from Germany until, in 1884, works were established by Abbe and Schott in Jena, where the process of Guinand is once more practised.

THE PHOTOELECTRIC EFFECT WITH MINUTE MERCURY SPHERES.—Dr. E. Wasser, in the *Zeitschrift für Physik*, September 12, describes an investigation of the photoelectric effect, using submicroscopic mercury spheres produced by evaporation and subsequent condensation in dry nitrogen and carbon dioxide. The particles were observed in an electric field with an Ehrenhaft condenser, the field being so adjusted that the observed particle remained suspended in the gas. Light of wave length $\lambda = 275\mu$ was employed to produce the photoelectric effect, and it was found that, up to about $1\cdot2 \times 10^{-5}$ cm. radius, the spheres were negatively charged, or there was an inverse photoelectric effect. From this radius up to $1\cdot9 \times 10^{-5}$ cm. some particles are charged positively and some negatively, while above $1\cdot9 \times 10^{-5}$ cm. radius all are charged positively. The magnitudes of the charges which the spheres acquire seem to depend on the radius; with small spheres charges of $0\cdot6 \times 10^{-10}$ electrostatic units, or about one-eighth of an elementary quantum, are much more frequent than charges equal to that of an electron; above 3×10^{-5} cm. radius, charge alterations down to about half the charge of an electron were observed. It is shown that these effects are not due to ionisation of the gases. The question whether the photo-effect has its origin in the adsorbed gas on the surface of the mercury, or in the interior of the metal, can only be answered when it is possible to investigate the same test particle with different gas pressures.

ELECTRIFICATION DUE TO BUBBLING GASES THROUGH FLUID METALS.—Messrs. A. Coehn and E. Duhme describe a series of experiments in which hydrogen, nitrogen, carbon dioxide, oxygen, and ammonia are bubbled through pure mercury and dilute amalgams (*Zeitschrift für Physik*, September 17). All these gases behave alike, and leave pure mercury negatively charged, while weak amalgams of " non-noble " metals (sodium, zinc, cadmium) are positively charged; " noble " metals (tin, copper, silver, gold) do not produce this reversal of sign. Lenard has concluded that, in the case of non-metallic fluids, the function of the bubbling gas is to break up the electrical double layer at the surface, and to carry off the charge which is least firmly held by the fluid. It appears that with pure mercury the electrons are held by the metal which remains behind more firmly than the positively charged mercury particles, which are carried off by the gas as a fine dust, giving it a positive charge. The effect with amalgams depends on the position of the metal employed in the electric tension series; a sodium atom, for example, gives up an electron to the mercury; and it must be assumed that the Na^+ ions bind Hg atoms, forming large $Na^+(Hg)_n$ complexes, which are less easily carried away by the gas bubbles than the corresponding negatively charged mercury particles. Thus the fine dust carried away by the gas must consist mainly of pure mercury; this is not necessarily the case with amalgams of the " noble " metals.

THE DOPPLER EFFECT AND CANAL RAYS.—When the light from canal rays is observed spectroscopically, the spectral lines are seen to be widened, owing to the different velocities of the radiating atoms. Dr. H. Krefft has photographed the β line of hydrogen under different conditions, and has measured photometrically the blackening throughout the band (*Annalen der Physik*, Aug.). He finds that the Doppler band is separated from the line which comes from atoms having small velocities; and that the intensity curve of the band has in general two maxima. The velocities corresponding to these are related, when the discharge voltage is above 40,000, not as $\sqrt{2} : 1$, as is the case with the spark lines of oxygen and nitrogen; the ratio being larger than $2 : 1$, and increasing with the voltage. Previous observers have found a limit for the Doppler effect when the voltage is raised sufficiently; but Krefft, who has used voltages from 1400 to 70,000, finds for the higher voltages that the effect increases regularly, proportionally to the square root of the discharge voltage. The difference between the velocity distribution, as determined by the Doppler effect, and the curve for that of the positive H atoms, as determined by electromagnetic analysis, is shown to be a necessary consequence of the facts that the carriers of the Balmer lines have no charge, and that the ratio of the numbers of positive and of neutral atoms depends on the velocity. With the spark lines of oxygen and nitrogen, where the " carriers " are the positive atoms, the two curves are nearly the same; and the two maxima of blackening indicate a velocity ratio of $\sqrt{2} : 1$, which is consistent with the assumption that the lower velocity is produced by the movement of a molecule with positive charge through the same voltage drop that produces the higher velocity in the positively charged atom. The oxygen spark line $\lambda = 4591\cdot6$ indicates extra high velocities, which must be due to the fall of doubly charged oxygen atoms through the discharge space.

MOBILE COMPONENTS OF CRYSTALS.—In Band 18, Heft, 1 of Eucken's *Fortschritte der Chemie, Physik und physikalische Chemie*, 1924, Dr. Hüttig contributes an essay with the somewhat curious title: " Uber Gitterbestandteile die im Kristallgitter vagabundieren." It is pointed out that in some cases the particles in a crystal lattice, besides oscillating about positions of equilibrium, may move through the lattice, and the rapidity with which this motion takes place will influence the pressure-composition curves when a volatile constituent is withdrawn from a system. A selection of such curves based on very recent experiments is given, and these are divided into three groups. In the first group, *e.g.*, $H_2O/LiCl$, the solid residue consists of a mechanical mixture of definite compounds, and the phase rule applies in the simplest form. When a single compound is present, the pressure curve drops vertically towards the composition axis. In the second group, *e.g.*, H_2O/WO_3, H_2O/Sb_2O_5, H_2O/SiO_2, the behaviour is intermediate between those of the first and third groups. In the third group, *e.g.*, O_2/UO_2, H_2/Li, and H_2O/Al_2O_3, the curve sinks continuously without any steps or changes of direction. The laws of solution can be applied to the examples in the third group, and the whole curve covered by an equation $\log(p_0/p) = k/n$, where p, p_0 are the vapour pressures of the solution and of the pure volatile constituent, respectively, n the simple molecular weight of the volatile constituent, and k a constant. It is mentioned incidentally that X-ray experiments have shown that some so-called " colloidal hydrates " contain definite compounds. Thus, white tungstic acid does not show the spectrum of WO_3, and is presumably not a mere colloidal association of H_2O and WO_3.

ERRATUM.—We regret that in our reference to Early Christian legends in India (NATURE, October 4, p. 515) by a slip Malabar was substituted for Mylapore in the last sentence. Mr. Frederick Fawcett, who writes to point out the error, states that while the legend of St. Thomas is very much alive at Mylapore and on the west coast, it does not occur in the Malabar district of British India. He adds that the legends of St. Thomas on both the west and the east coast agree in a remarkable manner.