.)
184	2367	France ...	*Ratier and Chauvière V.P. Airscrews.* (Der Flieger, Vol. 20, No. 9, Sept., 1941, pp. 299-301.)
185	2373	France ...	*French V.P. Airscrews* (*Levasseur, Messier, Levand, Gnome-Rhone, Gaba*). (Der Flieger, Vol. 21, No. 2, Feb., 1942, pp. 45-47.)
186	2375	Germany ...	*Permissible Tolerance in Wing Dimensions* (*from the Junkers Journal*). (Der Flieger, Vol. 21, No. 2, Feb., 1942, p. 50.)
187	2376	Italy	*Flying Boat Take-off Assisted by Water Propeller* (*Italian Aircraft, p. 7*). (Der Flieger, Vol. 21, No. 2, Feb., 1942, p. 50.)
188	2385	Germany ...	*Overcoming Freezing Hazard of Compressed Air Braking Systems.* (A.T.Z., Vol. 44, No. 4, 25/2/41, pp. 97-98.)
189	2410	Germany ...	*Minimum Pull-out Altitude of an Aircraft.* (H. Behrbohm, L.F.F., Vol. 19, No. 3, 26/4/42, pp. 98-101.)
190	2441	France ...	*The Antoinette Monoplane of 1911.* (Flight, Vol. 41, No. 1,742, 14/5/42, pp. 476-477.)
191	2445	G.B.	*Ground Flying* (*Review of Devices for Developing Sense of Balance and Gaining Familiarity with Aircraft Controls*). (N. Nicholas, Flight, Vol. 41, No. 1,742, 14/5/42, pp. 487-488.)

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192	2446	U.S.A. ...	...	*Aeroplanes of the Future.* (U.S. Air Services, Vol. 27, No. 3, March, 1942, pp. 10-11, 40.)
193	2448	U.S.A. ...	...	*Boeing "Pacific Clipper" (Photograph).* (U.S. Air Services, Vol. 27, No. 3, March, 1942, p. 28.)
194	2453	G.B. ...	...	*Fluctuations and Surges in Aircraft Hydraulic Systems.* (F. Postlethwaite, Engineering, Vol. 153, No. 3,983, 15/5/42, pp. 381-382.)
195	2460	G.B. ...	...	*Remote Controls for Aeroplanes.* (R. Hadekel, Airc. Eng., Vol. 14, No. 158, April, 1942, pp. 106-107.)
196	2472	U.S.A. ...	...	*Vought Sikorsky V.S. 44A Flying Boat.* (C. Macauley, Aviation, Vol. 41, No. 1, Jan., 1942, pp. 60-63, 192-194.)
197	2473	U.S.A. ...	...	*Aircraft Hydraulic Pumps.* (H. J. Marx and E. M. Greer, Aviation, Vol. 41, No. 1, Jan., 1942, pp. 96-97, 214-220.)
198	2478	U.S.A. ...	...	*Wood Plastic Aeroplane Parts.* (C. L. Bates, Aviation, Vol. 41, No. 1, Jan., 1942, pp. 82-83, 182.)
199	2482	U.S.A. ...	...	*Helicopters of To-morrow.* (I. Sikorsky, Aviation, Vol. 41, No. 1, Jan., 1942, p. 90.)
200	2484	U.S.A. ...	...	*Auto-Towed Glider on 7,000 ft. Tow-Line.* (Aviation, Vol. 41, No. 1, Jan., 1942, p. 178.)
201	2486	Germany	...	*Spring Support for Tail Wheel or Skid.* (V.D.M., Flugsport, Vol. 34, No. 9 (Pat. Coll. No. 28), 29/4/42, p. 114.)
202	2487	Germany	...	*Undercarriage Retracting with Engine Nacelle.* (Messerschmitt, Flugsport, Vol. 34, No. 9, (Pat. Coll. No. 28), 29/4/42, p. 115.)
203	2488	Germany	...	*Linked Twin Tail Wheels for Aircraft (Pat. No.* 719,407). (Messerschmitt, Flugsport, Vol. 34, No. 9 (Pat. Coll. No. 28), 29/4/42, p. 114.)
204	2489	Germany	...	*Arrangement for Counteracting Twisting Aircraft Spring Legs (Pat. No.* 719,408). (V.D.M., Flugsport, Vol. 34, No. 9 (Pat. Coll. No. 28), 29/4/42, p. 114.)
205	2490	Germany	...	*Locking Devices for Hydraulically Operated Controls (Pat. Nos.* 719,409, 719,410 *and* 719,411). (Junkers, Flugsport, Vol. 34, No. 9 (Pat. Coll. No. 28), 29/4/42, pp. 115-116.)
206	2491	Germany	...	*Wheel Brakes Capable of being Operated from Two Different Positions (Pat. No.* 717,018). (Elektron, Flugsport, Vol. 34, No. 9 (Pat. Coll. No. 28), 29/4/42, p. 116.)
207	2494	Germany	...	*Chamfering Tool for Wing Cover Plates (Junkers).* (Flugsport, Vol. 34, No. 9, 29/4/42, pp. 131-132.)
208	2495	Germany	...	*Icing Indicator (Difference in Dynamic Pressure as Hole Ices up) (Swiss Patent* 213,362). (Flugsport, Vol. 34, No. 9, 29/4/42, p. 132.)
209	2496	Germany	...	*Increasing Longitudinal Stability by Making Tail Plane Unsymmetrical with Regard to Slipstream (Pat. No.* 719,428). (Blohm and Voss, Flugsport, Vol. 34, No. 9 (Pat. Coll. No. 28), 29/4/42, p. 113.)

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210	2501	U.S.A.	*Engineering Problems in Air Cargo Transportation.* (R. D. Kelly and W. W. Davies, Aero Digest, Vol. 40, No. 4, April, 1942, pp. 110, 159-168.)
211	2502	U.S.A.	*Design and Materials for Hydraulic Packings.* (J. N. Smith, Aero Digest, Vol. 40, No. 4, April, 1942, pp. 119-122.)
212	2504	U.S.A.	*Crash Proof Fuel Tanks.* (J. W. Baird, Aero Digest, Vol. 40, No. 4, April, 1942, pp. 130-136, 154.)
213	2532	U.S.A.	*The Live Line Hydraulic Circuit.* (E. C. Breing, Aero Digest, Vol. 40, No. 2, Feb., 1942, pp. 159-160 and 222.)
214	2533	U.S.A.	*Electrical Power in Aircraft.* (G. W. Ledbetter, Aero Digest, Vol. 40, No. 2, Feb., 1942, pp. 163-170.)
215	2539	U.S.A.	*Anti-Icing Systems.* (H. C. Webb, Aero Digest, Vol. 40, No. 2, Feb., 1942, pp. 193-198.)
216	*2540	U.S.A.	*Aircraft Industrial Research.* (M. Nellas, Aero Digest, Vol. 40, No. 2, Feb., 1942, pp. 201-206, 221-222.)
217	2550	France ...	*Potez 161 Transatlantic Flying Boat.* (Aeroplane, Vol. 62, No. 1,617, 22/5/42, p. 593.)
218	2603	G.B.	*Servicing and Maintenance of Civil Aircraft.* (Engineering, Vol. 153, No. 3,984, 22/5/42, p. 410.)
219	2606	Germany ...	*Sailplane Mu. 17 fitted with Snow Skis.* (Flugsport, Vol. 34, No. 10, 13/5/42, pp. 141-143.)
220	2609	Germany ...	*Auto Gyro Jumping Start.* (Flugsport, Vol. 34, No. 10, 13/5/42, pp. 145-148.)
221	2612	Germany ...	*Laminated Wood Airscrew Blades (Pat. No. 719,045).* (Schwarz, Flugsport, Vol. 34, No. 10, 13/5/42 (Pat. Coll. No. 29), p. 117.)
222	2613	Germany ...	*Variable Pitch Airscrew with Three Automatic Blade Positions (Pat. No. 718,541).* (D.V.L., Flugsport, Vol. 34, No. 10, 13/5/42 (Pat. Coll. No. 29), pp. 117-118.)
223	2622	U.S.A.	*Notes on Aircraft Icing and its Prevention (Digest).* (W. H. Hunter, S.A.E.J., Vol. 50, No. 4, April, 1942, p. 35.)
224	*2623	U.S.A.	*The Growth and Development of Aircraft Hydraulic System and Equipment (Digest).* (H. J. Marx, S.A.E.J., Vol. 50, No. 4, April, 1942, p. 35.)
225	*2624	U.S.A.	*The Development of Impact Resisting Wind Shields.* (A. L. Morse, S.A.E.J., Vol. 50, No. 4, April, 1942, pp. 35-36.)
226	*2625	U.S.A.	*Engineering Problems Associated with Air Cargo Transportations (Digest).* (R. D. Kelly and W. W. Davies, S.A.E.J., Vol. 50, No. 4, April, 1942, pp. 36-37.)
227	*2626	U.S.A.	*Fuel Consumption from the Air Lines Viewpoint.* (M. G. Beard, S.A.E.J., Vol. 50, No. 4, April, 1942, pp. 37-38.)

