College. To Tuskegee Normal and Industrial School (Booker T. Washington), I give thirty thousand dollars, on same terms as that to Harvard College. I give to bacteriological laboratory (Harvard Medical School) ten thousand dollars. Mr. Austin was one of the class of East India merchants so prosperous in the first half of this century. He was born in Portsmouth in 1803, but his childhood was spent in Boston, where also his permanent home and interests were centred.

SCIENTIFIC SERIALS.

American Journal of Mathematics, vol. xxi. No. 1, January.—Systems of revolution and their relation to conical systems in the theory of Lamé's products, by F. H. Safford. In problems requiring the solution of Laplace's equation, it is often possible (the author remarks) to obtain a solution by transferring to curvilinear coordinates, λ, μ, ν, and assuming that V is a product of three factors, *i.e.* V = L.M.N, where L, M, N are functions of λ, μ, ν respectively. Such an expression for V is called a Lamé's product. The problem treated is an application of a theorem due to Lord Kelvin, by means of which, from a known solution, V, of Laplace's equation in terms of coordinates corresponding to a system of mutually orthogonal surfaces, a solution may be readily deduced for a new system of surfaces obtained from the first by inversion. The theorem is used in an extended sense, so that real surfaces have been obtained from imaginary surfaces by inversions with regard to imaginary points as centres. A. Wangerin, in his "Reduction der Potential-Gleichung" (Leipzig, 1875), has discussed many of the topics considered here with the aid of elliptic functions. The use of these functions is avoided in the present paper. Wangerin states that the most general surfaces of revolution for which Lamé's products, with an extraneous factor, exist, are those whose meridian curves are obtained from the curves (got by equating the real and imaginary parts of the equation $x + ri = f(t + mi)$, where f is either sn or cn) by an inversion with respect to a point on the axis of revolution. The same topics are treated by Haentzschel in his "Reduction der Potential-Gleichung" (Berlin, 1863), but he obtains surfaces of revolution of the thirty-second degree.—A. L. Baker contributes a short elementary proof of Cauchy's theorem, $W = \int dW = \int w dz$, taken around a closed curve enclosing no point where $w = \infty$ is zero.—The number is closed with a long essay (pp. 25-84), by C. L. Bouton, entitled "Invariants of the general linear differential equation and their relation to the theory of continuous groups." The titles of the chapters will indicate the line of work. Cap 1. Cockle's work ("Criticoids") and differential covariants. Cap 2. Cockle's results by Lie's methods. Cap 3. Invariants of the general linear differential equation in two variables for transformation of both variables. Cap 4. Consideration of a subgroup. Cap 5. Differential equation in canonical form (complete solution in explicit form of the problem of finding all the covariants and invariants of the equation in its canonical form (Forsyth's "Identical Covariants," &c.). The bibliographical references and the consideration of Sir J. Cockle's scattered results (the first dating from 1862) are a very useful feature of the memoir.—The pictorial accompaniment of the initial number of the new volume is a photograph, from a painting, of Prof. Simon Newcomb.

