# ABSTRACTS FROM THE SCIENTIFIC AND TECHNICAL PRESS.

*An Experimental Study of Turbulence Diffusion.* (E. G. Richardson, Proceedings of the Physical Society, Vol. 49, 1937, pp. 479-92. Article available in R.T.P., Absts.) (51/1 Great Britain.)

This paper describes a method involving study of the rate of diffusion, due to the turbulence prevailing in a stream, of a dye let into the stream. The concentration of the dye is measured with a beam of light and photo-electric cell, and the stream velocity with a hot wire anemometer, at various places in the stream. As a test of the method the latter is first applied to molecular diffusion and shown to give results in accordance with those obtained by other methods. Next, turbulence induced in a water channel by gratings of various mesh widths is traced. By using a pair of sources and light beams with associated photo-electric cells, the degree of correlation between the motions at two points in the turbulent stream, both along and across it, can be studied.

Finally, the diffusion due to turbulence of the dye source at the head of a plate edge on to the stream is studied. Smooth plates and those having a sinusoidal roughness are used. It is found that both the velocity distributions and the rates of diffusion can be expressed in terms of a Blasius parameter and a factor dependent on the wave length of the roughness.

*General Aerodynamical Criterion and its Application to the Determination of Optimum Wing Parameters.* (A. Borin, Aeron. Eng. (U.S.S.R.), No. 8, Aug., 1937, pp. 1-12. Original in Russian.) (51/2 U.S.S.R.)

(a) The aerodynamic criteria for aircraft in different régimes appear to be particular cases of the general aerodynamic criterion

$$\xi = C_x / C_y^n S^{n-1}.$$

(b) The aerodynamic properties of aeroplanes in extreme régimes appear to be functions of two parameters:—$C_\Sigma$ and $C_x$, the first of which characterises the aerodynamic properties of the parts which give no lift and the second characterises the aerodynamic properties of the wing profile.

(c) For a full comparative estimate of the aerodynamic properties of aircraft it is convenient to plot curves of $\xi$ against $n$.

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*Approximate Determination of Coefficients $B_n$ and $C_{2k}$ in Aerofoil Design by the Lotz Method.* (E. Krasnovperov, Aeron. Eng. (U.S.S.R.), No. 9, Sept., 1937, pp. 1-18. Original in Russian.) (51/3 U.S.S.R.)

Contents :—

1. Lotz method and its negative aspects.
2. Approximate method for determining the coefficients $C_{2k}$.
3. Comparison of the approximate and accurate values of $C_{2k}$ for several wings.
4. Approximate values of the coefficient $B_n$.
5. Comparison of the approximate and accurate values of $B_n$ for several wings.

*Measurements with the Six-Component Balance on a Model of a Flying Boat Supported on a Glass Plate in Order to Represent the Effect of the Water Surface.* (M. Kohler, L.F.F., Vol. 14, No. 12, 20/12/37, pp. 583-92.) (51/4 Germany.)

The model is immersed in a sheet of glass so as to represent the aircraft under floating conditions. The central section of the glass is in the form of a circular twin table so that the model can be rotated through 360°, whilst at the same time both the longitudinal and the lateral inclination of the model can be altered.

The object of the experiments is to determine the resultant of all the aerodynamic forces (position, magnitude and direction) acting on a flying boat floating on smooth water. The model represented the Dornier-Wal flying boat (high wing monoplane) and the results of the tests are compared with previous experiments carried out on a biplane fitted with floats.

Whilst the force measurements on the two models are in general agreement, the moments show considerable differences which are discussed.

Further experiments with running propellers are planned in order to investigate the flow phenomena more fully.

The boundary layer existing on the plate will also be studied further in order to obtain some information on the effect of the nature of the surface of the water on the phenomena under review.

*The Effect of the Type of Surface Roughness on the Resistance of a Ship's Hull.* (I. Khanovich, Tech. Phys., U.S.S.R., Vol. IV, No. 9, 1937, pp. 722-741. In English.) (51/5 U.S.S.R.)

The object of the paper is to investigate how the resistance produced by roughness depends on the roughness parameters and dimensions of the hull.

Two types of flow were considered :—

(1) The density distribution of the protuberances is relatively low, so that the additional resistance caused by their presence can be obtained by adding the individual eddy resistance of each element.
(2) The density distribution is so high that the entire resistance of the hull is due to the eddy resistance of the disturbed stream.

The author claims that the theoretical investigations in conjunction with the experiments make it possible for the first time to define roughness mathematically.

On the basis of the results obtained, various recommendations for the practical design of ships are made, such as—

(1) Reduce heights of rivets to a minimum.
(2) Increase breadth of plates.
(3) Increase length of plates.
(4) Smooth down the edges of lap joints and break them in the direction of the streamlines.
(5) Guard against all waviness in the hull.

*Production and Dissipation of Vorticity in a Turbulent Fluid.* (G. I. Taylor, Proc. Roy. Soc., Series A, Vol. 164, No. 916, 7/1/38, pp. 15-23.) (51/6 Great Britain.)

When isotropic turbulence is set up in a fluid, *e.g.*, by moving a grid of regularly spaced bars through it, the average vorticity decreases with time, this decrease being due to viscosity. Recently von Kármán has calculated the rate at which vorticity is destroyed by viscosity. His equation involves only quantities which can be measured in a wind tunnel by means of the hot wire technique. These quantities have now been measured in one case, and the rate of decrease in the mean square of the vorticity has also been measured. In this case it is proved that the rate of destruction of vorticity by viscosity is four times as great as the rate at which vorticity disappears. Vorticity is therefore being produced by extension of vortex filaments three times as fast as it is disappearing.

It seems that the stretching of vortex filaments must be regarded as the principal mechanical cause of the high rate of dissipation which is associated with turbulent motion.

*Notes on the U.S.S.R. Aircraft Strength Specifications.* (M. Precoul, L'Aerophile, Vol. 45, No. 5, pp. 106-113, No. 6, pp. 132-136; No. 7, pp. 156-159, No. 8, pp. 185-188, and No. 9, pp. 207-209.) (51/7 U.S.S.R.)

The Russian specifications are of interest in that the maximum speed of the aircraft as well as its weight is taken into consideration.

All aircraft is divided into two classes (civil and military) each class being sub-divided into categories on a weight basis. The load factor on the wings differs for each category and is moreover a linear function of the flying speed.

Important sections of the Russian regulations deal with the stressing of slotted wings and ailerons. The stressing of undercarriages and shock absorbers is also taken in great detail, including the case where ski runners are used.