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228	*2627	U.S.A.	*Crash Proof Fuel Tanks.* (T. W. Baird, S.A.E.J., Vol. 50, No. 4, April, 1942, p. 38.)
229	2635	Germany ...	*Arrangements of Power Plant on Multi-Engined Aircraft with Offset Fuselage (Pat. No.* 719,412). (Blohm and Voss, Flugsport, Vol. 34, No. 10, 13/5/42 (Pat. Coll. No. 29), p. 118.)
230	2636	Germany ...	*Wall Seal for Electric Cables Passing Through Pressure Cabin (Pat. No.* 697,408). (Henschel, Flugsport, Vol. 34, No. 10, 13/5/42, p. 118.) (Pat. Coll. No. 29.)
231	2637	Germany ...	*Device for Maintaining Equality of Fluid Level in Inter-connected Tanks (Pat. No.* 718,731). (Henschel, Flugsport, Vol. 34, No. 10, 13/5/42 (Pat. Coll. No. 29), pp. 118-119.)
232	2640	Germany ...	*Interconnection of Pitot Position on Wing with Flap Operation (Pat. No.* 719,487). (Flugsport, Vol. 34, No. 10, 13/5/42 (Pat. Coll. No. 29), p. 120.)
233	2644	France ...	*V.G.* 50 *Twin-Engined High Speed Aeroplane.* (Inter. Avia., No. 816-817, 13/5/42, pp. 12-13.)
234	2646	France ...	*New Breguet Types and Projects (Breguet* 500 *and* 730, *Gas Turbines, etc.).* (Inter. Avia., No. 816-817, 13/5/42, p. 13.)
235	2664	France ...	*S.E.* 200 *Giant Flying Boat.* (Inter. Avia., No. 815, 4/5/42, p. 13.)
236	2668	France ...	*French Gliding Records.* (Inter. Avia., No. 815, 4/5/42, p. 26.)
237	*2677	Italy	*The Stressing of Geodetic Aircraft Structures.* (S. Santangelo, L'Aerotecnica, Vol. 20, No. 6, June, 1940, pp. 455-456.) (Digest.)
238	2680	U.S.A.	*Sikorsky V.S.* 300 *Helicopter (Photograph).* (Flight, Vol. 41, No. 1,743, 21/5/42, p. 500.)
239	2683	G.B.	*Asymmetrical Aircraft.* (Flight, Vol. 41, No. 1,743, 21/5/42, p. 517.)
240	2701	Switzerland ...	*Escher Wyss V.P. Propeller for Large Range of Adjustment (Marine and Air).* (C. Keller, Escher Wyss Mitteilungen, No. 13, 1940, pp. 2-10.)
241	2702	Switzerland ...	*Dynamic Balancing of Aircraft Propellers.* (E. Kronauer, Escher Wyss Metteilungen, No. 13, 1940, pp. 11-14.)
242	2704	Switzerland ...	*Propeller Blade Shaping Machines.* (W. Heer, Escher Wyss Mitteilungen, No. 13, 1940, pp. 20-23.)
243	2706	Switzerland ...	*Escher Wyss V.P. Propeller for Ships.* (H. Obrist, Escher Wyss Mitteilungen, No. 13, 1940, pp. 28-31.)
244	2707	Switzerland ...	*Control Devices for Adjustable Pitch Propeller Pumps.* (H. Obrist, Escher Wyss Mitteilungen, No. 13, 1940, pp. 47-49.)
245	*2752	U.S.A.	*Load Factors Obtained on Civil Aeroplanes in Aerobatic Manœuvres.* (E. I. Ryder, J. Aeron. Sci., Vol. 9, No. 6, April, 1942, pp. 195-201.)

ENGINES AND ACCESSORIES.

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
246	2170	Germany ...	*Examples of Damage to Power Plants Due to Corrosion (Refers Mainly to Steam Turbines) (with Discussion).* (F. Barsig, Stahl und Eisen, Vol. 62, No. 9, 26/2/42, pp. 174-182.)
247	2203	Germany ...	*Theoretical Determination of the Stage Efficiency of Steam Turbines.* (H. Melan, Z.V.D.I., Vol. 86, No. 15-16, 18/4/42, pp. 228-229.)
248	2204	Germany ...	*Novel Protection for the Sliding Surface of Pistons.* (E. Meyer Rassier, Z.V.D.I., Vol. 86, No. 15-16, 18/4/42, pp. 245-247.)
249	*2217	U.S.A.	*Intake Air Filters.* (Inter. Avia., No. 813-814, 25/4/42, pp. 9-10.)
250	*2236	Switzerland ...	*Supercharging Two-Stroke Diesel Engines and the Possibility of Using a Free Piston Engine for Jet Propulsion.* (Inter. Avia., No. 812, 15/4/42, pp. 14-15.)
251	2243	Germany ...	*Problem of Two-Stroke Design, with Special Reference to Combined Reciprocation and Rotation of the Piston.* (R. Mertz, A.T.Z., Vol. 45, No. 6, 25/3/42, pp. 149-156.)
252	2255	U.S.A.	*Foundry Practice in Aircraft Engine Manufacture.* (H. G. Lamker, Aero Digest, Vol. 40, No. 3, March, 1942, pp. 221-222 and 302.)
253	2270	U.S.A.	*Carburettor Icing.* (A. N. Troshkin, Aero Digest, Vol. 40, No. 1, Jan., 1942, pp. 160-164, 252.)
254	2297	Germany ...	*Standardisation of Engine Part Names.* (H. Hartel, A.T.Z., Vol. 45, No. 5, 10/3/42, pp. 113-118.)
255	2311	G.B.	248 *Abstracts on Compression Ignition Engines (Ignition and Combustion, Fuel Injection, Design Combustion and Manufacture, Performance, Operation and Maintenance).* (Issued by I.A.E. Research Dept., No. 1,941, 12, Dec., 1941.)
256	2313	Germany ...	*Efficiency and Performance of High Speed Two-Stroke Engine Employing Crankcase Scavenging.* (O. Reschek, A.T.Z., Vol. 45, No. 4, 25/2/42, pp. 86-92.)
257	2314	Germany ...	*The Manufacture of Crankshafts.* (E. Frey, A.T.Z., Vol. 45, No. 4, 25/2/42, pp. 93-96.)
258	2317	Germany ...	*Stress Distribution in Piston Rings.* (M. Kuhm, A.T.Z., Vol. 45, No. 3, 10/2/42, pp. 62-67.)
259	2318	Germany ...	*Turbo-Supercharging Applied to I.C. Engines Operating on Generator Gas (Charcoal).* (A.T.Z., Vol. 45, No. 3, 10/2/42, pp. 71-72.)
260	2338	France/ U.S.A. ...	*New Ideas on Jet Propulsion (Leduc and Sikorsky Patents).* (Flight, Vol. 41, No. 1,740, 30/4/42, pp. 422-423.)
261	2369	Germany ...	*Multi-Cylinder Engine Consisting of Two K Units Placed Side by Side (Small Width) (Pat. No. 696,741).* (Daimler-Benz., Der Flieger, Vol. 20, No. 9, Sept., 1941, p. 302.)
262	2370	Germany ...	*Radial Engine Valve Timing to Compensate Power Differences in Cylinder Due to Articulation of Connecting Rods (Pat. No. 696,742).* (B.M.W., Der Flieger, Vol. 20, No. 9, Sept., 1941, p. 302.)

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263	2377	Germany ...	*Historical Development of the Otto Engine.* (A.T.Z., Vol. 44, No. 2, 25/1/41, pp. 27-30.)
264	2420	Germany ...	*New Researches on the Scavenging of Port Controlled Two-Stroke Engines.* (R. Wille, A.T.Z., Vol. 44, No. 5, 10/3/41, pp. 112-121.)
265	2421	Germany ...	*The Scavenging Process of Mixture Scavenged Two-Stroke Engines as Affected by Internal and External Pressure Variations.* (V. Schmidt, A.T.Z., Vol. 44, No. 5. 10/3/41, pp. 121-124.)
266	2424	Germany ...	*Effect of Altitude on Fuel Consumption of Non-Supercharged Engines (Effect of Mechanical Losses).* (F. Laner and L. Richter, A.T.Z., Vol. 44, No. 5, 10/3/41, p. 129.)
267	2427	Germany ...	*Acoustical Device for Checking Ignition Timing.* (A.T.Z., Vol. 44, No. 3, 10/2/41, p. 65.)
268	2507	U.S.A.	*Portable Heater for Aircraft Engines.* (Aero Digest, Vol. 40, No. 4, April, 1942, pp. 170-171.)
269	2508	Switzerland ...	*Review of Brown Boveri Development Work on Pressure Charging Velox Boiler and Gas Turbine.* (W. G. Noalk, Brown Boveri Review, Vol. 28, No. 8-9, Aug.-Sept., 1941, pp. 183-195.)
270	2509	Switzerland ...	*Test Bed for Exhaust Turbo Supercharging Sets.* (E. Erni, Brown Boveri Review, Vol. 28, No. 8-9, Aug.-Sept., 1941, pp. 211-213.)
271	2510	Switzerland ...	*The Influence of Multi-Stage Cooling on the Efficiency of the New Brown Boveri "Isotherm" Turbo Compressor.* (A. Bausmann, Brown Boveri Review, Vol. 28, No. 8-9, Aug.-Sept., 1941, pp. 196-199.)
272	2511	Switzerland ...	*Some Comments on the Properties of Material Used in the Manufacture of the Gas Turbine.* (H. Zschokke, Brown Boveri Review, Vol. 28, No. 8-9, Aug.-Sept., 1941, pp. 209-210.)
273	2512	Switzerland ...	*The Influence of Compressibility of the Fluid on the Performance of a Centrifugal Blower* (A. Meldahl, Brown Boveri Review, Vol. 28, No. 8/9, Aug.-Sept., 1941, pp. 200-202.)
274	2513	Switzerland ...	*The Separation of Impeller and Diffusor Losses in Radial Blowers.* (A. Meldahl, Brown Boveri Review, Vol. 28, No. 8-9, Aug.-Sept., 1941, pp. 203-206.)
275	2514	Switzerland ...	*The Supercharging of Internal Combustion Engines Operating on Producer Wood Gas, with Special Reference to Motor Vehicles.* (W. Meyer, Brown Boveri Review, Vol. 28, No. 8-9, Aug.-Sept., 1941, pp. 206-208.)
276	2515	Switzerland ...	*Theoretical Considerations on the Altitude Supercharging of Aeroplane Engines by Means of Exhaust Turbo Blowers.* (A. Meldahl, Brown Boveri Review, Vol. 28, No. 8-9, Aug.-Sept., 1941, pp. 213-217.)
277	2516	Switzerland ...	*Self-Starting Velox Steam Power Station.* (A. Spoerli, Brown Boveri Review, Vol. 28, No. 8-9, Aug.-Sept., 1941, pp. 217-221.)

