MANY of the numbers in the "Statistics of Public Education in England and Wales, 1905–6–7," recently published (Cd. 3886) by the Board of Education, give useful information as to the condition of our national education during the year 1905–6 and the years immediately preceding. On August 1, 1906, accommodation was provided in the public elementary schools of all grades for 7,068,641 children, of which number of places 3,543,760 were in "council" schools, or, as they were formerly called, "board" schools. In ordinary elementary schools, that is, omitting every kind of "special" school, there were 5,994,490 pupils on the registers and 5,303,229 in average attendance. These children were taught by 31,893 head teachers, 93,130 assistant teachers, and 49,056 "other" teachers. The Government grant to meet expenditure in respect of elementary education during 1906–7 reached 11,248,794*l.*, and in 1905–6 was 10,829,396*l.* In addition, 92,328*l.* was paid in 1906–7 on account of allowances and pensions for teachers, and 552,894*l.* for the training of teachers and pupil-teachers. In secondary schools in receipt of grants from the Board of Education, which in 1905–6 numbered 689, there were in that year 65,994 boys and 49,694 girls, and on 66,014 of these pupils—for grants were only paid on children between twelve and sixteen years of age taking an approved course of work—the sum paid in grants amounted to 246,220*l.* A serious falling off in the number of pupils in secondary schools between the ages of twelve and sixteen years is shown in the statistics. To take one example, the number of boys (about twelve to thirteen years of age) taking an approved course and doing the work of the first year was, in 1905–6, 12,238; doing the second year's work, 9,924; the third year's work, 4,907; and the fourth year's work, 2,397. It would seem that less than 20 per cent. of the boys who at twelve years of age begin the approved course of work remain at school until sixteen years of age, and the same proportion seems to be true in the case of the girls.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society. November 14, 1907.—"On the Result of Crossing Round with Wrinkled Peas, with Especial Reference to their Starch-grains." By A. D. **Darbishire.** Communicated by Prof. J. Bretland Farmer, F.R.S.

The facts so far brought to light are:—

(1) That, although roundness is dominant over wrinkledness in peas, the starch-grain of the F_1 generation (the round or *r*-grain) is a blend between the type of grain of the round pea (the potato-shaped or *p*-grain) and the type of grain of the wrinkled pea (the compound or *c*-grain) in respect of three characters:—

(*a*) It is intermediate in shape as measured by its length-breadth index—that of the *p*-grain being 66, that of the *c*-grain 92, and that of the *r*-grain 85 (neglecting decimals).

(*b*) It is intermediate in the distribution of compoundness, inasmuch as some of the *r*-grains are compound and some single.

(*c*) It is intermediate in the degree of compoundness, inasmuch as amongst those *r*-grains which are compound the most usual number of constituent pieces is three, whereas in *c*-grains it is six.

(2) In a subsequent generation—F_5—the homozygote round peas contain *p*-grains; the heterozygote round peas contain *r*- or intermediate grains. But both *r*- and intermediate grains may be associated either with a high or with a low degree of compoundness.

(3) *p*-Grains occasionally occur in wrinkled peas in F_5, and the evidence suggests that the existence of these grains in wrinkled peas tends to make them less wrinkled.

(4) A wrinkled pea takes up more water when it germinates than a round one. The hybrid between a round and a wrinkled pea is intermediate in respect of this character between its two parents.

(5) But this intermediateness of the hybrid in absorptive capacity is not occasioned by the intermediateness of the starch-grain of the hybrid, because, in F_2, peas containing *r*-grains *and peas containing* p-*grains* both have the same absorptive capacity as the F_1 pea.

(6) When, therefore, we cross a round with a wrinkled pea, we are dealing with *four* separately heritable characters:—

(i) The shape of the pea—whether round or wrinkled.

(ii) The absorptive capacity of the pea—whether low or high.

(iii) The shape of the starch-grain—whether long or round.

(iv) The constitution of the starch-grain—whether single or compound.