The sections dealing with seaplanes (floats and boats) are practically identical with the German regulations.

Although the Russian regulations are apparently complicated, such full directions are given that their employment is relatively simple and should not require the aid of specialists.

It appears as if the object of the Russian authorities had been to provide a compact handbook on the general problem of aircraft stressing for the use of the aircraft constructor.

*Tests of Related Forward Camber Aerofoils in the Variable Density Wind Tunnel.* (E. N. Jacobs, R. M. Pinkerton and M. Greenberg, N.A.C.A. Report No. 610, 1937.) (51/8 U.S.A.)

A recent investigation of numerous related aerofoils indicated that positions of camber forward of the usual location resulted in an increase of the maximum lift. As an extension of this investigation, a series of forward camber aerofoils has been developed, the members of which show aerofoil characteristics superior to those of the aerofoils previously investigated.

The primary object of the report is to present fully corrected results for aerofoils in the useful range of shapes. With the data thus made available, an aeroplane designer may intelligently choose the best possible aerofoil section shape for a given application and may predict to a reasonable degree the aerodynamic characteristics to be expected in flight from the section shape chosen.

For aerofoils of moderate thickness, the optimum camber position was found to correspond to that of the N.A.C.A. 23012 section. A discussion is included concerning the choice of the best thickness and camber for full-scale applications depending on specific design conditions. Data to assist in the choice of the optimum section for a design using split flaps were obtained by testing some of the better sections with trailing-edge split flaps.

*Maximum Forces Applied by Pilots to Wheel-Type Controls.* (W. H. McAvoy, N.A.C.A. Tech. Note, No. 623, Nov., 1937.) (51/9 U.S.A.)

Measurements were made of the maximum push, pull and tangential forces that could be applied to aeroplane wheel-type controls for a wide range of fore-and-aft positions of the wheel. The measurements were conducted with several sizes of wheels and several heights of the centre of the wheel above the seat. Various one- and two-hand grips with pilots, both secure and free, were studied for each of the two pilots used in the investigation.

*Extension of the New Family of Wing Profiles.* (R. W. Piper, Phil. Mag., Vol. 24, No. 105, Dec., 1937, pp. 1114-26.) (51/10 Great Britain.)

In this paper the use of transformation of " A New Family of Wing Profiles " (Phil. Mag., Vol. 24, No. 161, Sept., 1937, p. 425) has been extended, (*a*) to reflex the tail of the aerofoil and so restrict or eliminate the travel of its centre of pressure; (*b*) to produce a section with an arbitrarily sharpened nose. The extensions developed separately, for simplicity, are not mutually exclusive, and may be combined, if desired, to give a cambered profile with a stationary centre of pressure and an arbitrarily sharpened nose.

*Full-Scale Static Propeller Characteristics.* (L. H. Enos, J. Aer. Sci., Vol. 5, No. 1, Nov., 1937, pp. 25-8.) (51/11 U.S.A.)

Under static conditions the effect of tip speed is greater at blade angles of $15°$ than at $23°$. For a propeller using an R.A.F. 6 profile the tip-speed effect is noted above 700ft. per sec., while for propellers using the Clark Y and N.A.C.A. 2400 profiles the effect becomes noticeable above 900ft. per sec., particularly for the lower blade angles.

For a value of $C_p$ of 0.06, equivalent to a blade angle of approximately $15°$, and a tip speed of 900ft. per sec., the R.A.F. 6 profile propeller gives a $C_T/C_p$ ratio 4.5 per cent. greater than the Clark Y and 6.5 per cent. greater than the N.A.C.A. 2400 profile propeller. At a $C_p$ of 0.12, equivalent to a blade angle of approximately $23°$, the values are, respectively, 10.5 and 15.0 per cent. greater.

The ratio of the net static thrust on a single-engined aeroplane to the propeller shaft thrust varied from 0.85 on a high wing monoplane with several struts in the slipstream to 0.95 on a streamlined low wing monoplane.

*Wind Tunnel Investigations of Tapered Wings with Ordinary Ailerons and Partial Span Split Flaps.* (C. J. Wenzinger, N.A.C.A. Report No. 611, 1937.) (51/12 U.S.A.)

An investigation was made in the N.A.C.A. 7 by 10-foot tunnel to determine the aerodynamic properties of tapered wings having partial span flaps for high lift and ordinary ailerons for lateral control. Each of two Clark Y wings, tapered 5 : 1 and 5 : 3, was equipped with partial span split flaps of two lengths and with ordinary ailerons extending from the outboard ends of the flap to the wing tips. Measurements of wing forces and moments and of aileron hinge moments were made for the two conditions of flaps, neutral and deflected.

With split flaps of equal length both wings had practically the same $C_L$ max. If 30 per cent. of the flap outer span were removed for the installation of ailerons, a reduction in $C_L$ max. of the tapered wings with flaps might be expected of the order of 4 to 7 per cent.

Ailerons of the same span were found to give higher rolling moment coefficients together with greater adverse yawing moment coefficients on the 5 : 3 tapered wing than on the wing tapered 5 : 1. In addition, ailerons of the same span on the tapered wings tested gave greater rolling moment coefficients and smaller adverse yawing moment coefficients at the same lift coefficient when the partial span flaps were deflected than when they were neutral.

*Several New Problems in the Theory of Wing Flutter.* (E. Grossman, M. Keldish, L. Popov and J. Parchomovsky, Aeron. Eng. (U.S.S.R.), No. 6, June, 1937, pp. 4-20 (to be cont.). Original in Russian.) (51/13 U.S.S.R.)

The present instalment summarises the first of three papers read at a conference on vibrations in December, 1936, namely :—

1. Vibration of a Wing with an Aileron.
2. On the Vibrations of a Wing Set at a Dihedral.
3. The Effect of the Fuselage on a Vibrating Wing.

Extended methods are given for the calculation of wing flutter in the case of the system of a wing with an aileron. A series of experiments have been carried out for the case of torsional aileron flutter which confirm the theory and even explain the effect of some constructional parameters of the aileron on the value of the critical velocity.

*Spinning Characteristics of Wings IV—Changes in Stagger of Rectangular Clark Y Biplane Cellules.* (M. J. Bamber and R. O. House, N.A.C.A. Tech. Note No. 625, December, 1937.) (51/14 U.S.A.)