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278	2517	Switzerland ...	*Present Day Design of the Velox Steam Generator.* (W. G. Noack, Brown Boveri Review, Vol. 28, No. 8-9, Aug.-Sept., 1941, pp. 221-227.)
279	2519	Switzerland ...	*The Determination of Charge in State of the Working Substance in Turbo Machinery by Means of the Entry Diagram.* (O. Zweifel, Brown Boveri Review, Vol. 28, No. 8-9, Aug.-Sept., 1941, pp. 232-236.)
280	2520	Switzerland ...	*The Gas Turbine Locomotive.* (E. Schroeder, Brown Boveri Review, Vol. 28, No. 8-9, Aug.-Sept., 1941, pp. 236-240.)
281	2521	Switzerland ...	*Blast Generators and Blast Heating in Iron Works. (A Comparative Study of Gas Engines, Steam and Gas Turbine Plants).* (W. G. Noack, Brown Boveri Review, Vol. 28, No. 8-9, Aug.-Sept., 1941, pp. 240-242.)
282	*2615	Germany ...	*Design Features of the Ju. 211B Petrol Injection Aircraft Engines (Digest).* (S. Oldberg and T. M. Ball, S.A.E.J., Vol. 50, No. 4, April, 1941, pp. 23, 33.)
283	2633	U.S.A.	*Current Problems in Light Aeroplane Engines.* (R. S. White, S.A.E.J., Vol. 50, No. 4, April, 1942, pp. 141-159.)
284	2703	Switzerland ...	*Axial Compressors.* (W. Gaehler, Escher Wyss Mitteilungen, No. 13, 1940, pp. 15-19.)
285	2705	Switzerland ...	*Propeller Pumps.* (A. Voska, Escher Wyss Mitteilungen, No. 13, 1940, pp. 24-27.)
286	2708	Switzerland ...	*Governors for Steam Turbines and Compressors.* (A. Luthi, Escher Wyss Mitteilungen, No. 13, 1940, pp. 50-58.)
287	2710	Switzerland ...	*Acceptance and Performance Tests of Steam Turbines.* (R. W. Peter, Escher Wyss Mitteilungen, No. 13, 1940, pp. 71-75.)
288	2731	G.B.	*The Compression and Expansion of Air—Part I (in Turbo-Machinery).* (A. L. Egan, Engineering, Vol. 153, No. 3,985, 29/5/42, pp. 423-424.)
289	2738	Germany ...	*History of the Development of the Mercedes Benz Aero Engines.* (Luftwissen, Vol. 9, No. 2, Feb., 1942, pp. 44-47.)
290	2750	G.B.	*The Compression and Expansion of Air (in Turbo-Motors) (Conclusion).* (A. L. Egan, Engineering, Vol. 53, No. 3,986, 5/6/42, pp. 443-445.)
291	*2759	U.S.A.	*A Short Gauge Length Extensometer and its Application to the Study of Crankshaft Stresses.* (C. W. Gadd and T. C. Van Degrift, J. Applied Mechanics, Vol. 9, No. 1, March, 1942, pp. 15-12.)

FUELS AND LUBRICANTS.

292	2184	G.B.	*Practical Application of Gas Producers to Road Transport.* (S. G. Ward and W. J. Morison, Engineer, Vol. 173, No. 4,504, 8/5/42, pp. 386-387, 388-389.)

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294	2209	Germany ...	*Ignition Time Lag of Diesel Fuels as Recorded by Means of Photocells Sensitive to Different Wave Lengths.* (L. Bisang, Z.V.D.I., Vol. 86. No. 15-16, 18/4/42, pp. 241-244.)
295	2242	Germany ...	*The Effect of Producer Gas Operation on the Ageing and Sludging of Lubricating Oils.* (E. Thorn, A.T.Z., Vol. 45, No. 6, 25/3/42, p. 148.)
296	2300	Germany ...	*The Testing of Lubricating Oils.* (E. Thurn, A.T.Z., Vol. 45, No. 5, 10/3/42, pp. 152-153.)
297	2303	Germany ...	*Knocking in Multi-Cylinder Engines (Acoustical Investigations).* A. W. Schmidt, Z.V.D.I., Vol. 84, No. 25, 22/9/40, pp. 435-438.)
298	2305	Germany ...	*Water Sealed Fuel Storage Tanks made of Brick.* (Z.V.D.I., Vol. 84, No. 25, 22/9/40, p. 443.)
299	2335	Germany ...	*New Fuels for German Producer Gas Vehicles.* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 6, 25/3/42, pp. 417-418.)
300	2350	U.S.A.	*Greases for Ball and Roller Bearings.* (H. M. Fraser, National Petroleum News, Vol. 34, No. 3, 24/1/42, pp. 22-28.)
301	2351	U.S.A.	*Use of Liquid Petroleum Gas in the U.S.A.* (National Petroleum News, Vol. 34, No. 3, 24/1/42, pp. 20-21.)
302	2362	G.B.	*Fuel Research Intelligence Section. (Summary of Work for Weeks Ending 25th April and 2nd May.)*
303	2379	Germany ...	*Modern Gas Generators for Transport Vehicles.* (W. Heller, A.T.Z., Vol. 44, No. 2, 25/1/41, pp. 37-39.)
304	2380	Sweden ...	*Swedish Charcoal Gas Generators.* (A.T.Z., Vol. 44, No. 2, 25/1/41, pp. 39-41.)
305	2384	Germany ...	*Winter Operation of Gas Generators.* (A.T.Z., Vol. 44, No. 4, 25/2/41, p. 96.)
306	2411	Germany ...	*Fuel Consumption Measurements on a Weight Basis (Calibrated Tank Combined with Float Densimeter).* (E. Muhlner, L.F.F., Vol. 19, No. 3, 26/4/42, pp. 102-104.)
307	2422	Germany ...	*Bi-Fuel Arrangements for Raising Octane Number in an Emergency.* (A.T.Z., Vol. 44, No. 5, 10/3/41, pp. 124-125.)
308	2423	Germany ...	*Modern Charcoal Gas Generators.* (W. Heller, A.T.Z., Vol. 44, No. 5, 10/3/41, pp. 126-129.)
309	2426	Germany ...	*Vapour Pressure and Combustible Mixture Range of 87 Octane Petrol at Temperatures between +40°C. and −50°C.* (M. Ochmichen, A.T.Z., Vol. 44, No. 3, 10/2/41, pp. 54-62.)
310	2449	G.B.	*Practical Application of Gas Producer to Road Transport.* (S. G. Ward and W. T. Morrison, Engineer, Vol. 173, No. 4,505, 15/5/42, pp. 405-407.)

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311	*2525	U.S.A.	*Standard Oil Develops New Fuel Making Process.* (Aero Digest, Vol. 40, No. 2, Feb., 1942, p. 96.)
312	2544	G.B.	*Fuel Research Intelligence Section. Summary of Work for Weeks Ending 8th and 15th May,* 1942.
313	2554	U.S.A.	*Frictional Phenomena (Viscosity of Liquids).* (H. Gernant, J. App. Physics, Vol. 12, No. 12, Dec., 1941, pp. 827-836.)
314	2598	G.B.	*Liquefaction of Natural Gas for Public Supply.* (Engineer, Vol. 173, No. 4,506, 22/5/42, pp. 432-435.)
315	2605	G.B.	*Gas Producers for Road Vehicles.* (S. G. Ward and W. J. Morrison, Engineering, Vol. 153, No. 3,984, 22/5/42, pp. 418-420.)
316	2621	U.S.A.	*The Role of Surface Chemistry and Profile on Boundary Lubrication (Digest).* (J. T. Burwell, S.A.E.J., Vol. 50, No. 4, April, 1942, pp. 34-35.)
317	*2631	U.S.A.	*Commercial Vehicles and Lower Octane Fuels (Point of View of Refiner, Engine Manufacturer, Operator, with Discussion).* (Various authors, S.A.E.J., Vol. 50, No. 4, April, 1942, pp. 125-130.)
318	2634	U.S.A.	*A Cetane Number Study of Diesel Fuels (with Discussion).* (W. G. Ainsley and others, S.A.E.J., Vol. 50, No. 4, April, 1942, pp. 161-168.)

INSTRUMENTS.

319	2185	G.B.	*Some Experiences with Water Meters.* (H. Addison, Engineer, Vol. 173, No. 4,504, 8/5/42, pp. 390-393.)
320	2240	Germany ...	*The Application of Electrostatic Devices in Mechanical Research (Piezo Electric Force and Distance Measurements, including Direct Recording of Indicated H.P.).* (H. Illgen, A.T.Z., Vol. 45, No. 6, 25/3/42, pp. 144-145.)
321	2274	U.S.A.	*Automatic Ice Warning Indicator (Registering Rate of Growth).* (Aero Digest, Vol. 40, No. 1, Jan., 1942, p. 255.)
322	2308	Germany ...	*Temperature Measurements in Engineering (Review of Errors of Liquid/Glass and Thermometric Thermometers).* (E. Zimmerman, Z.V.D.I., Vol. 84, No. 23, 8/6/40, pp. 393-395.)
323	2312	Germany ...	*The Accuracy of Balancing Machines.* (H. Oschatz, A.T.Z., Vol. 45, No. 4, 25/2/42, pp. 31-88.)
324	2320	U.S.A.	*Rotating Bulb Method for the Determination of Surface and Interfacial Tension.* (B. Vonnegnt, Rev. of Scient. Instruments, Vol. 13, No. 1, Jan., 1942, pp. 6-9.)
325	2321	U.S.A.	*An Electric Integrator for Solving Differential Equations.* (R. N. Varney, Rev. of Scient. Instruments, Vol. 13, No. 1, Jan., 1942, pp. 10-16.)

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326	2324	G.B.	*Mathematical Machines.* (S. Lilley, Nature, Vol. 149, No. 3,782, 25/4/42, pp. 462-465.)
327	*2327	G.B.	*A Cathode Ray Method of Wave Analysis.* (V. O. Johnson, Electronic Engineering, Vol. 14, No. 170, April, 1942, p. 721.)
328	2381	Germany ...	*Vibrometer and Extensometers Suitable for Road Tests of Motor Vehicles.* (W .G. Schilling and A. Theis, A.T.Z., Vol. 44, No. 2, 25/1/41, pp. 43-46.)
329	2396	Germany ...	*Automatic Compensation for Aircraft Displacement during Long Exposure Aerial Photographs.* (H. Nagel, Z. fur Instrum., Vol. 61, No. 12, Dec., 1942, p. 48.)
330	2407	Germany ...	*Electrical Temperature Recorder and Control Gear.* (A. Kuntze, Gas, Vol. 14, No. 3, March, 1942, pp. 42-48.)
331	2415	Germany ...	*Piezo Electric Indicator with Long Distance Cable Transmission.* (F. Lichtenberger, E.T.Z., Vol. 63, No. 11-12, 26/3/42, pp. 134-139.)
332	2425	Germany ...	*Modified Geiger Torsiograph for Frequencies up to* 100,000/*minute.* (A.T.Z., Vol. 44, No. 3, 10/2/41, p. 53.)
333	2435	U.S.A.	*Research with the Polarograph (Analysis by Current/Voltage Curves with Dropping Hg. Electrode).* (O. H. Muller, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 2, 15/2/42, pp. 99-105.)
334	2455	G.B.	*Horizontal Ontimeter (Optical Gauge for Small Parts).* (Engineering, Vol. 153, No. 3,983, 15/5/42, p. 387.)
335	2459	G.B.	*Manometer for Routine Testing.* (R. Barrington Brock, Airc. Eng., Vol. 14, No. 158, April, 1942, pp. 104-105, 110.)
336	2466	Germany ...	*Extensometer for Controlling the Longitudinal Motion of Underground Pipe Lines.* (P. Ahls, Stahl und Eisen, Vol. 62, No. 12, 19/3/42, p. 251.)
337	2638	Germany ...	*Spring Clip for Mounting Aircraft Instruments (Pat. No.* 715,518). (D.V.L., Flugsport, Vol. 34, No. 10, 13/5/42 (Pat, Coll. No. 29), p. 120.)
338	2639	Germany ...	*Aircraft Instrument Panel (Separate Location of Instruments Requiring Continuous from those Requiring Occasional Supervision) (Pat. No.* 716,116). (Henschel, Flugsport, Vol. 34, No. 10, 13/5/42 (Pat. Coll. No. 29), p. 120.)
339	2690	Germany ...	*The Application of the Ellis National Calculating Machine to Scientific Calculations.* (S. Kerridge, Z.A.M.M., Vol. 21, No. 4, Aug., 1941, pp. 242-249.)
340	2709	Switzerland ...	*Basic Problems of Control Designs.* (T. Stein, Escher Wyss Mitteilungen, No. 13, 1940, pp. 59-64.)

