Early Science at the Royal Society.

November 23, 1664. Monsieur Le Febure presented his printed discourse, both in French and English, upon the preparation of Sir Walter Raleigh's cordial. He likewise read a Latin letter sent him from Paris, and signed for attestation by some of the principal physicians and chirurgeons of that city, concerning the art practised by one Monsieur Bienaise, of healing tendons and nerves transversely cut, so as to restore the patient to the full use of his limbs. He was desired to leave the letter with the society, which he promised to do, after he had shewn to some of the college of physicians.

November 25, 1663. The president acquainted the society, that he had received a letter sent to a minister in England from a suffragan bishop in Iceland; which letter being produced, the secretary was ordered to peruse it, and give an account of it to the society at their next meeting; against which time the amanuensis was ordered to make a copy of the inquiries formerly drawn up by Mr. Hooke and sent to Iceland, in order that they might be considered of, and fitted by the president to be sent and recommended to the said bishop, as a person conceived to be capable and curious enough to return a proper answer to them.

November 26, 1662. The lord viscount Brouncker acquainted the Society with the approach of St. Andrew's day; and that by reason of the necessity of making some alterations in their charter, there could not be conveniently made an election of new council this year: but it was offered to the Society, whether they would propose some other persons to be presented to the King, and, according to his majesty's pleasure, to be put into the council of the altered patent, instead of some of those, who were in the first. It was put to the question, whether any alteration should be made in the council, or not? and it was carried in the negative.—Dr. Wilkins showed his way-wiser, and the effects thereof upon a coach; and was desired to leave his first engine of this kind with the society.

November 28, 1666. Mr. Henry Howard [afterwards Duke of Norfolk] was elected and admitted, who also received the public thanks of the Society for his respects to them.—Dr. Wallis gave the society some account of what he had lately observed in Kent about tides, viz., that, according to his hypothesis, the tides had been very high about Romney-marsh, three days after the new moon; which though the seamen there ascribed to the high winds, as not thinking of any other cause, yet he thought it might be imputed to the cause assigned in his theory; especially if upon continued observations for several years together it should happen in the same manner.

1667. Mr. Coga, the first person in England, on whom the experiment of transfusion was made by order of the Society, and by the management of Dr. Lower and Dr. King, presented himself before the Society, and produced a Latin paper of his own, giving an account of what he had observed in himself since he underwent the said experiment. It was ordered likewise that Mr. Coga being willing to have the experiment repeated on him, it should be tried again accordingly, when the physicians of the Society should judge it seasonable. [Oldenburg in a letter to Boyle, takes notice that the experiment was performed at Arundel-house, in the presence of many spectators, including Mr. Henry Howard and both his sons. The morning after the lord viscount Brouncker and Mr. Oldenburg went to see Mr. Coga pretty early.]

Societies and Academies.

LONDON.

Royal Society, November 13.—Sir Arthur **Schuster**: On the total reflection of light. The light which enters the optically rarer medium at or beyond the critical angle is an effect of diffraction originating near the boundary of the refracting surface. It derives its energy from the incident beam and must diminish the intensity of the reflected light. Thus there can be no total reflection in the strict sense of the word. The ratio of the energy dissipated by diffraction to the total energy of the incident light is inversely proportional to the length of the refracting surface, and therefore tends towards zero as the size of the refracting surface increases. At the critical angle the light dissipated by diffraction amounts to about one per cent. of the incident light, when the length of the refracting surface is 5 cm. The numerical value is subject to correction depending on the approximate nature of the investigation.—N. K. **Adam** and J. W. W. **Dyer**: The molecular structure of thin films. Pt. VI. Five long-chain alcohols have been examined. The area of cross-section of the chain in the alcohols is the same as in the acids, within $2\frac{1}{2}$ per cent., and the CH_2OH group occupies 21·6 sq. A.U. of area. The acetates of these alcohols pack with the heads occupying 23 sq. A.U., and form expanded films of the same kind as other esters. The methyl ethers of the alcohols do not form stable films. Highly unsaturated acids, with three and five double bonds in the chains, behave much like oleic acid, which only has one double bond. Arachidic acid and its derivatives behave normally. Substituted acetamides show a solid film with chains close-packed at low temperatures, and this melts at a definite temperature, raised by compression, to a liquid film of area 24·2 sq. A.U. This melting seems to be due to the molecules acquiring sufficient kinetic energy other than translational to break up the solid structure. Hydrocarbon chains more than 27 carbons long tend to mask the typical phenomena in condensed films. Pentærythritol tetrapalmitate, which has four chains attached to a common centre through polar groups, and should normally have these four chains directed to the corners of a tetrahedron, orients all the chains vertically in the surface. These are not quite close-packed until a compression of about 20 dynes per centimetre is applied.—T. **Alty**: The cataphoresis of gas bubbles in water. The velocity of a gas bubble in water is independent of the gas used. It is proportional to the applied field throughout the whole range of diameters, the maximum velocity being $4\cdot1\times10^{-4}$ cm./sec./volt/cm. at a diameter of about 0·1 mm. The highest velocity is only attained in water of specific conductivity $8\cdot5\times10^{-6}$ $ohms^{-1}$. In water of specific conductivity $1\cdot8\times10^{-6}$ $ohms^{-1}$, the charge on the bubble is very small, and is occasionally reversed during the course of an experiment. Two bubbles appear to repel each other.—D. R. **Hartree**: Some relations between the optical spectra of different atoms of the same electron structure. I.—Lithium-like and sodium-like atoms. Relations between values of corresponding terms of the spectra of different atoms of the same electron structure are worked out for the Bohr atom model with a central field. The relations are different according as the series electron does or does not penetrate into the core. The theoretical relations agree fairly closely with such experimental data as are available.—P. A. M. **Dirac**: The conditions for statistical equilibrium between atoms, electrons and radiation. The principle that every process which