On the assumption that the arbitrary constants added to the rolling moment and yawing moment coefficients are of the right order of magnitude, the following main conclusions are drawn from experiments on a conventional biplane with rectangular Clark Y wings having 0.25, zero and −0.25 stagger respectively, the decalage being 0° throughout and the gap equal to the chord.

1. The value of the yawing moment coefficient required from the fuselage, tail and interference effects for steady spinning equilibrium is small and nearly always negative.

2. The maximum value of the yawing moment coefficient to be supplied by all parts of the aircraft (other than wings or inertia couples) to prevent spinning equilibrium is $Cn = -0.025$.

3. The value of stagger for test characteristics depends on the type of aircraft.

4. At some angles of attack fin area ahead of the wing will be more effective than a good tail arrangement in preventing a dangerous spin.

5. Too much reliance must not be placed on tail arrangements for preventing bad spinning characteristics.

(Twelve references.)

*Transport Comparison—Comparative Table of Efficiency of Various Makes of Civil Aircraft.* (R. A. E. Luard, Flight, Vol. 33, No. 1515, 6/1/38, pp. 16-18.) (51/15 Great Britain.)

The 11 machines compared differ widely in disposable load, this factor ranging from 1,117lb. (Monospar ST. 25) to 16,650lb. (Short Empire boat). (The disposable load is defined as the difference between the all-up weight fully equipped and the weight empty.)

The following table gives the maximum variation in the other factors considered by the author :—

| | | |
|---|---|---|
| Disposable load as per cent. of all-up weight ... | 32 — | 41% |
| Cruising h.p. as per cent. of maximum h.p. ... | 56 — | 85% |
| Cruising speed in m.p.h. ... ... ... | 116 — | 213 |
| Disposable load in lb./cruising h.p. ... ... | 4.5 — | 8.2 |
| Fuel consumption in gallons per ton/mile disposable load at cruising speed ... ... ... | 0.1 — | 0.2 |
| No. of passenger seats ... ... ... ... | 4 — | 24 |
| Capital cost per passenger seat/miles per hour (cruising speed) ... ... ... ... | £4 — | £15 |
| Capital cost per ton/mile disposable load for a flight of one hour at cruising speed... ... | £31 — | £49 |

In addition to the above, such factors as reliability, safety and passenger comfort will, of course, require consideration.

*Static Thrust Analysis of the Lifting Airscrew.* (M. Knight and R. A. Hefner, N.A.C.A. Tech. Note No. 626, December, 1937.) (51/16 U.S.A.)

The theoretical part of this study is based on Glauert's analysis, the solidity concept being, however, eliminated as an independent parameter.

Model experiments were carried out with 2, 3, 4 and 5-bladed rotors and the results are generally in satisfactory agreement with theory.

The scale effect has been evaluated theoretically and convenient charts enable hovering flight performance to be calculated rapidly.

*Comparative Performance of Automatic Guns.* (A. Stager, W.T.M., Vol. 41, No. 11, November, 1937, pp. 494-6.) (51/17 Germany.)

The author proposes two efficiency factors :—

$$1. \ E_0 Z / G.$$
$$2. \ g Z / G.$$

where $E_0$ = energy muzzle of shell.
 $Z$ = number of shots per minute.
 $g$ = weight of shell.
 $G$ = weight of gun.

From comparison of the data applying to four machine guns varying in calibre from 13 to 40 mm., it is concluded that both efficiency factors show a pronounced maximum in the neighbourhood of 20 mm. calibre.

*Attack on Crops by Means of " Fire Rain " (from the Russian).* (Luftwehr, Vol. 4, No. 10/11, October/November, 1937, p. 439.) (51/18 U.S.S.R.)

The " rain " consists of a mixture of petrol, phosphorus, and carbon tetrachloride which is sprayed by low flying aircraft. Principal objectives are forests and crops, but small villages are also mentioned. According to the Russian author, the " fire rain " is more effective than incendiary bombs when used against targets of this type.

*The Shock Wave and Explosion Productions from Detonating Explosives.* (W. Payman and D. W. Woodhead, Proc. Roy. Soc., Series A, Vol. 163, No. 915, 22/12/37, pp. 575-92.) (51/19 Great Britain.)

The mode of expansion of the disturbance produced when a cartridge of explosive suspended freely is detonated has been studied by means of Schlieren photography, using cameras of both instantaneous and continuous types. The records show that there are three phases in the life of the disturbance produced.

1. Detonation of cartridge. The time of this phase is short (of the order of $10^{-5}$ sec.) ; the shock wave is smooth and precedes the front of the gaseous products by a fraction of a cm.
2. The second phase lasts about ten times the first period and characteristic prominences due to solid particles appear in the wave front.
3. The third phase begins when all prominences have disappeared ; the wave rapidly assumes a spherical form, travelling at an initial speed of app. 500 m./sec. This speed diminishes till the wave degenerates into an ordinary sound wave.

*Aerial Combat—The Probability of Hitting Target as a Function of the Rate of Fire.* (C. Brissot, Rev. de l'Arm de l'Air, No. 100, November, 1937, pp. 1257-77.) (51/20 France.)

From consideration of the mathematical theory of probability, the author draws the following main conclusions :—

(1) For a frontal attack on a light bomber (aircraft approaching on the same course), a fighter fitted with four light machine guns (7.5 mm., firing rate 20 rounds/sec.) has nine chances in ten of hitting the target, the normal rate of approach being 200 m./sec.

Firing starts at a range of 800 m. and the action is broken off at 300 m.

These results are better than can be obtained with two cannons of 20 mm. calibre, firing rate 12 rounds/sec.

(2) Cross fire at short distances (100-300 m.) is very uncertain in its effects, unless the dispersion of the gun is deliberately increased or the fire of several aircraft concentrated on the same target.

(3) In future a closer adjustment between the precision of the gun and the accuracy of the sight is called for.

*Improvements in Aircraft Cannons.* (French Patent No. 810,943.) (M. Birkigt, Rev. de l'Arm de l'Air, No. 100, November, 1937, pp. 1310-2.) (51/21 France.)

The object of this patent is to reduce friction and wear as well as inertia loads.

The gun is gas controlled, the novelty consisting in the fact that both barrel and striking mechanism can oscillate independently, although they are locked together over certain parts of the stroke.

On account of the lighter barrel rendered possible by this construction, it is claimed that a rate of fire appreciably higher than that of the standard Hispano 20 mm. cannon can be maintained.

*Device for Increasing the Muzzle Velocity of Shells.* (French Patent No. 804,237.) (Rev. de l'Arm de l'Air, No. 100, November, 1937, pp. 1312-3.) (51/22 France.)