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341	2746	Germany	...	*Design Improvements in Magnetic Compass for Submarine.* (C. Ludle, Z.V.D.I., Vol. 85, No. 26, 28/6/41, p. 586.)
342	*2167	Germany	...	*Rapid Chemical Analysis of Pig Iron (Mn, P, S, Si, and C in Nine Minutes).* (H. Kerapf, Stahl und Eisen, Vol. 62, No. 7, 12/2/42, pp. 136-140.)
343	2168	Germany	...	*Effect of Phosphorus and Various Alloying Constituents on the Temper Brittleness of Structural Steels.* (E. Maurer and others, Stahl und Eisen, Vol. 62, No. 6, 5/2/42, pp. 115-121.)
344	2169	Germany	...	*Ferrous Materials Employed in the Construction of Enemy (Non-German) Aircraft (with Some References to Russian Types).* (H. Cornelius, Stahl und Eisen, Vol. 62, No. 10, 5/3/42, pp. 197-206.)
345	2177	Germany	...	*Metal Banded Plywood for Fuselage Construction (Pat. No. 699,284).* (Klemm, Pat. Coll. No. 27, Flugsport, Vol. 34, No. 8, 15/4/42, p. 110.)
346	2189	G.B.	... ...	*Grain Size Control in Steel.* (F. T. Pascoe, Engineer, Vol. 173, No. 4,503, 1/5/42, p. 370.)
347	2190	G.B.	... ...	*Steel Specifications and Their Interpretations.* (S. W. Jaslin, Engineer, Vol. 173, No. 4,503, 1/5/42, pp. 370-371.)
348	2191	G.B.	... ...	*Beryllium Oxide and its Applications.* (Engineering, Vol. 153, No. 3,981, 1/5/42, p. 344.)
349	2194	Germany	...	*Determination of Graphite in Pig and Cast Iron.* (E. Diepschlag, Stahl und Eisen, Vol. 62, No. 15, 9/4/42, pp. 315-316.)
350	2195	Germany	...	*Spectroanalytical Determination of the Thickness of Galvanic Deposits.* (A. Lanenstein, Stahl und Eisen, Vol. 62, No. 15, 9/4/42, p. 317.)
351	2196	G.B.	... ...	*Air Hydraulic Intensifier for Portable Riveting Tools.* (Engineering, Vol. 153, No. 3,982, 8/5/42, p. 376.)
354	2207	Germany	...	*Investigation of the Injection and Filling Process in Die Casting (High Speed Motion Camera).* (W. Koster and K. Gohring, Z.V.D.I., Vol. 86, No. 15-16, 18/4/42, p. 240.)
355	2208	Germany	...	*Stiffening Tube Connectors by Means of Welded Ribs (Acting as Stress Relief).* (Z.V.D.I., Vol. 86, No. 15-16, 18/4/42, p. 250.)
356	2210	Germany	...	*Mechanical Properties of Soft Rubber Under Compression.* (H. Rocklig, Z.V.D.I., Vol. 86, No. 15-16, 18/4/42, pp. 251-252.)
357	2211	Germany	...	*Protection of Isolated Wooden Structures Against Attack of Moisture.* (E. Schulke, Z.V.D.I., Vol. 86, No. 15-16, 18/4/42, p. 244.)
358	2212	Germany	...	*Limitation of Elastic Theory Due to Finite Size of Crystallites.* (L. Foppl, Z.V.D.I., Vol. 86, No. 15-16, 18/4/42, p. 252.)

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359	*2227	G.B.	*The Grain Size of Rolled Aluminium* (*Numerous Plates, Graphs and Drawings; Bibliography*). (H. W. L. Phillips, J. Inst. Metals, Vol. 68, No. 3, March, 1942, pp. 48-106.)
360	2228	G.B.	*Metallurgical Abstracts, General and Non-Ferrous, Vol.* 9, *No.* 3. (J. Inst. Metals, Vol. 68, No. 3, March, 1942, pp. 67-94.)
361	2241	Germany ...	*New Alloy for Permanent Magnets.* (P. Wiest, A.T.Z., Vol. 45, No. 6, 25/3/42, pp. 146-147.)
362	2252	U.S.A.	*Al. Alloy Bead Proportions.* (E. J. Rautsch, Aero Digest, Vol. 40, No. 3, March, 1942, p. 209.)
363	2260	U.S.A.	*Tubular Blind Rivet.* (Aero Digest, Vol. 40, No. 3, March, 1942, p. 322.)
364	2266	U.S.A.	*Cementing Rubber to Metal or Fabrics.* (Aero Digest, Vol. 40, No. 1, Jan., 1942, p. 253.)
365	2275	U.S.A.	*Sound Insulating Glass Fibre Wool.* (Aero Digest, Vol. 40, No. 1, Jan., 1942, pp. 259-260.)
366	2276	U.S.A.	*Tests Under Vibration of Rubber Mountings.* (Aero Digest, Vol. 40, No. 1, Jan., 1942, p. 260.)
367	2277	U.S.A.	*Self-Contained Soldering Kit* (*Cartridge Ignited*). (Aero Digest, Vol. 40, No. 1, Jan., 1942, p. 276.)
368	2281	G.B.	*Bibliography of Stressed Skin Construction* 1939-1941, *No.* 38.
369	2382	G.B.	*Bibliography on Gas Carbonising* 1941-1942, *No.* 37.
370	2284	G.B.	*Use of Rubber in Electroplating.* (S. Buchan, Metal Industry, Vol. 60, No. 9, 8/5/42, pp. 316-318.)
371	2285	G.B.	*Al. Alloys in Modern Warfare.* (P. M. Haenni, Metal Industry, Vol. 60, No. 19, 8/5/42, pp. 325-326.)
372	2286	G.B.	*Fluxes for Soft Solders.* (Engineering, Vol. 153, No. 3,980, 24/4/42, p. 328.)
373	2289	G.B.	*Properties of Monel Metal at Low Temperatures.* (Engineering, Vol. 153, No. 3,980, 24/4/42, p. 340.)
374	2293	Germany ...	*Surface Hardening with Coal Gas—Oxygen Flame.* (L. Wagener, Gas, Vol. 14, No. 4, April, 1942, pp. 55-64.)
375	2294	Germany ...	*Determination of the Shear Strength of Light Alloy Rivets.* (E. V. Rajakovies and A. Teubler, Aluminium, Vol. 24, No. 4, April, 1942, pp. 125-131.)
376	2295	Germany ...	*Radiation Characteristics of Al. and its Alloys.* (R. Hase, Aluminium, Vol. 24, April, 1942, pp. 140-141.)
377	2296	Germany ...	*The Utilisation of Exolated* (*Anodised*) *Wires in Electrical Engineering.* (K. Stender, Aluminium, Vol. 24, No. 4, April, 1942, pp. 147-150.)
378	2301	Germany ...	*Strength and Permissible Loading of Polyvinyl-Chloride Plastics.* (W. Buchmann, Z.V.D.I., Vol. 84, No. 25, 22/9/40, pp. 425-431.)

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379	2302	Germany ...	*The Influence of S and P on the Weldability of Steel.* (H. Cornelius, Z.V.D.I., Vol. 84, No. 25, 22/9/40, pp. 432-434.)
380	2304	Germany ...	*High Speed Tool Steels Containing Lead.* (H. Schrader, Z.V.D.I., Vol. 84, No. 25, 22/9/40, pp. 439-441.)
381	2306	Germany ...	*Structural Steels Containing Neither Ni. nor Mo.* (H. Kiessler, Z.V.D.I., Vol. 84, No. 23, 8/6/40, pp. 385-392.)
382	2307	Germany ...	*Alarm Bells Made of Glass.* (Z.V.D.I., Vol. 84, No. 23, 8/6/40, p. 392.)
383	2310	Germany ...	*Connectors for Electrical Conductors Made of Al. and Mg.* (R. Schulz and B. Zeiss, Z.V.D.I., Vol. 84, No. 23, 8/6/40, pp. 399-402.)
384	2316	Germany ...	*Plastic and Elastic Compression of Material Due to Rolling, Shot Blasting, etc., and its Effect on Fatigue Strength.* (O. Fopple, A.T.Z., Vol. 45, No. 3, 10/2/42, pp. 57-61.)
385	2319	Germany ...	*The Use of Al. in Electrical Engineering.* (L. Lux and W. Deisinger, Aluminium, Vol. 21, No. 5, May, 1939, pp. 362-376.)
386	2329	G.B.	*Evacuation of Metal Powders Prior to Compression.* (C. Hardy, Metal Industry, Vol. 60, No. 17, 24/4/42, pp. 288-289.)
387	2330	G.B.	*Rhodium Platinum Thermocouples.* (J. C. Chaston, Metal Industry, Vol. 60, No. 18, 1/5/42, pp. 300-301.)
388	2331	G.B.	*Al. Allyos in Modern Warfare.* (P. M. Haenni, Metal Industry, Vol. 60, No. 18, 1/5/42, pp. 302-304.)
389	2342	G.B.	*Mycalex Insulators (Mica-Glass Bonded).* (Electronic Engineering, Vol. 14, No. 171, May, 1942, pp. 749-752.)
390	2345	G.B.	*Chemical Structure of Plastics.* (C. A. Redfarn, Chem. and Ind., Vol. 61, No. 18, 2/5/42, pp. 201-204.)
391	2346	U.S.A.	*Sunlight Ageing of Rubber.* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 5, 10/3/42, p. 340.)
392	2347	U.S.A.	*Use of Plastics in American Aircraft.* (British Plastics, Vol. 13, No. 153, Feb., 1942, pp. 307-309.)
393	2348	G.B.	*Corolite Resin Impregnated Sisal Fibre for Gears, etc.* (British Plastics, Vol. 13, No. 153, Feb., 1942, p. 338.)
394	2349	G.B.	*Synthetic Rubber and Plastics, IX.* (H. Barron, British Plastics, Vol. 13, No. 153, Feb., 1942, pp. 345-350.)
395	2352	Germany ...	*Relation between Modulus of Plasticity, Hardness and Ddmping (with Discussion).* (W. Spath, Z. fur Metallk., Vol. 33, No. 6, June, 1941, pp. 221-229.)
396	2353	Germany ...	*High Temperature Density Measurements, XII (Specific Volumes and Expansions of Mg.-Zn. Alloys in Solid and Liquid State).* (E. Pelzel and F. Sanerwald, Z. fur Metallk., Vol. 33, No. 6, June, 1941, pp. 229-232.)