"On the Inheritance of Eye-colour in Man." By C. C. **Hurst.** Communicated by W. Bateson, F.R.S.

An examination of the eye-colours of a number of parents and their offspring in a Leicestershire village shows that there are at least two discontinuous types of iris in man:—

(1) The duplex type, with both anterior and posterior pigments, as in ordinary brown eyes.

(2) The simplex type, with posterior pigment only, the anterior pigment being absent, as in clear blue eyes.

In heredity the simplex type behaves as a Mendelian recessive to the duplex type, which is dominant. The unit characters concerned are evidently presence (duplex) and absence (simplex) of anterior pigment on a basis of posterior pigment, presence being dominant.

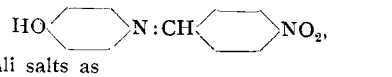
The duplex and simplex types can be distinguished at any age. Various pigmental and structural changes take place in the iris during childhood and youth, the extent of which is not yet known. Few families with living parents and offspring, all adult, are to be found in one village. Consequently, it has not yet been possible to determine the genetic relations between the various shades of the duplex type.

Mathematical Society, February 13.—Prof. W. Burnside, president, in the chair.—A proof that every algebraic equation has a root: Dr. H. A. de S. **Pittard.**—Note on *q*-differences: F. H. **Jackson.**—An extension of Eisenstein's law of reciprocity (second paper): A. E. **Western.**—Conformal representation and the transformation of Laplace's equation: E. **Cunningham.**—The uniform approach of a continuous function to its limit: Dr. W. H. **Young.**

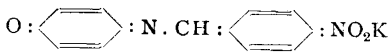
Physical Society. January 24.—Prof. J. Perry, F.R.S., president, in the chair.—Observations on recalescence curves: W. **Rosenhain.** Referring to the importance of the accurate study of recalescence phenomena in metals and alloys, the author describes the two principal methods employed for obtaining recalescence curves. These are known as the "inverse rate" and "differential" methods respectively. In the former method the times occupied by successive equal decrements of temperature are observed and plotted against the temperature of the cooling body, thus giving a curve the ordinates of which are temperature (t) and dT/dt (T = time) respectively. In the differential method the difference of temperature between the body under observation and a neutral or "blank" body cooling under approximately the same conditions is observed and plotted against the temperature of the body. The physical interpretations, in terms of quantity of heat evolved and of rate of evolution of heat of these two kinds of curves, are discussed by reference to the fundamental curve representing the time-temperature relations of one or two cooling bodies. Finally, the author describes a recalescence first observed to occur somewhat mysteriously in the body of certain furnaces at a temperature of 580° C. This was ultimately traced to a transformation occurring in crystalline silica, whether free or in admixture with porcelain or fire-clay. The author points out that this recalescence in crystalline silica coincides with certain points in the iron-carbon diagram of Roberts-Austen and of Carpenter and Keeling, and suggests that the recalescences observed by those workers may have arisen from silica in their furnaces.

Society of Chemical Industry, February 3.—Dr. J. Lewkowitsch in the chair.—Nitroglycerine and its manufacture: Lieut.-Colonel Sir F. L. **Nathan** and W. **Rintoul.** The discovery and properties of nitroglycerine were described, and particulars were given of improvements which have been effected in methods of manufacture.

Chemical Society, February 6.—Sir William Ramsay, K.C.B., F.R.S., president, in the chair.—The metallic picrates: O. **Silberrad** and H. A. **Phillips.** The water of crystallisation and properties of the commoner picrates have been definitely established.—Some physicochemical properties of mixtures of pyridine and water: H. **Hartley,** N. G. **Thomas,** and M. P. **Applebey.**—The constitution of umbellulone, part iii.: F. **Tutin.** A refutation of Semmler's recent statements (*Ber.*, 1907, xl., 5017) respecting the constitution of umbellulone.—Colour and constitution of azomethine compounds, part i.: F. G. **Pope.** The nitrohydroxyazomethine compounds show an entirely different absorption spectrum from that of their alkali salts when the nitro- and hydroxyl groups are in the *para* position to the azomethine group, and from the similarity of the .N : CH. grouping to the .N : N. grouping it would seem that the alkali salts of these compounds could be formulated on a di-quinonoid basis, the free hydroxyl compounds being represented thus:—