Wiedemann's Annalen der Physik und Chemie (Supplementary Number, 1898).—Mobilities of electric ions, by F. Kohlrausch. The conductivities of very dilute solutions may be theoretically determined from their concentrations by adding up the separate mobilities of the ions constituting the molecule. The author gives tables of mobilities from which the conductivities of monovalent salt solutions can be calculated down to concentrations of decinormal strength.—Kinetic theory of liquids, by C. Dieterici. It is shown that by applying the methods and data of the kinetic theory of gases, the properties of liquids may be to a large extent mathematically deduced. The size of the molecules exerts of course a great effect, and it will have to be more definitely known before the liquid theory is complete.—Magnetisation by alternating currents, by Max Wien. Toroids of soft iron wire, exposed to alternations of 128, 256, or 512 per second, provided by an alternate current siren, are not capable of following those frequencies by corresponding magnetic inductions. Eddy currents of higher periods are developed, and the soft iron becomes magnetically harder.—Reaction pressure of kathode rays, by E. Riecke. An ordinary radiometer is used to determine the reaction pressure, the vanes acting as kathodes. The pressure is proportional to the current intensity, with a current of 3×10^{-6} absolute units the pressure is 0·04 dynes per square cm.—Induction coils, by W. Hess. The discharge of an induction coil is studied by introducing a liquid condenser in parallel with the spark gap. The liquid condenser contains CS_2, and produces a Kerr effect between two crossed nicols. A strained glass plate is put between the nicols, and converts the dark field into a field of fringes. These are displaced by any fluctuation of potential, and when the displacements of a section of the fringes are photographed, a record is obtained of the whole course of the discharge. Some excellent photographs are reproduced.—Effect of Röntgen rays upon spark discharges, by H. Starke. Like ultra-violet light, Röntgen rays are capable of reducing the discharge potential between terminals upon which they impinge. But, unlike ultra-violet rays, they are indifferent as to the sign of the terminal impinged upon.—A new method of demonstrating Hertz's experiments, by J. Precht. The sections of a Hertzian resonator provided with a parabolic mirror are connected with a spark gap having a blunt kathode and a pointed anode. A steady discharge from an influence machine traverses the spark gap, and the gap is so adjusted that only a glow discharge passes. Any electromagnetic waves received by the mirror convert the glow into a shower of sparks, and at the same time the discharge potential is diminished.—Use of the coherer, by O. Behrendsen. For showing the reflection of electromagnetic waves, it is necessary to use a coherer which is not very sensitive, and to avoid single wires. The author uses a coherer made of powdered arc carbon.—Pyro-electricity and piezo-electricity, by W. Voigt. The question is raised whether the whole of the pyro-electric charge of a crystal can be described as piezo-electric, and as due to the change of volume which accompanies every change of temperature. The author shows that in tourmaline and other crystals with a singular axis, about 20 per cent. of the charge is purely pyro-electric. In the other crystals it is altogether piezo-electric.—Gliding discharge along pure glass surfaces, by M. Toepler. The length of sparks in air may be considerably extended by making them pass along glass surfaces backed by tinfoil, which is in metallic connection with one of the terminals.—Magnetisation of crystals in different directions as depending upon temperature, by Ascan Lutteroth. Faraday found that the orientation of a crystal in a magnetic field is less pronounced at higher than at lower temperatures. The author shows by experiments on various sulphates that this may or may not be true according to the choice of the axis of suspension, and explains his observations on the basis of molecular magnets.—Conduction of electricity by thin sheets of dielectrics, by W. Leick. Gutta-percha, paraffin, and sulphur show greater conductivity in thin layers than in thick layers. The conductivity depends upon the current strength, the resistance decreasing as the current increases. Gutta-percha and paraffin do not show any polarisation, but sulphur does.—Absorption of uranyl salts, by Ernst Deussen. Kundt's law of dispersion does not apply to the more easily soluble uranyl salts such as the nitrate and the chloride. But it holds for the nitrate in glycerin, and for the chloride in alcohol. In the case of the less soluble salts, such as the sulphate, acetate, and oxalate, the bands are displaced towards the red.—Effect of gases and metals upon the photographic plate, by B. von Lengyel. Hydrogen is capable of modifying silver bromide so as to give images on development. Metals which, like zinc, are capable of disengaging hydrogen from moist air, also exert an effect upon the sensitive plate. The Becquerel rays of uranium and thorium are, however, a pure radiation.—Visibility of Röntgen rays, by E. Dorn. The X-rays are not only visible to the ordinary eye, but to totally colour-blind eyes, sometimes appearing exceedingly bright, but always diffused owing to the absence of refraction. The rods of the retina are more affected by them than the cones.—A new electromagnetic string interrupter, by L. Arons. This interrupter dispenses with electromagnets, the vibrating string being attracted by a permanent magnet, which breaks the circuit by withdrawing a platinum wire attached to the string from a mercury surface. The attraction is electrodynamic. Since the self-induction of the circuit can be thus made very small, very high frequencies can be attained.

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