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397	2354	Germany ...	*Stress Propagation Accompanying the Bending of Single and Multi-Crystals.* (V. Dehlinger and others, Z. fur Metallk., Vol. 33, No. 6, June, 1941, pp. 233-235.)
398	2355	Germany ...	*Experiments on Cavitation Erosion with the Mantel Impact Paddle (with Extensive Bibliography).* (F. V. Schwarz, Z. fur Metallk., Vol. 33, No. 6, June, 1941, pp. 236-244.)
399	2356	Italy	*The Intercrystalline Corrosion of Zn. Alloys.* (R. Piontelli and F. Cremascoli, Z. fur Metallk., Vol. 33, No. 6, June, 1941, pp. 245-248.)
400	2357	Germany ...	*Magnetic Investigations on Internal Stresses, I. Stresses Accompanying the Stretching of Ni. Wire.* (F. Forster and K. Stambke, Z. fur Metallk., Vol. 33, No. 3, March, 1941, pp. 97-104.)
401	2358	Germany ...	*Magnetic Processes Accompanying the So-called Barkhansen Jump in Iron and Nickel.* (F. Forster and H. Wetzel, Z. fur Metallk., Vol. 33, No. 3, March, 1941, pp. 115-124.)
402	2359	Germany ...	*Determination of the Micro Hardness of Metals.* (F. Schulz and H. Hanemann, Z. fur Metallk., Vol. 33, No. 3, March, 1941, pp. 124-134.)
403	2360	Germany ...	*The Micro Hardness of Solids in the Region of the Kick Law of Similarity.* (E. O. Bernhardt, Z. fur Metallk., Vol. 33, No. 3, March, 1941, pp. 135-144.)
404	2361	Germany ...	*II. Stress Induced by Drawing Wire Through a Die.* (F. Forster and K. Stambke, Z. fur Metallk., Vol. 33, No. 3, March, 1941, pp. 104-114.)
405	2368	Germany ...	*The Electrical Oxidation of Aluminium (Elexal Process).* (H. Otto, Der Flieger, Vol. 20, No. 9, Sept., 1941, pp. 303-305.)
406	2382	Germany ...	*Progress and Novel Devices for Machining Operations (Turning, Shaping, Drilling, Grinding).* (W. Vits, A.T.Z., Vol. 44, No. 4, 25/2/41, pp. 77-83.)
407	2383	Germany ...	*Heat Treatment of Modern High Speed Tool Steels.* (A.T.Z., Vol. 44, No. 4, 25/2/41, pp. 92-94.)
408	2397	G.B.	*Metal Powders Pressed at Low Temperatures.* (H. W. Jones, Light Metals, Vol. 4, No. 51, April, 1941, pp. 95-107.)
409	2400	G.B.	*Utilisation of Light Alloy Scrap.* (Light Metals, Vol. 4, No. 51, April, 1942, pp. 124-127.)
410	2401	G.B.	*Manufacture of Mg. Powder (Comminuted Metal).* (Light Metals, Vol. 4, No. 51, April, 1942, pp. 128-133.)
411	2402	G.B.	*Producing Al. from Clay.* (Light Metals, Vol. 4, No. 51, April, 1942, pp. 134-136.)
412	2412	Germany ...	*Effect of Excessive Hardening Temperature on the Properties of Heat Treated Steel.* (H. Cornelius, L.F.F., Vol. 19, No. 3, 26/4/42, pp. 105-110.)

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413	2413	Germany ...	*The Mechanical Properties of Transparent Plastics at 20°C.* (W. Kuch, L.F.F. Vol. 19, No. 3, 26/4/42, pp. 111-120.)
414	2417	Germany ...	*Spectroscopic Determination of the Thickness of Galvanic Deposits (Digest).* (A. Lanenstein and M. Passer, E.T.Z., Vol. 63, No. 11-12, 26/3/42, p. 146.)
415	2418	France	*New Silver-Zinc Accumulator for Traction (40 Wh. per kg. and 100 Wh. per dm.²).* (E.T.Z., Vol. 63, No. 11-12, 26/3/42, pp. 145-146.)
416	2428	Germany ...	*Hardness Testing of Steel—Comparison of Methods, Conversion of Scales and Range of Errors.* (W. Hengemühle, Stahl und Eisen, Vol. 62, No. 16, 16/4/42, pp. 321-328.)
417	2433	G.B.	*A Theory of the Strength of Metals.* (L. Bragg, Nature, Vol. 149, No. 3,784, 9/5/42, pp. 511-513.)
418	2450	G.B.	*High Purity Powdered (Spongy) Chromium.* (Engineer, Vol. 173, No. 4,505, 15/5/42, p. 411.)
419	2451	G.B.	*The Machining of Non-Ferrous Alloys.* (Engineer, Vol. 173, No. 4,505, 15/5/42, pp. 412-414.)
420	2456	G.B.	*Standard Methods of Steel Analysis.* (Engineering, Vol. 153, No. 3,983, 15/5/42, p. 395.)
421	2464	G.B.	*Data Sheet of Mechanical Properties of Steel Bars and Forgings.* (Airc. Eng., Vol. 14, No. 158, April, 1942, p. 116.)
422	*2465	G.B.	*The Cold Pressing Properties of Dural Type Alloy Sheets, with Special Reference to the Production of Large Pressings for Aircraft.* (J. C. Arrowsmith and others, J. Inst. Metals, Vol. 68, No. 4, April, 1942, pp. 109-132.)
423	2467	Germany ...	*Bending Fatigue Strength of Alloy Steel Forging Along and Across the Grain.* (G. V. Rossing, Stahl und Eisen, Vol. 62, No. 4, 19/3/42, pp. 251-252.)
424	2468	Germany ...	*Effect of Grain Size on the Weldability of Steel St. 52.* (W. Eilender and others, Stahl und Eisen, Vol. 62, No. 12, 19/3/42, p. 252.)
425	2469	Germany ...	*Effect of Low Temperature on the Tension-Compression Fatigue of Steel.* (M. Hempel and J. Luce, Stahl und Eisen, Vol. 62, No. 12, 19/3/42, p. 252.)
426	2470	Germany ...	*Structural Investigation of Steel with the Electron Microscope.* (H. Bernick and others, Stahl und Eisen, Vol. 62, No. 12, 19/3/42, p. 252.)
427	2476	U.S.A.	*Kirksite Dies for Metal Steel Forming.* (J. Harris, Aviation, Vol. 41, No. 1, Jan., 1942, pp. 70-71, 188.)
428	2477	U.S.A.	*New Types of Abrasives.* (Aviation, Vol. 41, No. 1, Jan., 1942, p. 104.)
429	2480	U.S.A.	*X-Ray Inspection.* (H. M. Muncheryan, Aviation, Vol. 41, No. 1, Jan., 1942, pp. 84, 184-186.)
430	2483	U.S.A.	*Beryllium Alloys in Aviation.* (E. Burke Wilford, Aviation, Vol. 41, No. 1, Jan., 1942, pp. 92-93, 188.)

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431	2527	U.S.A.	*The Mechanics of Deep Drawing Sheet Metal Parts.* (G. Brewer and M. Rockwell, Aero Digest, Vol. 40, No. 2, Feb., 1942, pp. 126-135.)
432	2528	U.S.A.	*Calculations for Joggle Dies.* (E. J. Rautsch, Aero Digest, Vol. 40, No. 2, Feb., 1942, pp. 136, 271.)
433	2529	U.S.A.	*A Quick and Efficient Method of Making Carbide Tools.* (Aero Digest, Vol. 40, No. 2, Feb., 1942, p. 141.)
434	2530	U.S.A.	*Torsional Centre Determination in Stressed Skin Structures.* (M. Walter, Aero Digest, Vol. 40, No. 2, Feb., 1942, pp. 145-146.)
435	2534	U.S.A.	*Gear Production by Shaving Instead of Grinding.* (R. S. Drummond, Aero Digest, Vol. 40, No. 2, Feb., 1942, p. 170.)
436	2535	U.S.A.	*Surface Hardening of Stainless Steels.* (E. A. Malcolm, Aero Digest, Vol. 40, No. 2, Feb., 1942, pp. 172-177, 272-273.)
437	2536	U.S.A.	*Synthetic Rubber "Ameripol."* (Aero Digest, Vol. 40, No. 2, Feb., 1942, pp. 178-180.)
438	2552	U.S.A.	*Determination of the Static and Dynamic Constant by Means of Response Curves (with Application to Testing Materials Under Fatigue).* (R. K. Bernhard, J. App. Physics, Vol. 12, No. 12, Dec., 1942, pp. 866-874.)
439	2555	Italy	*Stresses in Shell Structures Introduced by Riveting.* (L. Lazzarino, L'Aerotecnica, Vol. 21, No. 7-8, July-Aug., 1941, pp. 449-466.)
440	2556	Italy	*On the Stressing of So-called Geodetic Elastic System (Surfaces of Revolution Rendered Rigid by a System of Plane and Curved Ribs or Consisting Solely of such Ribs).* (G. Santangilo, L'Aerotecnica, Vol. 21, No. 7-8, July-Aug., 1941, pp. 467-476.)
441	2594	G.B.	*Tungsten Economy in High Speed Tool Steels.* (Engineer, Vol. 173, No. 4,507, 29/5/42, pp. 452-453.)
442	2597	G.B.	*Tungsten Shortage.* (Engineer, Vol. 173, No. 4,506, 22/5/42, p. 428.)
443	2599	G.B.	*The Tilt Nut, a Simple Lock Nut.* (Engineer, Vol. 173, No. 4,506, 22/5/42, p. 436.)
444	2614	U.S.A.	*U.S.A. Alternate or National Emergency Steel Specification.* (S.A.E.J., Vol. 50, No. 4, April, 1941, pp. 20-21.)
445	*2629	U.S.A.	*Uses of Rubber in War.* (P. W. Drew, S.A.E.J., Vol. 50, No. 4, April, 1942, p. 41.)
446	2632	U.S.A.	*Building Up of Worn Parts.* (W. J. Cumming, S.A.E.J., Vol. 50, No. 4, April, 1942, pp. 139-140.)
447	*2641	Germany ...	*Wear and Friction of Sliding Contacts, with Special Reference to Carbon Brushes Sliding on Copper Rings.* (R. Holm and others, Wissenschaftliche Veroffentlichungen aus den Siemens-Werken, Vol. 18, No. 1, 1939, pp. 73-100.)