The shell is of smaller diameter than the gun barrel and fitted in a special carrier which transmits the gas pressure and follows the rifling. On leaving the muzzle, the carrier is shed automatically. The inventor claims that by giving a special shape to the shell proper, the muzzle velocity can be increased by 40 per cent. above current values and that speeds of the order of 1,500 m./sec. should be possible for machine guns. The patentees are the Skoda Works in Czechoslovakia.

*Synchronised Control Gear for Rigid Machine Gun on Aircraft.* (Luftwissen, Vol. 4, No. 12, Dec., 1937, pp. 367-9.) (51/23 Germany.)

The control gear described and illustrated is that of the Rheinmetall-Borsig 7.9 mm. gun. As is well known, synchronised gun gears may be either of the electrical, hydraulic, or mechanical type. The gun illustrated operates on the latter principle, the mechanism being entirely wire controlled. The operation of the gun is illustrated from the instant a new cartridge is inserted till the firing takes place. The total time interval between consecutive shots is made up of :—

(1) Time $t_T$ for ejecting spent cartridge, inserting new cartridge and locking barrel.

(2) Rest period $t_w$ from the instant the weapon is ready till the cam on the propeller shaft begins to operate.

(3) Operation time interval $t_{st}$ determined by shape of cam.

For this particular gun, $t_T$ and $t_{st}$ are of the order of 0.050 and 0.017 sec. respectively, the effect of the operation time interval being to reduce the rate of fire from the theoretical value of 1,200/minute to 900/minute.

*Wind Tunnel Tests of Air Intake Louvres.* (J. R. Weske, J. Aer. Sci., Vol. 5, No. 1, Nov., 1937, pp. 8-11.) (51/24 U.S.A.)

Air intakes for cooling or ventilating purposes of aircraft or surface vehicles may be of the projecting type designed to produce a considerable pressure, or else of the flush type. The latter type is advantageous for large intake openings and also in those instances where reduction of drag is essential.

An analysis of the operation of ventilating openings and a large amount of experimental data were presented by F. Rokus and T. Troller in a recent paper (Tests on Ventilating Openings for Aircraft, Journal Aeronautical Sciences, Vol. 3, No. 6, April, 1936, pp. 203-8). These data, however, do not include non-projecting intakes of relatively large size. Since the latter are of considerable practical importance, an experimental investigation of several models of intake louvres with a large number of deflecting vanes was undertaken and the results are presented in the present paper.

*Family of " M.G. " Aero Engines.* (M. Bondariuk, Aeron. Eng. (U.S.S.R.), No. 8, Aug., 1937, pp. 32-45. Original in Russian.) (51/25 U.S.S.R.)

This paper describes the construction of a class of air-cooled radial engines, the general characteristics of which are summarised in the following table:—

|  | MG 31 | MG 21 | MG 11 |
|---|---|---|---|
| Number of cylinders ... ... ... | 9 | 7 | 5 |
| Cylinder diameter in mm. ... ... | 125 | 125 | 125 |
| Stroke of piston in mm. ... ... | 140 | 140 | 140 |
| Compression ratio ... ... ... | 5 :1 | 5 :1 | 5 :1 |
| Maximum guaranteed h.p. and corresponding r.p.m. ... ... ... | 320/1820 | 220/1720 | 180/1890 |
| Nominal h.p. and corresponding number of r.p.m. ... ... ... | 270/1720 | 200/1680 | 150/1790 |
| Weight of the empty engine in kg. ... | 247 | 214 | 175 |
| Recommended fuel and octane number { | Baku 70—72 | Petrol 70—72 | Type II 70—72 |
| Specific fuel consumption in gr./h.p. ... | 245 | 245 | 245 |
| Specific oil consumption in gr./h.p. ... | 15—20 | 10—15 | 10—15 |

*Design of Supercharger Diffusors Taking into Account Friction Coefficients.* (G. Skubatchevzky, Aeron. Eng. (U.S.S.R.), No. 9, Sept., 1937, pp. 52-67. Original in Russian.) (51/26 U.S.S.R.)

Contents :—

Theory of the elementary diffusor.

Experimental arrangement and theory of the experiments carried out to determine :—

(*a*) The quantity of air per second passing through the supercharger (and consequently through the diffusor under investigation).
(*b*) The temperature of the air entering the diffusor $-T_n°C$.
(*c*) The pressures in the different sections of the diffusor.

Geometrical dimensions of diffusors.

Experimental results.

Effect of through-put of air on the values of the coefficients.

Determination of air pressure in diffusors by means of coefficients of friction $\xi$, which are determined experimentally.

*Research and Design Problems Introduced by Increased Power Output.* (O. Kurtz, Luftwissen, Vol. 4, No. 4, April, 1937, pp. 116-25. Available as translation N.A.C.A. Tech. Memo. No. 840.) (51/27 Germany.)

The author is of the opinion that the reciprocating piston engine (either in the form of spark or compression ignition) will hold the field for a long time to come and in his paper studies in detail the following problems :—

(1) Form and lay-out of high performance engines.
(2) Raising of engine power.
(3) Improving take-off performance.
(4) Lowering of fuel consumption.

In brief, the conclusions are the following :—

(1) Mechanical complications limit the minimum size of cylinder. For a 1,000/1,500 b.h.p. engine, a number of cylinders varying between 14 and 24 appears promising. (Radial, V or H lay-out.)

(2) Power output depends on r.p.m. and boost pressure. The efficiency of the supercharger determines the mixture temperature and is therefore of great importance. The sleeve valve, being apparently less sensitive to speed and temperature than the normal poppet valve will require careful consideration.

(3) Apart from special fuels (alcohol mixture) water injection appears promising for providing internal cooling under strenuous conditions.

(4) At high compression ratios, the spark ignition engine with weak mixture will give a fuel consumption of the order of 0.4lb./b.h.p. hour at 60 per cent. full load. Very sensitive carburettor installations are required to maintain this low consumption as the possible running range is limited.

*Turbulence in Internal Combustion Engines.* (W. T. David, Engineer, No. 4277, 31/12/37, pp. 733-4.) (51/28 Great Britain.)

The author concludes from explosion records (cooling curves) that the turbulence due to the combustion of fast burning mixtures is of a much higher order than any mechanical turbulence due to the piston motion.

The major part of the heat loss (near T.D.C.) is thus due to the combustion proper and mechanical turbulence only has an effect towards the end of the expansion stroke, when the effect of combustion in stirring up the gases has died down.