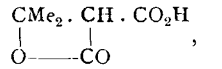
and the alkali salts as



(compare Hewitt and Mitchell, Trans., 1907, xci., 1251).—The preparation of *l*-benzoin: A. **McKenzie** and H. **Wren.**—Organic derivatives of silicon, part v., benzylethylsilicone, dibenzylsilicone, and other benzyl and benzylethyl derivatives of silicane: R. **Robison** and F. S. **Kipping.** Descriptions of these silicon derivatives are given.—The residual affinity of the coumarins and thiocoumarins, as shown by their additive compounds: A. **Clayton.** The coumarins and thiocoumarins combine with mercuric chloride, forming compounds of the type $R,HgCl_2$, where R is a coumarin or a thiocoumarin.—The influence of foreign substances on certain transition temperatures, and the determination of molecular weights: H. M. **Dawson** and C. G. **Jackson.** The changes investigated were:—

(1) $Na_2S_2O_3,5H_2O \rightarrow Na_2S_2O_3,2H_2O$ at 48°·1;
(2) $NaBr,2H_2O \rightarrow NaBr$ at 50°·67; and
(3) $CaCl_2,6H_2O + 2MgCl_2,6H_2O \rightarrow CaCl_2,2MgCl_2,12H_2O$ at 22°·4.

Constants representing the depression of the transition temperature when one gram-molecule of the foreign substance is contained in 100 grams of the saturated transition solution have been calculated. From a knowledge of these constants, the corresponding invariant points may be utilised for the purpose of obtaining the molecular weights of dissolved substances.—The bromination of *p*-hydroxydiphenylamine: Miss A. E. **Smith** and K. J. P. **Orton.**—The decomposition of ammonium dichromate by heat: W. M. **Hooton.** If the salt is decomposed slowly by heat, the final product is hydrated chromium dioxide, $2CrO_2,H_2O$, a glistening black powder which when heated yields oxygen, water, and chromium sesquioxide. If ammonium dichromate is heated in absence of oxygen, the final product is a dull, greenish-black powder having the composition $H_2Cr_2O_4$.—The effect of constitution on the rotatory power of optically active nitrogen compounds, part ii.: H. O. **Jones** and J. R. **Hill.**—Malacone, a silicate of zirconium: A. C. **Cumming.** The author finds that the formula ZrO_2,SiO_2 corresponds more closely with the observed composition of malacone than does the formula $3ZrO_2,2SiO_2$ assigned to it by Kitchin and Winterson (Trans. Chem. Soc., 1906, lxxxix., 1568).—The reducibility of magnesium oxide by carbon: R. E. **Slade.** The isolation of magnesium by direct reduction of the oxide by carbon has been effected at temperatures above 1700°. Rapid evacuation of the vessel in which the reaction occurs, absorption of the magnesium by molten copper, and reduction of magnesia in presence of aluminium or in a swift stream of hydrogen have all proved useful in preventing the reverse reaction, which occurs between magnesium and carbon monoxide.—The crystal form of halogen derivatives of open chain hydrocarbons with reference to the Barlow-Pope theory of structure: F. M. **Jaeger.** In accordance with the theory of Barlow and Pope, it is found that tetrabromo-ββ-dimethylpropane, 1 : 3 : 5-hexatriene, di- and tetra-bromide, and tetraiodoethylene exhibit a close morphotropic relationship.—The determination of the rate of change by measurement of the gases evolved: F. E. E. **Lamplough.**—The temperatures of spontaneous crystallisation of mixed solutions, and their determination by means of the index of refraction. Mixtures of solutions of sodium nitrate and lead nitrate: Miss F. **Isaac.**—Contributions to the chemistry of the terpenes, part iii.; some oxidation products of pinene: G. G. **Henderson** and I. M. **Heilbron.**—A β-lactonic acid from acetone and malonic acid: A. N. **Meldrum.** When malonic acid and acetone are mixed with acetic anhydride and a little sulphuric acid, the β-lactone of β-hydroxy*iso*propylmalonic acid,



is formed.