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448	2652	Switzerland ...	*Investigations on Phenol Plastics, I (Constitution, Structure and Resistance to High Voltage Surface Leakage in Presence of Electrolytes).* (H. Stager and others, Schweizer Arkiv. fur Ang. Wiss and Technik, Vol. 7, No. 7, May, 1941, pp. 129-139.)
449	2653	Switzerland ...	*Investigation on Phenol Plastics, II (Mechanical Properties as Influenced by Structure).* (H. Stager and others, Schweizer Archiv., Vol. 7, No. 6, June, 1941, pp. 153-174.)
450	2654	Switzerland ...	*Photo-elastic and Mechanical Model Experiments on the Stressing Commutator Sections.* (R. V. Band, Schweizer Archiv., Vol. 7, No. 6, June, 1941, pp. 174-182.)
451	*2655	Switzerland ...	*Anti-Corrosion Protection of Al. Alloys in Aircraft Construction.* (A. von Zeerleder, Inter. Avia., No. 815, 4/5/42, pp. 1-5.)
452	2665	Sweden ...	*Swedish Synthetic Rubber.* (Inter. Avia., No. 815, 4/5/42, pp. 13-14.)
453	2669	Switzerland ...	*History of the A.I.A.G., Neuhausen (Production of Al. in Switzerland).* (Inter. Avia., No. 815, 4/5/42, pp. 27-28.)
454	*2676	U.S.S.R. ...	*An Investigation of the Stresses in Rotating Discs with a Number of Apertures.* (J. G. Teverovsky, Sov. Kotloturbo, No. 1, Nov., 1940, pp. 402-411.)
455	2686	Germany ...	*Determination of the Displacement and Distribution Coefficients of a Spatically Curved Bar with Help of Castigliano's Principle.* (K. Marguerre, Z.A.M.M., Vol. 21, No. 4, Aug., 1941, pp. 218-227.)
456	2687	Germany ...	*Increase in Stress Due to Circular Arc Notches.* (E. Weinel, Z.A.M.M., Vol. 21, No. 4, Aug., 1941, pp. 228-230.)
457	2688	Germany ...	*Semiplane with Arc Shaped Notch.* (C. Weber, Z.A.M.M., Vol. 21, No. 4, Aug., 1941, pp. 230-232.)
458	2689	Germany ...	*On Some Particular Catenaries.* (K. Federhoper, Z.A.M.M., Vol. 21, No. 4, Aug., 1941, pp. 233-242.)
459	2692	Germany ...	*Stress Increase in a Perforated Strip Under Tension.* (C. Weber, Z.A.M.M., Vol. 21, No. 4, Aug., 1941, p. 252.)
460	2699	Germany ...	*On the Development of Play in Bolted Connections Under Fatigue.* (B. Dirksen, L.F.F., Vol. 19, No. 4, 6/5/42, pp. 153-156.)
461	2711	Switzerland ...	*Investigations on the Effect of Air Content on Cavitation and Corrosion.* (I. Vuskovic, Escher Wyss Mitteilungen, No. 13, 1940, pp. 83-90.)
462	2714	U.S.A.	*New Materials.* (Rev. Scientific Insts., Vol. 13, No. 4, April, 1942, pp. 192-194.)
463	2717	G.B.	*Magnetostriction in Electrical Sheet Steels.* (F. Brailsford and R. G. Martindale, J. Inst. Elect. Eng., Vol. 89, No. 17, May, 1942, pp. 225-231.)

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464	2718	G.B.	*Cold-Pressing Properties of Duralumin-Type Alloy Sheets.* (J. C. Arrowsmith and others, Metal Industry, Vol. 60, No. 22, 29/5/42, pp. 367-370.)
465	2719	G.B.	*New U.S. Magnesium Foundry.* (E. F. Core, Metal Industry, Vol. 60, No. 22, 29/5/42, pp. 370-371.)
466	2720	G.B.	*The Electrodeposition of Alloys.* (C. L. Faust, Metal Industry, Vol. 60, No. 22, 29/5/42, pp. 372-374.)
467	2721	G.B.	*Aluminium-Magnesium Alloys Resistance to Chemical Attack.* (L. J. Benson and R. B. Mears, Metal Industry, Vol. 60, No. 23, 5/6/42, pp. 380-382.)
468	2722	G.B.	*Cavitation Erosion of Non-Ferrous Metals and Alloys, Part I.* (J. W. Donaldson, Metal Industry, Vol. 60, No. 23, 5/6/42, pp. 383-386.)
469	2723	G.B.	*Aluminium from Alunite.* (F. Eichelberger, Metal Industry, Vol. 60, No. 23, 5/6/42, pp. 387-388.)
470	2724	G.B.	*Simplification of Alloy Types.* (D. K. Crampton, Metal Industry, Vol. 60, No. 23, 5/6/42, p. 390.)
471	2725	G.B.	*Output of Aluminium Die Castings Increased.* (Metal Industry, Vol. 60, No. 23, 5/6/42, p. 391.)
472	2726	G.B.	*Non-Ferrous Metals Production in 1941.* (Metal Industry, Vol. 60, No. 23, 5/6/42, p. 391.)
473	2727	G.B.	*Galvanising Tanks and Pipes (Production).* (Metal Industry, Vol. 60, No. 23, 5/6/42, p. 392.)
474	2729	G.B.	*Improved Gear Hobbing Machine.* (Engineer, Vol. 173, No. 4,508, 5/6/42, pp. 476-477.)
475	2730	G.B.	*The Damping Capacity of Engineering Materials.* (W. H. Hatfield and others, Engineer, Vol. 173, No. 4,508, 5/6/42, pp. 477-480.)
476	2732	G.B.	*British Diamond Cutting and Polishing Factory.* (Engineering, Vol. 153, No. 3,985, 29/5/42, pp. 426-427.)
477	2733	G.B.	*Bench Milling Machine.* (Engineering, Vol. 153, No. 3,985, 29/5/42, p. 427.)
478	2734	G.B.	*The Spinning of Monel and Nickel Sheet.* (Engineering, Vol. 153, No. 3,985, 29/5/42, p. 430.)
479	2740	G.B.	*Plastics: Their Origin and Formation* (3) (*Cellulose Plastics*). (Plastics, Vol. 6, No. 60, May, 1942, p. 123.)
480	2741	G.B.	*Acrylic Resins as Industrial Finishes.* (H. K. Wood, Plastics, Vol. 6, No. 60, May, 1942, pp. 127-128.)
481	2742	G.B.	*Metal Protection by Plastic Sheet and Film.* (E. E. Halls, Plastics, Vol. 6, No. 60, May, 1942, pp. 141-147.)
482	2743	G.B.	*Resinoids and Other Plastics as Film Formers.* (B. J. Braznikoff, Plastics, Vol. 6, No. 60, May, 1942, pp. 151-160.)
483	2748	Germany	*Accurate Calibration of Tapered Holes of Small Diameter by the Preparation of Casting in Ca. Amalgam.* (Z.V.D.I., Vol. 85, No. 26, 28/6/41, pp. 586-587.)

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484	*2753	U.S.A.	*Effect of Magnetic Field Distribution in Magnetic Inspection.* (F. L. Fuller, J. Aeron. Sci., Vol. 9, No. 6, April, 1942, pp. 202-206.)
485	*2754	U.S.A.	*Flash Butt Welding of Chrome Molybdenum Steels.* (W. S. Evans and V. Netchvolodoff, J. Aeron. Sci., Vol. 9, No. 6, April, 1942, pp. 207-212.)
486	2755	U.S.A.	*Bending and Torsional Design Charts for Round Cr. Mo. Tubing.* (V. C. Trimarchi, J. Aeron. Sci., Vol. 9, No. 6, April, 1942, pp. 213-219.)
487	2758	U.S.A.	*Buckling of Circular Plate Beyond the Critical Thrust.* (K. O. Friedrichs and J. J. Stoker, J. App. Mechanics, Vol. 9, No. 1, March, 1942, pp. 7-14.)
488	2761	US.A.	*Note on Plane Strain.* (W. R. Osgood, J. App. Mechanics, Vol. 9, No. 1, March, 1942, p. 26.)
489	*2762	U.S.A.	*Determining Critical States of Equilibrium of Plates and Shells Under Initial Stress.* (H. Hencky, J. App. Mechanics, Vol. 9, No. 1, March, 1942, pp. 27-30.)
490	*2763	U.S.A.	*The Mechanism of Cavitation Erosion.* (J. C. Poulter, J. App. Mechanics, Vol. 9, No. 1, March, 1942, pp. 31-37.)
491	2764	U.S.A.	*Effect of Foundation Stiffness on the Resonant Frequencies of Rotating Machines.* (Various authors, J. Ap. Mechanics, Vol. 9, No. 1, March, 1942, pp. 48-50.)
492	2765	U.S.A.	*Expansion of Formulæ for Calculating Loads, Rotation and Deflections of Quarter Bends and Tangents of Pipes.* (A. S. McCormick, J. App. Mechanics, Vol. 9, No. 1, March, 1942, pp. 38-42.)
493	2766	U.S.A.	*Effect of Surface Finish on Journal Bearing Performance (Discussion).* (Various authors, J. App. Mech., Vol. 9, No. 1, March, 1942, pp. 43-44.)
494	2767	U.S.A.	*Eddy Current Method of Flow Detection in Non-Magnetic Materials (Discussion).* (Various authors, J. App. Mech., Vol. 9, No. 1, March, 1942, p. 44.)
495	2768	U.S.A.	*High Speed Tension Tests at Elevated Temperature (Discussion).* (Various authors, J. App. Mech., Vol. 9, No. 1, March, 1942, pp. 45-47.)
			PRODUCTION.
496	2188	G.B.	*Quality Control (Statistical Method).* (Engineer, Vol. 173, No. 4,503, 1/5/42, pp. 370, 374-376.)
497	2253	U.S.A.	*Lofting Problems of Streamline Bodies (Part II).* (C. M. Hartley and R. A. Liming, Aero Digest, Vol. 40, No. 3, March, 1942, pp. 210-213 and 311.)
498	2256	U.S.A.	*Methods of Template Reproduction.* (C. O. Prest, Aero Digest, Vol. 40, No. 3, March, 1942, p. 240.)
499	2258	U.S.A.	*Production Short Cuts (Organisation, Tooling, Fabrication).* (Aero Digest, Vol. 40, No. 3, March, 1942, pp. 253-301.)