Interesting photographs showing how the turbulence is associated with the last stages of the flame travel are reproduced.

*Acetal as Motor Fuel.* (S. Doldi, Chimica e industria, No. 19, 1937, pp. 369-72. Chem. Absts., Vol. 31, No. 21, 10/11/37, p. 8155.) (51/29 U.S.A.)

Both dimethyl and dimethylacetal can be used in alcohol fuel mixtures to replace part of the alcohol. The dimethylacetal is better and it has a high anti-knock value. With its use, motors can attain the same speed as with petrol alone, which cannot be done when alcohol alone is added to the petrol fuel.

*Mechanism of the Autoxidation of Simple Hydrocarbons. Autoxidation of Motor Fuels and Lubricating Oils.* (H. Hock, Oel, Kohle, Erdoel, Teer, 13, 1937, pp. 697-700. Chem. Absts., Vol. 31, No. 22, 20/11/37, p. 8875.) (51/30 Germany.)

Literature is reviewed briefly. The preparation of pure peroxides, their properties and transformation are described. Reactions and properties of the tetralin peroxide previously reported (C.A. 31, 4619), an α-hydroperoxide, are described. Failure of Plisov (C.A. 30, 3975) to obtain peroxides with paraffins is explained by decomposition at the temperatures used (120-150°).

*Formation of Nitrogen Oxide in Combustion of City Gas in Burners and Heating Chambers.* (P. Schlapfer, Schweiz. Ver. Gas-u. Wasserfach. Monats-Bull. 17, 1937, pp. 147-60. Chem. Absts., Vol. 31, No. 22, 20/11/37, p. 8885.) (51/31 Germany.)

The literature on the formation of N-O compounds during combustion is reviewed and their significance in the theory of detonation is pointed out.

A series of experiments is described in which the formation of N-O compounds during the combustion of coal gas is demonstrated.

*The Viscosity Temperature Index of Lubricating Oils.* (Y. A. Pinkevich, Neftyanoe Khoz, No. 4-5, 1937, pp. 75-7. Chem. Absts., Vol. 31, No. 22, 20/11/37, p. 8945.) (51/32 Poland.)

A modified Dean and Davis (*cf.* C.A. 24,716) equation for the determination of the temperature viscosity index is proposed. It is claimed that the new equation permits the determination viscosity temperature indexes at low temperature even if non-standard temperatures were used in the viscosity determination.

*The Ageing of Lubricating Oils.* (H. Suida, Oel, Kohle, Erdoel, Teer 13, 1937, pp. 201-6 and 225-32. Chem. Absts. Vol. 31, No. 22, 20/11/37, p. 8906.) (51/33 Germany.)

The following are some of the points discussed in this report :—

1. Products formed during the ageing process.
2. Their effect on lubricating properties.
3. Ageing tests.
4. The effect of fatty additions.
5. Compensation for ageing by pre-treatment.

*The Influence of Lubricating Agents on the Starting Behaviour of Motors.* (K. Schwaiger, Oel, Kohle, Erdoel, Teer 13, 1937, pp. 715-20. Chem. Absts., Vol. 31, No. 22, 20/11/37, p. 8906.) (51/34 Germany.)

Lubrication at temperatures below o° has been studied with a new cold viscometer which is described. Findings therewith are equivalent to those by motor tests. Changes in viscosity (kinematic units) of many lubricants below o° do not conform to those calculated with present-day formulæ.

*Lubrication of Anti-Friction Bearings.* (L. Ballard, Blast Furnace Steel Plant, 25, 1937, pp. 709-12. Chem. Absts., Vol. 31, No. 22, 20/11/37, pp. 8906-7.) (51/35 U.S.A.)

Functions of lubricant for anti-friction bearings are :—(1) To provide lubrication between the balls or rollers and their retainers; (2) to provide protection against corrosion; (3) to assist in forming a seal for preventing the entrance of dirt and abrasive materials into the housings. At high speeds the lubricant serves to carry a portion of the load. Bearing troubles traced to lubrication are :—(1) Disintegration of grease structure by severe agitation or heat; (2) oxidation of lubricant resulting in gummy deposits; (3) over-lubrication which creates excess internal fluid friction; (4) use of lubricants unsuited for operating conditions.

*Development of Acidity in Certain Lubricating Oils on Use or Oxidation.* (A. R. Rescorla. F. L. Carnahan and M. R. Fenske, Ind. and Eng. Chem. (Analytical Edn.), Vol. 9, No. 12, 15/12/37, pp. 574-6.) (51/36 U.S.A.)

Increase in viscosity, sludge content and carbon residue of lubricating oils subjected to oxidation at elevated temperature are in many instances accompanied by development of acidity. In such cases the acidity as measured by electro-metric methods is a convenient means of following these changes and of furnishing additional data on the general problem of oil deterioration.

Some of the oils studied were subjected to engine oxidation, the remainder to standard laboratory procedure (5 litres of air per hour at 172°C.).

In the latter case the accelerating effect due to the presence of certain metals (such as copper) was investigated.

(Eight references.)

*Aeroplane Performance Slide Rule.* (G. S. Schairer, J. Aer. Sci., Vol. 5, No. 1, Nov., 1937, pp. 12-15.) (51/37 U.S.A.)

The prediction of aeroplane performance is a lengthy process by conventional methods. This paper presents a modification of the conventional method which greatly shortens the time required to make an estimation. This method is based on the use of logarithmic instead of linear co-ordinates for plotting the aeroplane-power-required curve and the propeller-power-available curve. It is shown that all aeroplanes can be represented by one power-required curve and that standard propeller curves can be used to represent most fixed pitch and constant speed propellers.

*The Design of Flexure Pivots.* (F. S. Eastman, J. Aer. Sci., Vol. 5, No. 1, Nov., 1937, pp. 16-21.) (51/38 U.S.A.)

The idea of supporting the moving parts of sensitive instruments on thin strips of metal or other elastic material rather than on knife edges or jewelled bearings, is not new. The advantages were clearly demonstrated by the Emery testing machine built in 1897 (C. H. Gibbons, " Materials Testing Machines," Instruments, Vol. 8, No. 3, pp. 76-78, March, 1935).

Most aeronautical engineers are familiar with the Zahm wind tunnel balance (N.A.C.A. Technical Report No. 146) in which the fulcrums of the weighing system consist of flexible pieces of steel. It is a significant fact that this device is essentially free from hysteretic effect caused by the friction and lost motion which occurs in other types of pivots and bearings.