PARIS.

Academy of Sciences, February 10.—M. H. Becquerel in the chair.—The spectra of non-dissociated compounds: Henri **Becquerel.** A reply to a recent note of M. A. Dufour, and pointing out the connection between the results of M. Dufour and certain phosphorescent and absorption spectra.—The alcoholysis of linseed oil: A. **Haller.** The author has applied his method of saponification with alcoholic hydrochloric acid to the preparation of the methyl esters of the fatty acids contained in linseed oil. These methyl esters were submitted to fractional distillation under reduced pressure, and the distillates caused to crystallise at −7° C. In this way the methyl esters of stearic, palmitic, and arachic acids were separated in a pure state.—Parthenogenesis at Roscoff and at Berkeley: Yves **Delage.** A controversial paper in reply to Loeb.—The dispersion of light in interstellar space: Charles **Nordmann.** A sketch of a new method for determining if rays of different wave-lengths all travel in interstellar space with the same velocity, based on the monochromatic photometry of a variable star. The experimental results will be given in a later paper.—Observations of the transit of Mercury of November 14, 1907, made at the Royal Observatory of Belgium: M. **Lecointe.** Results are given for the observations of the contacts, the form of the disc, and observations of position and of physical appearance.—Theorem on Taylor's series: Michel **Petrovitch.**—The approximate integration of differential equations: Émile **Cotton.**—The diminution of the rolling of ships: V. **Crémieu.**—A new series of ammoniacal ferric salts in which the iron is masked: P. **Pascal.** A description of some complex salts formed by the addition of ammonia to solutions of sodium ferripyrophosphate.—The silicide of magnesium: Paul **Lebeau** and Robert **Bossuet.** Alloys of magnesium and silicon containing from 0·38 per cent. up to more than 50 per cent. of silicon were examined micrographically. From the results of this examination it appeared that there exists only one magnesium silicide containing less than 40 per cent. of silicon. Aqueous solutions proved to be useless for the isolation of the silicide from the ingot, and the excess of magnesium was removed by the action of ethyl iodide and ether. The compound thus isolated was $SiMg_2$, and gives hydrogen free from hydrogen silicide when acted upon by water. Hydrochloric acid attacks it energetically, a mixture of hydrogen and spontaneously inflammable hydrogen silicides being produced. The compound is completely dissociated in a vacuum at 1100°–1200° C., the magnesium being volatilised.—The colloidal properties of starch, and on the existence of a perfect solution of this substance: E. **Fouard.** The starch solution was filtered through a membrane of collodion, and its properties were totally different from ordinary starch solutions. The strength of the solution was 2·74 per cent. of starch; it was clear and perfectly transparent, and an intense light bundle after passing through the solution showed no trace of polarisation. The viscosity of a 1 per cent. solution was of the same order of magnitude as water or 1 per cent. sugar solution, and only one-twelfth that of a 1 per cent. starch solution made in the ordinary way.—The state of the camphocarbonates of the fatty and aromatic amines in solution, as shown by the rotatory power: J. **Minguin.**—Researches on the physical