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500	2268	U.S.A.	*Production Metallizing.* (H. E. Linsey, Aero Digest, Vol. 40, No. 1, Jan., 1942, pp. 154-159, 248-249.)
501	2269	U.S.A.	*Lofting Problems of Streamline Bodies (Part II).* (C. M. Hartley and R. A. Liming, Aero Digest, Vol. 40, No. 1, Jan., 1942, pp. 180-184.)
502	2271	U.S.A.	*Design Improvements by Research.* (H. Ellinwood, Aero Digest, Vol. 40, No. 1, Jan., 1942, pp. 166-176.)
503	2278	U.S.A.	*Methods of Production Engineering (Part II).* (C. H. Spark, Aero Digest, Vol. 40, No. 1, Jan., 1942, pp. 292-296.)
504	2287	G.B.	*Statistical Control of Repetition Work.* (Engineering, Vol. 153, No. 3,980, 24/4/42, pp. 332-333.)
505	2309	Germany ...	*Modern Methods for the Manufacture of Pocket Watches.* (A. Spetzler, Z.V.D.I., Vol. 84, No. 23, 8/6/40, pp. 396-398.)
506	2343	G.B.	*X-Ray Analysis in Industry (Inst. of Physics Conference).* (Electronic Engineering, Vol. 14, No. 171, May, 1942, pp. 753-754.)
507	*2386	U.S.A.	*Planning for Production in the Douglas Works.* (D. W. Douglas, Aero Digest, Vol. 40, No. 1, Jan., 1942, pp. 132-133, 250-252.)
508	2398	G.B.	*X-Rays in the Light Metal Industry.* (E. J. Turnicliffe, Light Metals, Vol. 4, No. 51, April, 1941, pp. 108-119.)
509	2419	Germany ...	*Research and Development (the Eradication of Weak Spots in the Final Product).* (K. Dawes, A.T.Z., Vol. 44, No. 5, 10/3/41, pp. 107-111.)
510	2429	G.B.	*Education and Training of Engineers.* (Nature, Vol. 149, No. 3,783, 2/5/42, pp. 482-483.)
511	2431	G.B.	*X-Ray Analysis in Industry.* (Nature, Vol. 149, No. 3,783, 2/5/42, pp. 503-504.)
512	2432	G.B.	*Organisation of Production.* (Nature, Vol. 149, No. 3,784, 9/5/42, pp. 507-509.)
513	2452	G.B.	*Photo Copying Methods in the Drawing Office.* (Engineer, Vol. 173, No. 4,505, 15/5/42, pp. 415-416.)
514	2493	Germany ...	*The Training of Shop Foremen in the Aircraft Industry.* (E. Krause, Flugsport, Vol. 34, No. 9, 29/4/42, pp. 128-131.)
515	2503	U.S.A.	*Lofting Problems of Streamline Bodies (Part I).* (C. M. Hartley and R. A. Liming, Aero Digest, Vol. 40, No. 4, April, 1942, pp. 126-129, 259-261.)
516	2531	U.S.A.	*Lofting Problems of Streamline Bodies (III).* (C. M. Hartley and R. A. Liming, Aero Digest, Vol. 40, No. 2, Feb., 1942, pp. 151-155, 210.)
517	2537	U.S.A.	*Machine Tools in the Aircraft Industry.* (T. Berna, Aero Digest, Vol. 40, No. 2, Feb., 1942, pp. 183-187.)
518	2538	U.S.A.	*Production Engineering, Part III (Liaison).* (C. H. Speck, Aero Digest, Vol. 40, No. 2, Feb., 1942, pp. 188-190 and 198.)

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519	2611	Germany ...	*Spring Stool for Women in Factories (Advert.).* (Flugsport, Vol. 34, No. 10, 13/5/42, p. 120a.)
520	*2617	U.S.A.	*Production Test Experiments for Packard Built Rolls Royce Aircraft Engines (Digest).* (R. N. Du Bois, S.A.E.J., Vol. 50, No. 4, April, 1942, p. 33.)
521	*2618	U.S.A.	*Allison Production Testing Facilities (Digest).* (H. T. Buttner, S.A.E.J., Vol. 50, No. 4, April, 1942, p. 33.)
522	*2619	U.S.A.	*Buick Production Engine Testing (Digest).* (A. Chayne, S.A.E.J., Vol. 50, No. 4, April, 1942, pp. 33-34.)
523	*2620	U.S.A.	*Ford Production Test Equipment (Digest).* (W. H. Hedley, S.A.E.J., Vol. 50, No. 4, April, 1942, p. 34.)
524	*2628	U.S.A.	*Maintenance Instruction in the Automotive Industry.* (J. W. Lard, S.A.E.J., Vol. 50, No. 4, April, 1942, p. 40.)
525	2630	U.S.A.	*Production Council for U.S.A. Automotive War Effort.* (S.A.E.J., Vol. 50, No. 4, April, 1942, p. 42.)
526	2648	U.S.A.	*Truman Reprint on the O.P.M. and Organisation of New War Production Board.* (Inter. Avia., No.816-817, 13/5/42, pp. 16-19.)
527	2751	G.B.	*Aircraft Factory Lighting Installation.* (Engineering, Vol. 53, No. 3,986, 5/6/42, p. 450.)

SOUND, LIGHT AND HEAT.

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
528	2193	G.B.	*A Review of Recent Progress in Heat Transfer (with Discussion).* (C. H. Lander, Engineering, Vol. 153, No. 3,981, 1/5/42, pp. 354-355.)
529	2213	Germany ...	*Illumination Standards Relation between Heffener Candles and New Candle.* (Z.V.D.I., Vol. 86, No. 15-16, 18/4/42, p. 254.)
530	2259	U.S.A.	*Temperature (Colour Scale and Melting Points of Some Common Metals and Alloys).* ' (Aero Digest, Vol. 40, No. 3, March, 1942, pp. 313-314.)
531	2328	G.B.	*Relative Advantages of Film and Disc for Sound Recording.* (R. H. Cricks, Electronic Engineering, Vol. 14, No. 170, April, 1942, pp. 708-710, 726.)
532	2332	G.B.	*X-Ray Fluorescent Paper.* (Metal Industry, Vol. 60, No. 18, 1/5/42, p. 307.)
533	2434	G.B.	*History of the British Thermal Unit.* (R. W. Powell, Nature, Vol. 149, No. 3,784, 9/5/42, pp. 525-526.)
534	2461	G.B.	*Tubular Fluorescent Lamps in Industry.* (C. W. M. Phillips, Airc. Eng., Vol. 14, No. 158, April, 1942, p. 111.)
535	2462	G.B.	*Fluorescent Lighting.* (H. J. Jenkins, Airc. Eng., Vol. 14, No. 158, April, 1942, pp. 112-114.)
536	2479	U.S.A.	*Fibre Glass Sound Insulator in Engine Test Cells.* (Aviation, Vol. 41, No. 1, Jan., 1942, pp. 104-105.)

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537	2518	Switzerland ...	*The Design of Heat Exchangers.* (R. Nickus, Brown Boveri Review, Vol. 28, No. 8-9, Aug.-Sept., 1941, pp. 228-232.)
538	2760	U.S.A.	*Measurement of Latent Heat of the Gas Current Method.* (T. A. Goff and J. B. Hunter, J. App. Mech., Vol. 9, No. 1, March, 1942, pp. 21-25.)

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ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
539	2164	G.B.	*Wireless Engineer Abstracts for May,* 1942, *Compiled by the Radio Research Board.*
540	*2223	Germany ...	*German Radiolocation Equipment.* (Inter. Avia., No. 813-814, 25/4/42, p. 13.)
541	2246	U.S.A.	*Airway Radio Range Development.* (D. S. Little, Aero Digest, Vol. 40, No. 3, March, 1942, pp. 66-67, 413-415.)
542	2263	U.S.A.	*Medium High Frequency Visual Ground Direction Finder.* (D. S. Little, Aero Digest, Vol. 40, No. 1, Jan., 1942, pp. 70-73, 307-308.)
543	2323	G.B.	*Aerial Characteristics (Radiation Resistance, Anti-Fading, Feed, Terminal Resistance).* (N. Wells, J. Inst. Elect. Engs., Vol. 89, Pt. 1, No. 14, Feb., 1942, pp. 106-110.)
544	2325	G.B.	*Future of Radio Communication.* (P. P. Eckersley, Nature, Vol. 149, No. 3,782, 25/4/42, pp. 465-466.)
545	2344	G.B.	*Recent Progress in Electron Research.* (J. M. A. Leniham, Electronic Engineering, Vol. 14, No. 171, May, 1942, pp. 764-766.)
546	2399	G.B.	*Special X-Ray Film (Ilford).* (Light Metals, Vol. 4, No. 51, April, 1942, p. 120.)
547	2403	G.B.	*Short Wave Disturbance.* (T. W. Berrington, Wireless World, Vol. 48, No. 4, April, 1942, pp. 79-82.)
548	2405	G.B.	*Homodyne Reception (Energy Input in Synchronism with Carrier Frequency).* (Wireless World, Vol. 48, No. 4, April, 1942, pp. 87-89.)
549	2406	G.B.	*Electrons in M.H.F. Valves, II (Hollow Resonators and Circuits of High Q) (Ratio of Stored to Lost Power).* (M. Johnson, Wireless World, Vol. 48, No. 4, April, 1942, pp. 92-95.)
550	2408	Italy	*Radio in Wartime.* (E. Gnesutta, Radio Industria, Vol. 8, No. 86, Dec., 1941, pp. 74-78.)
551	2444	U.S.A.	*United Air Line Short Wave Location Recorder (Direction and Position Finding of Aircraft by Ground Stations).* (Flight, Vol. 41, No. 1,742, 14/5/42, pp. 482-484.)
552	2454	G.B.	*The Future of Trans-Oceanic Telephoning.* (O. E. Buckley, Engineering, Vol. 153, No. 3,983, 15/5/42, pp. 384-385.)
553	*2481	U.S.A.	*The Stratoscope, a Radio Aid to Navigation.* (Aviation, Vol. 41, No. 1, Jan., 1942, p. 151.)
554	2498	U.S.A.	*Standardisation of Aircraft Radio.* (D. S. Little, Aero Digest, Vol. 40, No. 4, April, 1942, pp. 76-80, 258.)