The author has recently designed a new six-component wind tunnel balance in which flexure pivots are used in various ways, and to the exclusion of all others. The simple but comprehensive method of analysis which is described, is an outgrowth from the more cumbersome methods which were used to design the numerous flexures of this balance.

*Performance Characteristics of Venturi Tubes Used in Aircraft for Operating Air-Driven Gyroscopic Instruments.* (H. Sontag and D. P. Johnson, N.A.C.A. Tech. Note No. 624, November, 1937.) (51/39 U.S.A.)

Wind tunnel and flight tests were made to determine the performance characteristics of two designs of commercially available venturi tubes used in aeroplanes to operate air-driven gyroscopic instruments.

For constant values of the ratio of suction to atmospheric pressure, the air flow is approximately a linear function of the product of the indicated air speed and the square root of the ratio of standard air pressure to the atmospheric pressure. This relation is independent of altitude for a double venturi.

For a given installation in which an air-driven instrument is connected through tubing with a venturi tube, the volume rate of induced air flow is approximately proportional to the product of the indicated air speed and the square root of the ratio of standard to ambient air pressure. The efficiency of such a system at a given altitude is constant.

*The Goodrich Flexometer for Testing Rubber.* (E. T. Lessig, Ind. and Eng. Chem. (Analytical Edn.), Vol. 9, No. 12, 15/12/37, pp. 582-7.) (51/40 U.S.A.)

A definite compressive load is applied to the bottom face of a cylindrical test piece, the upper surface of which is subjected to a high frequency cyclic compression of definite amplitude. The temperature rise of the sample is recorded by means of a thermo-couple at its base. The change in height of the test piece can be measured continuously and the effect of anisotropic differences in structure, degree of softening or hardening can be observed over a series of temperatures, the sample being enclosed for this purpose in an electric oven.

It is claimed that the flexometer is easily operated and has the additional advantage that only relatively small samples are required.

*Airport Orientator (Gyro Orientated Chart).* (Inter. Avia., No. 503-4, 3/1/38,
p. 9.)  (51/41 U.S.A.)

The object of the instrument is to provide the pilot with a chart of the airport
of destination and surroundings, the chart remaining properly orientated by
means of a directional gyro.  The chart (supported on a vertical shaft attached
to the vertical gimbal ring of the gyro) is set by reference to the magnetic compass
and when approaching the airport with the help of the radio compass, the pilot
is able to see any obstacles as well as the position of the radio beams in relation
to the course.  (As from January 1st, 1938, radio compass or direction finders
will be compulsory on all American aircraft.)


*Instruments for Testing the Performance of Aircraft in Flight.* (W. Drude,
Luftwissen, Vol. 4, No. 12, Dec., 1937, pp. 363-6.)  (51/42 Germany.)

The instruments have been developed by the D.V.L. over a number of years.
Amongst those described and illustrated in the report, an optical pressure recorder
for 40 measuring points (pressure distribution on aircraft in flight) is of special
interest.

All 40 records are traced on the same film and the measurements can be carried
out over a period of 12 seconds without fear of the records overlapping.

The complete recorder is circular, the recording membranes being arranged
on the circumference.  Dimensions of apparatus 50 cm. diameter, 20 cm. high,
weight 15 kg.

On large aircraft the recorder can be installed in close proximity to the region
under investigation with a corresponding reduction in the lengths of pipe line
required.  Fifteen photographs of various instruments (accelerometers, control
force recorders, etc.) are given.


*Modern Aids to Vibration Study.* (E. H. Hull, J. App. Mech., Vol. 4, No. 4,
December, 1937, pp. A.151-5.)  (51/43 U.S.A.)

Many advantages are pointed out for the portable cathode ray oscillograph
combined with an electrical vibration pick-up for general vibration study.  Repre-
sentative types chosen from the three principal classes of vibration pick-ups
(displacement, velocity and acceleration) are described.  The particular uses for
these several types of pick-up and their assembly with oscillographs and ampli-
fiers are described as well as experimental methods for determining frequency
and phase.

The paper concludes with a description of the use of this assembled apparatus
in the following four vibration problems :—Detection of out-of-round journals
and other extraneous causes of vibration when balancing large machines ; com-
parison of the residual sources of vibration in well-balanced ball-bearing high
speed motors ; measurement of commutator roughness ; and the investigation of
high frequency noise in small single-phase motors.


*Vibration Stress Measurements in Strong Centrifugal Fields.* (C. M. Kearns
and R. M. Guerke, J. App. Mech., Vol. 4, No. 4, December, 1937, pp.
A.156-9.)  (51/44 U.S.A.)

Following a brief review of existing methods of measuring vibrational stresses
in strong centrifugal fields, the authors discuss the characteristics of carbon
resistance strain gauges and indicate their method of use.

These gauges may be calibrated statically and used for dynamic measurements
with an accuracy of $\pm$ ten per cent.  With present cementing technique they can
be applied in fields up to 12,000 times gravity.

The necessary instruments for use with these pick-ups are described and several
records of aircraft propeller tip stresses are shown.

*The Bearing Strength of Steel and Aluminium Alloy Sheet in Riveted and Bolted Joints.* (R. A. Miller, J. Aer. Sci., Vol. 5, No. 1, Nov., 1937, pp. 22-4.) (51/45 U.S.A.)

It is concluded that the bearing strength of a joint made of sheets in combination with bolts or rivets depends upon the material, the sheet thickness, the bolt or rivet size and the edge distance. The ultimate bearing stress intensity does not appear to vary directly as the ultimate tensile strength of the material, though the error involved in making such an assumption is small for small differences. Curves by means of which the allowable ultimate bearing value for 24 ST aluminium alloy sheet may be obtained are given. Similar curves are also given for chrome-molybdenum steel sheet in double shear and with ultimate tensile strength of 80,000 and 150,000lb. per sq. in.

*Stress Analysis of Beams with Shear Deformation of the Flanges.* (P. Kuhn, N.A.C.A. Report No. 608, 1937.) (51/46 U.S.A.)

The fundamental action of shear deformation of the flanges is discussed on the basis of simplifying assumptions. The theory is developed to the point of giving analytical solutions for simple cases of beams and of skin stringer panels under axial load. Strain gauge tests on a tension panel and on a beam corresponding to these simple cases are described and the results are compared with analytical results. For wing beams, an approximate method of applying the theory is given. As an alternative the construction of a mechanical analyser is advocated.

