described the appearance of the surface immediately under the newly secreted pus. It was made up of eminences and hollows; the former consisting of clusters of tortuous blood-vessels, the latter filled with pus. After a few minutes' exposure, the following changes were observed: a transparent pellicle covered the surface, under which globules of air made their appearance in different places; then horizontal anastomozing canals, filled with red blood, were seen to form; and red spots, which were the termination of perpendicular canals, were observed under the pellicle. Drawings illustrating these appearances accompany the paper.

After detailing further proofs and illustrations of the above phenomena, presented by the surfaces of sores covered with pus, Sir Everard observes, that the carbonic acid originally contained in the tubes is very readily displaced by the blood, in consequence of its disposition to absorb that particular gas which forms so large a proportion of its component parts. He thinks that the extrication of carbonic acid is the original cause of the tubularity of pus; and that the tubes are then filled with red blood, and thus connected with the circulation. The succeeding changes are illustrated by Mr. Bauer's drawing, which the author laid before the Society last year.

On the Laws which regulate the Absorption of Polarized Light by Doubly Refracting Crystals. *By* David Brewster, *LL.D. F.R.S. Lond. and Edinb.* *In a Letter addressed to the Right Hon. Sir* Joseph Banks, *Bart. G.C.B. P.R.S.* Read November 12, 1818. [*Phil. Trans.* 1819, *p.* 11.]

In examining the polarizing structure of acetate of copper, the author's attention was drawn to certain changes of colour exhibited by its crystal, when exposed in different positions to polarized light; and as these were independent of the thickness of the plate, and of any analysis of the transmitted pencil, he was induced to regard them as a new affection of light, ascribable to the absorption of the homogeneous tints forming the compound colour of the crystal. Dr. Brewster, therefore, collected a variety of coloured crystals, with a view to examine the phenomena which they presented, when cut at different angles with the axis, and when exposed in different positions to polarized light. The details of this examination are next given; and as the property of transparent bodies, by which they detain and assimilate to their own substance a portion of the rays which penetrate them while the rest are freely transmitted, is related to the axes of double refraction, the author first describes the phenomena presented by crystals of one axis, and then explains the modifications which they undergo when the number of axes is increased.

It appears from these investigations that the colouring particles of crystals, instead of being indiscriminately dispersed throughout their mass, have an arrangement related to the ordinary and extraordinary forces which they exert upon light. In some cases, the extraordinary

medium appeared to be tinged with the same kind and number of colouring particles as the ordinary medium; but in other cases, in the same mineral, the extraordinary medium was either tinged with a different number of particles of the same colour, or with a colouring matter entirely different from that of the ordinary medium. In some specimens of topaz the colouring matter of the one medium was more easily discharged by heat than that of the other, one of the pencils being yellow and the other pink: hence it is a mistake to suppose that in converting yellow topazes into pink by heat, the former colour is changed into the latter; the fact being, that the yellow is discharged by heat, thus leaving the pink unimpaired. Hence it may be ascertained beforehand whether a topaz will receive a pink colour by heat; for if that colour exist in one of its images, seen by exposing it to a polarized ray, we may predict the success of the experiment.

In two specimens of emerald it was found that the colouring matter which tinged the ordinary medium in the one, tinged the extraordinary medium in the other, and *vice versâ*.

Observations sur la Décomposition de l'Amidon à la Température Atmosphérique par l'Action de l'Air et de l'Eau. *Par* Théodore de Saussure, *Professeur de Minéralogie dans l'Académie de Genève, Correspondant de l'Institut Royal de France, &c.* *Communicated by* Alexander Marcet, *M.D. F.R.S.* Read December 17, 1818. [*Phil. Trans.* 1819, *p.* 29.]

After some general observations on the changes which starch undergoes during the process of germination, and also when acted on by dilute sulphuric acid, in the manner contrived by M. Kirchoff, the author proceeds to show that starch alone, boiled in water and left to itself, forms, at the end of a certain time, a considerable portion of sugar, which is crystallizable, and much resembling that of M. Kirchoff. This change takes place at a temperature between 68° and 77° of Fahrenheit, with or without access of air. There is also produced, at the same time, a gum possessed of properties analogous to that procured by roasting starch, and a peculiar substance which M. de Saussure calls *Amidine*. There is also formed a body, insoluble in water and in most acids, but which agrees with starch in forming a blue compound with iodine.

When the air has free access in these experiments, water is abundantly formed, carbonic acid is evolved, and a portion of charcoal is deposited. When the solid contents of this solution are examined, they are found greatly inferior in weight to that of the original starch. The loss is referred principally to the formation of water, and only in small part to the carbon carried off in the form of carbonic acid.

When air is excluded, no water is produced. A little carbonic acid and nearly pure hydrogen are evolved, and no carbonaceous deposit ensues. Whether the presence or absence of air influences the production of sugar, the author has not been able to determine.