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555	2541	U.S.A.	*Aircraft Radio Trailing Antenna.* (Aero Digest, Vol. 40, No. 2, Feb., 1942, p. 259.)
556	2553	U.S.A.	*Propagation of Electromagnetic Waves in a Space Charge Rotating in a Magnetic Field and the Possibility of Using a Magnetron as a Resistance at Ultra High Frequencies.* (J. P. Blewett and S. Rams, J. App. Physics, Vol. 12, No. 12, Dec., 1941, pp. 856-859.)
557	2560	G.B.	*An Investigation of the Time Lag in an Electromagnetic Clutch.* (F. Horner, Phil. Mag., Vol. 33, No. 220, May, 1942, pp. 345-352.)
558	2601	G.B.	*Electric Battery Vehicle.* (Autom. Eng., Vol. 32, No. 423, May, 1942, p. 204.)
559	*2616	U.S.A.	*Aircraft Engines Radio Shielding (Digest).* (D. W. Randolph, S.A.E.J., Vol. 50, No. 4, April, 1942, p. 33.)
560	2712	U.S.A.	*Cosmic Ray Radio Sonde.* (H. V. Neher and W. H. Pickering, Rev. Scient. Insts., Vol. 13, No. 4. April, 1942, pp. 143-147.)
561	2715	G.B.	*German Aircraft Radio.* (Electronic Engineering, Vol. 15, No. 172, June, 1942, pp. 9-12.)
562	2716	G.B.	*Television Wave Forms.* (C. E. Lockhart, Electronic Engineering, Vol. 15, No. 172, June, 1942, pp. 19-26.)

Meteorology and Physiology.

563	2247	U.S.A.	*The Stars in March.* (W. C. Youngclaus, Aero Digest, Vol. 40, No. 3, March, 1942, pp. 68, 304-305.)
564	2262	U.S.A.	*The Stars in January.* (W. C. Youngclaus, Aero Digest, Vol. 40, No. 1, Jan., 1942, pp. 69, and 296.)
565	2288	G.B.	*Soil Erosion by Wind Action.* (Engineering, Vol. 153, No. 3,980, 24/4/42, p. 335.)
566	2404	G.B.	*Doppler Effect Produced by Meteors.* (Wireless World, Vol. 48, No. 4, April, 1942, p. 82.)
567	2436	U.S.A.	*A Modified Noyons Thermic Diaferometer for Respiratory Gas Analysis.* (T. M. Carpenter and V. S. Coropatchinsky, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 2, 15/2/42, pp. 159-163.)
568	2457	G.B.	*Oxygen Breathing Systems.* (A. R. Weyl, Airc. Eng., Vol. 14, No. 158, April, 1942, pp. 92-96, 110.)
569	2499	U.S.A.	*Stars in April.* (W. C. Youngclaus, Aero Digest, Vol. 40, No. 4, April, 1942, pp. 82-85, 159.)
570	2523	U.S.A.	*The Stars in February.* (W. C. Youngclaus, Aero Digest, Vol. 40, No. 2, Feb., 1942, pp. 64, 273.)
571	2590	G.B.	*Micro Straining—A New Development in Water Purification (No. II).* (P. L. Boucher, Engineer, Vol. 173, No. 4,507, 29/5/42, pp. 445-446.)
572	2596	G.B.	*Micro Straining (Water Purification).* (P. L. Boucher, Engineer, Vol. 173, No. 4,506, 22/5/42, pp. 420-422.)

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573	*2756	U.S.A.	*Gas Exchange in the Lungs at High Altitudes.* (D. B. Dill and F. G. Hall, J. Aeron. Sci., Vol. 9, No. 6, April, 1942, pp. 220-223.)
			PHOTOGRAPHY.
574	2326	G.B.	*Errors in Photography of Cathode Ray Tube Traces (Effect of Screen Curvature).* (H. Mass and E. Cattanes, Electronic Engineering, Vol. 14, No. 170, April, 1942, pp. 720-721.)
575	2736	Germany ...	*Development Problems in Aerial Cameras.* (H. C. Wohbrab, Luftwissen, Vol. 9, No. 2, Feb., 1942, pp. 37-41.)
576	2749	G.B.	*Enemy Aircraft Photographic Equipment.* (F. Postlethwaite, Engineering, Vol. 53, No. 3,986, 5/6/42, pp. 441-443.)
			TRANSPORT.
577	2244	Germany ...	*Motor Cycle Combination with Differential Drive on Rear Wheels.* (A.T.Z., Vol. 45, No. 6, 25/3/42, pp. 163-165.)
578	2299	Germany ...	*The Turning Circle of Caterpillar Tractors.* (I. Frey, A.T.Z., Vol. 45, No. 5, 10/3/42, pp. 129-131.)
579	2315	Germany ...	*Experience with German Standard Motor Vehicles in Russia.* (A.T.Z., Vol. 45, No. 4, 25/2/42, p. 101.)
580	2378	Germany ...	*Acceleration and Hill Climbing Qualities of Stream Lined Motor Cars.* (H. Hahn, A.T.Z., Vol. 44, No. 2, 25/1/41, pp. 31-36.)
581	2600	G.B.	*Rubber Tracks for Traction.* (R. Mayne and H. W. Delzell, Autom. Eng., Vol. 32, No. 423, May, 1942, pp. 183-188.)
582	2558	Italy	*German Notes on the Performance of Motor Vehicles in North Africa (Effect of Temperature and Dust).* (l'Auto italiana, Vol. 23, No. 10, 10/4/42, pp. 21-23.)
583	2747	Germany ...	*Standardisation of Some General Terms Applying to Motor Transport Vehicles.* (Z.V.D.I., Vol. 85, No. 26, 28/6/41, pp. 586-587.)
			MISCELLANEOUS.
584	2165	G.B.	*Rotol Digest.* (Vol. 3, No. 17, 29/4/42.)
585	2163	G.B.	*Abstracts for March, 1942. Issued by the I.A.E. Automobile Research Committee.*
586	2166	G.B.	*Bristol Aero Engine Dept. Abstracts and Information.* (Vol. 6, No. 17, 29/4/42.)
587	2183	Germany ...	*Lilienthal Prizes for 1942. (List of Subjects for Competitions.)* (Supplement to Luftwissen, Vol. 9, No. 3, March, 1942, pp. 1-6.)
588	2222	Germany ...	*Subject of Lilienthal Prize Competition.* (Inter. Avia., No. 813-814, 25/4/42, pp. 12-13.)
589	2363	G.B.	*Rotol Digest.* (Vol. 3, No. 18, 6/5/42.)
590	2364	G.B.	*Rotol Digest.* (Vol. 3, No. 19, 13/5/42.)
591	2365	Germany ...	*Bristol Aero Engine Dept. Technical Abstracts and Information.* (Vol. 6, No. 18, 6/5/42.)

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592	2366	G.B.	*Bristol Aero Engine Dept. Technical Abstracts and Information.* (Vol. 6, No. 19, 13/5/42.)
593	2387	G.B.	*Technical Abstracts Issued by Bristol Aero Engine Dept.* (Vol. 6, No. 20, 20/5/42.)
594	2388	G.B.	*Rolls-Royce Technical Abstracts and Information.* (Vol. 111, No. 5, May, 1942.)
595	2389	G.B.	*Rotol Digest.* (Vol. 3, No. 20, 20/5/42.)
596	2559	G.B.	*On the Dimensions of Physical Magnitude.* (H. Dingle, Phil. Mag., Vol. 33, No. 220, May, 1941, pp. 321-344.)
597	2561	G.B.	*Some Disputed Questions in the Philosophy of the Physical Sciences.* (E. T. Whittaker, Phil. Mag., Vol. 33, No. 220, May, 1942, pp. 353-366.)
598	2562	G.B.	*Dimensions.* (N. Campbell, Phil. Mag., Vol. 33, No. 220, May, 1942, p. 398.)
599	2591	G.B.	*Scientific Research and Development in the Empire.* (A. V. Hill, Engineer, Vol. 173, No. 4,507, 29/5/42, pp. 447-449.)
600	*2610	Germany ...	*List of Subjects for Lilienthal Competition,* 1942. (Flugsport, Vol. 34, No. 10, 13/5/42, pp. 149-150.)
601	2657	Germany ...	*Aeronautical Prizes in Germany.* (Inter. Avia., No. 815, 4/5/42, pp. 8-9.)
602	2670	G.B.	*Abstracts for April,* 1942, *Issued by the I.A.E. Automobile Research Committee.*
603	2671	G.B.	*Rotol Digest.* (Vol. 3, No. 21, 27/5/42.)
604	2672	G.B.	*Rotol Digest.* (Vol. 3, No. 22, 3/6/42.)
605	2673	G.B.	*Technical Abstracts Issued by the Aero Engine Dept., Bristol Aeroplane Co., Ltd.* (Vol. 6, No. 21, 27/5/42.)
606	2674	G.B.	*Technical Abstracts Issued by the Aero Engine Dept., Bristol Aeroplane Co., Ltd.* (Vol. 6, No. 22, 3/6/42.)
607	2675	G.B.	*Abstracts and References Compiled by the Radio Research Board, June,* 1942.
608	2713	U.S.A.	*Condensed Library Guide for the Physicist.* (J. A. Wheeler and M. C. Shields, Rev. Scient. Insts., Vol. 13, No. 4, April, 1942, pp. 197-202.)