*Stability of Plywood Plates.* (L. Balabuch, Aeron. Eng. (U.S.S.R.), No. 9, Sept., 1937, pp. 19-36. Original in Russian.) (51/47 U.S.S.R.)

In the present paper the following problems are considered :—
1. Determination of the critical compression strength of rectangular plywood plates :—(a) With all four sides hinged to supports, and (b) when the two sides perpendicular to the direction of compression are hinged and the other two sides are rigidly fixed.
2. Determination of the critical stress in the case of simultaneous application of compression and shear.
3. Investigation of the stability of plywood plates where the direction of the maximum torsional strength (direction of the fibres) makes a definite angle with the direction of the longitudinal sides of the plate.

The formulæ deduced for the strength of plywood plates when compression and shear are applied simultaneously appear to be approximately valid.

*Adsorption of Constituents of a Solid Phase on the Surface.* (S. Dobinski, Nature, Vol. 141, No. 3558, 8/1/38, pp. 81-2.) (51/48 Great Britain.)

The accumulation of the constituent of an alloy on the surface can be explained in a quite general manner on a purely physical basis (tendency to reduce free surface energy to a minimum leads to concentration of constituent with smallest surface tension on the surface). Adsorption on the surface explains protective action exercised by some constituents and the problem of bearing alloys is another field where the adsorption may be expected to play an important *rôle*.

*Devices and Tools made of Reinforced Synthetic Resin for Use in Metal Aircraft Construction.* (R. Ribeke, Luftwissen, Vol. 4, No. 12, Dec., 1937, pp. 359-362.) (51/49 Germany.)

In the mass production of metal aircraft, a considerable number of formers, jigs, etc., are required.

In the past most of these jigs were made of steel, which not only renders their manufacture costly, but also leads to a considerable wastage of material.

The article gives a number of examples of jigs and dies made of synthetic resin, suitably reinforced.

As this material can be worked as easily as wood, the jig can be made rapidly in the carpenter's shop and as the parts are very light (half the density of Al) female labour can be profitably employed.

*Fatigue Failures from Stress Cycles of Varying Amplitude.* (B. F. Langer, J. App. Mech., Vol. 4, No. 4, December, 1937, pp. A.160-2.) (51/50 U.S.A.)

The problem may be stated as follows:—Suppose a machine member is subjected to a stress of magnitude $S_1$ a certain number of times $p_1$ per unit of operation. (The unit of operation can be any arbitrarily chosen quantity, such as an hour, a revolution, or a mile.) During the same period a stress $S_2$ is applied $p_2$ times, $S_3$ is applied $p_3$ times, and so on. If the fatigue characteristics of the material are known, how can the life of the member be estimated?

The author attempts to answer this question from the study of crack growth curves, but concludes that much further experimental work is required before the results can be generalised. The question is of importance to designers, since considerable economy may often be effected in the cost of a structure, if maximum stresses above the endurance limit can be allowed, provided it is known that such stresses will not be repeated often enough to endanger the structure within the expected life.

*Recent Investigations in Plastic Torsion.* (C. W. MacGregor and J. A. Hrones, J. App. Mech., Vol. 4, No. 4, December, 1937, pp. A.163-9.) (51/51 U.S.A.)

Tension, double shear and torsion tests on cast iron, S.A.E. 1045 annealed steel, and S.A.E. 1112 annealed steel are described in which the quantitative relations between the so-called modulus of rupture, double shear strength, and actual maximum shear stress in the bar at fracture are given for each material. The shear stress distribution over the cross section of each bar at fracture is also determined.

Finally, there is described a series of plastic torsion tests on bars of mild steel with various new cross sections of practical interest, namely, the splined shaft, the circular shaft with two shallow rectangular keyways, double- and four-lipped drills, and I-beams. In these tests, the regions of initial yielding are determined by means of the Fry etching method.

*The Calculation of Maximum Deflection, Moment, and Shear for Uniformly Loaded Rectangular Plates with Clamped Edges.* (I. A. Wojtaszak, J. App. Mech., Vol. 4, No. 4, December, 1937, pp. A.173-6.) (51/52 U.S.A.)

The problem of the uniformly loaded rectangular plate with four clamped edges has been solved by H. Hencky and independently by J. Boobnoff. Hencky made refined calculations only for the case of a square plate while Boobnoff made precise calculations for several ratios of the sides of the plate. This article gives the results of calculations for maximum deflection, moment, and shear for several ratios of the sides of the plate, using Hencky's equations. Curves are drawn with the coefficients, used in defining these maximum quantities, as ordinates and the ratios of the sides of the plate as abscissas.

*The Stability of a Clamped Elliptic Plate under Uniform Compression.* (S. Voinovsky-Krieger, J. App. Mech., Vol. 4, No. 4, December, 1937, pp. A.177-8.) (51/53 U.S.A.)

The energy criterion of stability, investigated by G. N. Bryan and S. Timoshenko, has been applied with great success to numerous problems of

buckling of thin elastic plates submitted to compressive or shearing forces in their own plane. The cases discussed up to the present have concerned almost exclusively rectangular plates, this form of the plate being practically the most important. The application of the energy method to plates bounded curvilinearly is illustrated in the present paper by the case of the elliptic plate.

*Recent Research in Elasticity.* (J. N. Goodier, J. App. Mech., Vol. 4, No. 4, December, 1937, pp. A.179-82.) (51/54 U.S.A.)

Since the last review on elasticity research (published in this Journal, March, 1936) more than 300 papers on the subject have been published. The present review deals with some of the more important work under the generalised headings of stability, stress analysis in two dimensions, photo-elasticity, torsion and flexure, flexure of plates, thermal stress, impact and frame works. A certain number of papers on general theory are also included (48 references).

*Long Range Weather Forecasting.* (G. Walker, Nature, Vol. 141, No. 3558, 8/1/38, p. 85.) (51/55 Great Britain.)

It has been found that the movements of regions of rising and falling surface pressure determined for a 24-hour interval, and defined by 24-hour isallobars, are usually almost completely in accordance with the gradient wind at a height of 5 km. and not with winds near the ground. At times, however, the " steering " of the 24-hour isallobaric regions is by winds in the stratosphere, and that of the 3-hour isallobars by the winds of the lower troposphere. It has been found that the mean duration of a " broad weather " situation is $5\frac{1}{2}$ days, and that their life histories are closely connected with the formation and decay of " highs " and " lows " in the stratosphere. Since isallobaric systems most often move from some westerly point, this method would be less effective in British forecasting (where identification of the systems is hampered by paucity of observations to westward) than on the continent (Germany).