modifications of gelatin in presence of electrolytes and non-electrolytes: J. Larguier **des Bancels.** In presence of certain salts gelatin dissolves in water at the ordinary temperature. At equal concentrations, salts of divalent metals exert a more powerful solvent action than salts of monovalent metals. For the same metals nitrates exert a more energetic action than chlorides. Certain non-electrolytes, such as alcohol or acetone, also attack gelatin more easily than pure water.—The rapid estimation of potassium bichromate in milks: M. **Gouere.**—The preparation of dithymol: the action of bromine on dithymol. H. **Cousin** and H. **Hérissey.** The oxidation of the thymol is carried out with ferric chloride in aqueous solution; the yield is from 25 per cent. to 30 per cent.—γ-Oxytetrolic acid: MM. **Lespieau** and **Viguier.** This is prepared by the interaction of propargyl alcohol and ethylmagnesium bromide, the reaction product being treated with carbon dioxide. The addition products with bromine have been studied.—Researches on a method of preparing the cyclic aldehydes: M. **Savariau.** Phenylmagnesium bromide reacts with chloral hydrate to give the compound $C_6H_5.CH(OH).CCl_3$, and this is converted into benzaldehyde by boiling with a solution of an alkaline carbonate. The method appears to be general, and may be useful in preparing small quantities of rare cyclic aldehydes.—The action of alcohols upon sodium benzylate: Marcel **Guerbet.** The action of sodium benzylate upon benzyl alcohol at 225° C. gives rise to stilbene, dibenzyl, toluene, and benzoic acid.—The chemical constitution and biological properties of the protoplasma of Koch's bacillus: Jules **Auclair** and Louis **Paris.**—Tyrosinase and racemic tyrosine: Gabriel **Bertrand** and M. **Rosenblatt.**—The genus Seuratia and its connections with Capnodium: Paul **Vuillemin.**—The intramolecular respiration of the aërial vegetative organs of vascular plants: G. **Nicolas.**—The multiplication *in vitro* of *Treponema pallidum*: C. **Lebailly.**

DIARY OF SOCIETIES.

THURSDAY, FEBRUARY 20.

ROYAL SOCIETY, at 4.30.—Notes on the Application of Low Temperatures to some Chemical Problems (1) Use of Charcoal in Vapour Density Determination. (2) Rotatory Power of Organic Substances: Sir James Dewar, F.R.S., and Dr. H. O. Jones.—On the Osmotic Pressure of Compressible Solutions of any Degree of Concentration. Part II. Cases in which both Solvent and Solute are Volatile: A. W. Porter.—Effects of Self-induction in an Iron Cylinder when traversed by Alternating Currents: Prof. Ernest Wilson.—(1) On the Refractive Indices of Gaseous Nitric Oxide, Sulphur Dioxide, and Sulphur Trioxide. (2) On the Dispersion of Gaseous Mercury, Sulphur, Phosphorus, and Helium: C. Cuthbertson and E. Parr Metcalfe.

ROYAL INSTITUTION, at 3.—Wood: its Botanical and Technical Aspects: Prof. W. Somerville.

INSTITUTION OF MINING AND METALLURGY, at 8.—The Alloys of Gold and Tellurium: Dr. T. K. Rose.—A Method of Settling Slimes, as applied to their Separation from Solution in Cyanide Treatment: H. G. Nichols.—Two Deterrents to the Dissolution of Free Gold in the Cyanide Process: D. Simpson.—A Rapid Method for the Estimation of Arsenic in Ores: H. E. Hooper.—The Indian Mint Assay of Silver Bullion: F. T. C. Hughes.

LINNEAN SOCIETY, at 8.—Experiments with Wild Species of Tuber-bearing Solanums: A. W. Sutton.—The Life-history and Larval Habits of Tiger Beetles (Cicindelæ): Dr. V. E. Shelford.—On a Possible Case of Mimicry in the Common Sole: Dr. A. T. Masterman.—*Exhibit*: Stereoscopic Photographs of Alpine Plants in Natural Colours: T. Ernest Waltham.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Electrical Power in Railway Goods Warehouses: H. Henderson.—Electric Power in Docks: C. E. Taylor.

CHEMICAL SOCIETY, at 8.30.—The Action of Thionyl Chloride and of Phosphorus Pentachloride on the Methylene Ethers of Pyrocatechol Derivatives: G. Barger.—The Preparation of Conductivity Water: H. Hartley, N. P. Campbell and R. H. Poole.—Derivatives of *para*-Diazoiminobenzene: G. T. Morgan and Miss F. M. G. Micklethwait.—A Study of the Diazo-reaction in the Diphenyl Series: G. T. Morgan and Miss F. M. G. Micklethwait.—Organic Derivatives of Silicon. Part VI. The Optically Active Sulphobenzylethylpropylsilicyl Oxides: F. S. Kipping.—A Simple Manometer for Vacuum Distillation: N. L. Gebhard.

FRIDAY, FEBRUARY 21.

ROYAL INSTITUTION, at 9.—The Ether of Space: Sir Oliver Lodge, F.R.S.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.—Annual Meeting.—Tests of a Live Steam Feed-water Heater: Prof. J. Goodman and D. B. MacLachlan.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Currents as a Cause of Coast-erosion: G. O. Case.

MONDAY, FEBRUARY 24.

ROYAL SOCIETY OF ARTS, at 8.—The Theory and Practice of Clock Making: H. H. Cunynghame, C.B.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Travels in the Old Kingdom of Congo: Rev. Thomas Lewis.

INSTITUTE OF ACTUARIES, at 5.—A Review of the Investments of Offices in Recent Years, with Notes on Stock Exchange Fluctuations and the Future Rate of Interest: P. L. Newman.

TUESDAY, FEBRUARY 25.

ROYAL INSTITUTION, at 3.—Membranes: Their Structure, Uses and Products: Prof. W. Stirling.

ROYAL SOCIETY OF ARTS, at 4.30.—Irrigation in Egypt under British Direction: Sir Hanbury Brown, K.C.M.G.

ROYAL ANTHROPOLOGICAL INSTITUTE, at 8.15.—Montenegrin Manners and Customs: Miss M. Edith Durham.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The New York Rapid-transit Subway: W. B. Parsons.

FARADAY SOCIETY, at 8.—Hydrolysis as Illustrated by Heats of Neutralisation: Dr. V. H. Veley, F.R.S.—A Study of the Sulphur Anion and of Complex Sulphur Anions: Dr. J. Knox.

WEDNESDAY, FEBRUARY 26.

ROYAL SOCIETY OF ARTS, at 8.—The Problem of Road Construction with a View to Present and Future Requirements: H. S. Hele-Shaw, F.R.S., and Douglas Mackenzie.

BRITISH ASTRONOMICAL ASSOCIATION, at 5.—Address by Prof. H. H. Turner, F.R.S.

THURSDAY, FEBRUARY 27.

ROYAL SOCIETY, at 4.30.—*Probable Papers*:—The Influence of Temperature on Phagocytosis: J. C. G. Ledingham.—On the Maturation of the Ovum in the Guinea-pig: Prof. J. E. S. Moore and Miss F. Twort.

ROYAL INSTITUTION, at 3.—Wood: its Botanical and Technical Aspects: Prof. W. Somerville.

SOCIETY OF DYERS AND COLOURISTS, at 8. The Deterioration of Modern Dyed Leathers: M. C. Lamb.—A Note on the Germicidal Value of Petroleum Benzine: F. J. Farrell and F. Howles.

FRIDAY, FEBRUARY 28.

ROYAL INSTITUTION, at 9.—Explosive Combustion, with Special Reference to that of Hydrocarbons: Prof. W. A. Bone, F.R.S.

ROYAL SOCIETY OF ARTS, at 8.—The Removal of Dust and Fumes in Factories: Dr. J. S. Haldane, F.R.S.

PHYSICAL SOCIETY, at 5.—Contact Potential Differences Determined by Means of Null Solutions: S. W. J. Smith and H. Moss.—An Experimental Examination of Gibbs' Theory of Surface Tension as the Basis of Adsorption with an Application to the Theory of Dyeing: Mr. Lewis.

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