*Point Discharge Currents during Thunderstorms.* (M. N. S. Immelman, Phil. Mag., No. 166, January, 1938, pp. 159-63.) (51/56 Great Britain.)

During fine weather there is a positive potential gradient over the surface of the earth, the average value for the whole earth being about 120 volts per metre. This gives rise to a downward " fine weather " current of about 1,000 amperes. In addition there exists a " precipitation " current of about 400 amperes.

It appears that during thunderstorms the potential gradient is generally reversed and experiments carried out by the author over a number of years show that the magnitude of this effect is sufficient to prevent the indefinite accumulation of positive ions associated with fine weather.

*Progressive Lightning. IV.—The Discharge Mechanism.* (B. F. J. Schonland, Proc. Roy. Soc., Series A, Vol. 164, No. 916, 7/1/38, pp. 132-150.) (51/57 Great Britain.)

1. Oscillographic observations indicate that all processes in the discharge to ground observed in South Africa involve a cloud cathode and an earth anode.

2. The first lightning stroke appears to involve :—

    (a) The development of a pilot streamer, a negative streamer proceeding from the cloud into virgin air.

    (b) The periodical catching up of this pilot streamer by a much faster step streamer, a negative streamer advancing along an ionised path.

    (c) The distribution by this leader process of the greater portion of the cloud charge tapped by it upon a branched leader channel in the air below the cloud.

    (d) The passage of this charge to ground in the return stroke, a positive streamer travelling along an ionised and oppositely charged path.

3. The second and subsequent strokes involve :—
(a) A fast dart streamer, a negative streamer advancing along an ionised path.
(b) A return stroke streamer similar to 2 (d).

4. The mechanisms of the three types of streamer are investigated. Satisfactory explanations of their behaviour can be derived.

5. Discussions are given of the currents in the various streamer processes, of the luminosity associated with their movement and of the effect of space charge on leader development.

6. Evidence is given which indicates that the occurrence of separate strokes in the discharge is due to the presence in the cloud of separate charge generating centres.

*The Effect of Change of Temperature on the Strength of Permanent Magnets with Special Reference to Magnet Steels.* (A. C. Whiffin, J. Inst. Elec. Engs., Vol. 81, No. 492, December, 1937, pp. 727-40.) (51/58 Great Britain.)

A survey is made of the literature and it is found that a magnet can be put into steady condition, as regards magnetic strength, by mechanical shocks or by cyclic heating, and then it has a definite strength at each temperature, the connection between the two generally giving rise to a negative coefficient.

In the present paper a description is given of a rotating search coil and ballistic galvanometer arrangement for testing cobalt steel, aluminium-nickel, and aluminium-nickel-cobalt alloy magnets over the temperature range −60°C. to 100°C. When the magnets had attained the reversible state it was found that the magnetic strength $H_r$ could be connected with the temperature $r$ (°C.) by an equation of the type

$$H_r = H_o \left( 1 + ar + br^2 \right)$$

where $a$ and $b$ were negative constants and were determined for each magnet.

*Experiments with Ultra High Frequency Antenna for Aeroplane Landing Beam.* (H. Diamond and F. W. Dunmore, Proc. Inst. Rad. Eng., Vol. 25, No. 12, Dec., 1937, pp. 1542-60.) (51/59 U.S.A.)

Experiments are described on the electrical properties of an ultra high frequency transmitting antenna operating very near to and below the surface of the ground. The work was done with the object of locating the landing beam in the centre of an air port in order to secure a steeper approach path and provide landing facilities for different wind directions. The effect of the proximity of the ground to the transmitting antenna on the low angle distribution of energy and polarisation is described. An approximate mathematical analysis is given of the mechanism of setting up a landing path when the transmitting antenna is below the ground surface.

The method is regarded as very promising, and it gives a very material increase in the flexibility of use of the landing beam.

*Minimum Noise Levels Obtained on Short Wave Radio Receiving Systems.* (K. G. Jansky, Proc. Inst. Rad. Eng., Vol. 25, No. 12, Dec., 1937, pp. 1517-30.) (51/60 U.S.A.)

The theoretical minimum noise level of receivers in the absence of any interference, the source of which is external to the receiver, is discussed and compared with the limit actually measured on various antennæ over a limited frequency range in the short wave spectrum. It is pointed out that on the shorter wave lengths and in the absence of man-made interference, the usable signal strength is generally limited by noise of interstellar origin. The power obtained from this noise with various antennæ and for different times of day are given.

Recently, man-made interference, of which that caused by diathermy machines constitutes the greater part, has become so extensive that it is now the limiting noise during most of the daytime. Data are given on the intensity and extent of this form of interference.

*Solution of Variable Circuits by Matrices.* (L. A. Pipes, J. Frank. Inst., Vol. 224, No. 6, December, 1937, pp. 767-777.) (51/61 U.S.A.)

It is the purpose of this paper to present a method for the numerical solution of circuits whose parameters vary with the time. The method is not limited to electrical networks, but any electrical or mechanical system whose behaviour may be expressed by an ordinary homogeneous linear equation with variable coefficients. This method is particularly well adapted to the solution of the free oscillations of circuits whose parameters are periodic functions of the time. This class of problem is of great technical interest both in engineering and in physics.

*Short Wave Wireless for Sail Planes.* (Luftwissen, Vol. 4, No. 12, Dec., 1937, pp. 355/358.) (51/62 Germany.)

The sending and receiving set carried in the plane operates on a wave length of 12.2 m., the complete installation weighing 4.5 kg. Telephonic communication with the ground station is possible for distances up to 80 km., whilst conversation between two sail planes can be carried out up to 20 km.

Some details of the electrical circuits are given, and it is pointed out that communication during the night was surprisingly good. (Ten photographs.)

*A New Television System.* (H. Braude, Tech. Phys., U.S.S.R., Vol. 4, No. 9, 1937, pp. 671-706. Original in German.) (51/63 U.S.S.R.)

In the usual television systems, the scanning of the original picture is carried out either by rotating discs or by oscillating electron beams. In the present systems, the scanning impulses are associated with changes in the position of zero potential on the surface of a conducting wire placed in an electrostatic field, the wire being suitably coated so as to act as a photo cell responding to variable illumination. It is claimed that the new television system gives very good definition for a sub-division of 300 lines and that an adaptation to the Leningrad telephone system is in preparation.