contained in the same soils, producing ferric chloride, and, on the other hand, decomposes the ammonium carbonate eliminated from the organic substances of the soil, which are subjected to dry distillation by the heat of the invading lava. The hydrochloric acid which gives rise to the sal-ammoniac of the fumaroles of volcanic lavas, cannot be derived from the lavas themselves, inasmuch as its presence is only transient; but it is derived from the decomposition of the chlorides contained in the invaded lands. An inspection of the lava of 1850 shows indeed that the denuded soil has been completely burnt, and nothing is seen but scoria of a reddish sand, which have evidently been subjected to a very high temperature.—[Ann. di. Chim. app. alla Med., July, 1869, p. 61.]

TIGRI has observed that the flowers of the hop have the power of destroying the vitality of the *Mycoderma vini*. A quantity of this fungus situated at the bottom of a vessel full of wine was found to be so completely disorganised by contact with the hop-flower, that it had no further effect in promoting the fermentation of the wine. Tigri accordingly recommends the use of hops for preserving wine.—(Ann. di Chim. app. alla Med., July, 1869, p. 20.)

M. VICTOR MEUNIER communicates to *Cosmos* the result of an experiment made in a Pasteur's flask. Seventy-five cubic centimeters of urine were introduced into a flask of three hundred cubic centimeters capacity, boiled for five minutes, and sealed. At the end of fifty-seven days two clusters of vegetation appeared; they proved to be a new species of Aspergillus, which the author, with some humour, dedicates to M. Pasteur. In another experiment, to the details of which we need not refer, M. Meunier discovered an additional species of Aspergillus, which he has named *gibbosus*.

PROFESSOR ROCHLEDER has found a new colouring ingredient in madder, in addition to alizarine and purpurine, its well-known constituents. The dye is soluble in both water and alcohol, crystallising from the latter in orange-yellow needles. The boiling aqueous solution, mixed with a little acetic acid, communicates a beautiful golden tint to wool or silk. Madder root contains, unfortunately, too small an amount of this substance to render its industrial extraction profitable.

OPINIONS seem still divided as to the poisonous nature of coralline and solferino red. Two cases are reported in *Cosmos*, from which we learn that wool impregnated with these colours produces loss of appetite, distaste for food, and cephalalgia. The wool became harmless after washing.

M. V. MARCHAND proposes to apply a chemical remedy to the newly-discovered disease of the vine. He thinks it certain that a saturated solution of sulphuretted hydrogen in water, or a mineral mixture which gradually evolves the gas, will effectually destroy the grubs which are now, in many vineyards, busily devouring the roots.

THE second part of the third volume of Dr. Kolbe's "Ausführliches Lehrbuch der Organischen Chemie" has appeared. This work, which will be complete in another volume, is a sequel to the well-known Graham-Otto's Chemie. The portion of it now before us treats principally of petroleum and similar oils, resins and balsams, albuminous bodies, biliary and cerebral products, and the constituents of urine.

GEOLOGY

Steneosaurus

MR. J. W. HULKE has published an elaborate description of the remains of a fossil crocodile from the Kimmeridge clay of Dorsetshire, which he identifies with Cuvier's *Deuxième Gavial d'Honfleur*, named *Steneosaurus rostro-minor* by Geoffroy Saint-Hilaire, and also as belonging to Quenstedt's genus *Dakosaurus*. The last-named genus will therefore be synonymous with *Steneosaurus* (Geoff. St.-Hil.).—[Quart. Journ. Geol. Soc., No. 100.]

On Sphærodus Gigas

IN a paper containing descriptions of two new species of *Gyrodus*, Sir Philip Egerton has described and figured the vomer of *Sphærodus gigas*, the discovery of which is interesting as proving the validity of the genus. In its character it is quite distinct from the same part in *Lepidotus*, to which genus the species has been referred on account of the resemblance of the detached teeth. The specimen figured contains a median row of six circular teeth, on each side of which is a row of seven rather smaller circular teeth. Sir Philip Egerton also describes and figures a beautiful specimen of the vomer of a *Gyrodus* from Kimmeridge, which he ascribes to one of his new species.—[Quart. Journ. Geol. Soc., No. 100.]

The Geology of Thrace

DR. A. BOUÉ, who has been investigating the geology of Thrace, announces some of the results of his expedition. He has traced the cretaceous and nummulitic formations from Jarim Brugas to Adrianople, and found crinoids in the shales and limestones near Eski Sara, one of which he is inclined to identify with the carboniferous limestone. The steep southern declivity of the Balkan represents a great fissure of dislocation, the granitic central stock of the ancient Balkan having sunk down bodily during the enormous porphyritic and trachytic eruptions; hot water flows from the fissures of the sunken granite, and forms numerous baths along the foot of the Balkan. In Mechli ravine, near Kisantik, immediately surrounded by mountains 4,000 feet in height, Dr. Boué discovered, resting directly upon gneiss, an old carboniferous formation, with three beds of good coal; but as no fossils were to be detected in the deposit, he was unable to determine whether it belongs to the coal measures. Coal-beds, probably of Eocene age, occur in the Rhodopi.—[Proc. Imp. Geol., Institute of Vienna, 31st Oct., 1869.]

PHYSICS

The Dynamics of Prince Rupert's Drops

PROFESSOR DUFOUR, of Lausanne, has been engaged in a research on the Development of Heat which accompanies the explosion of Prince Rupert's Drops. The examination of bodies which, in modern language, are said to be in a state of "molecular tension" is of the highest importance to dynamics, and the investigation to which we now refer is an example of the kind of work that is really required.

Every one is familiar with the pulverisation and explosion, so disproportionate to the mechanical force exerted to produce them, which are witnessed on the fracture of the point of one of these drops. M. Dufour finds, in addition, that an appreciable amount of heat is evolved at the same time. The simplest mode of exhibiting this effect is to adjust the drop in the cone of a vertical thermopile in such a manner as to prevent the powder produced by the disruption from projection elsewhere than against the upper face of the pile. This is easily accomplished by means of a caoutchouc cover, through which the point of the drop alone projects; and the entire apparatus, abundantly surrounded with cotton, is left at rest for a day. The pile is then connected with a galvanometer, and, after breaking the point, the required observation is readily made. With drops of 4·8 to 7·7 grammes, M. Dufour obtained a deflection of 5° to 9°. The mere friction of powdered glass gave no deflection. Attempts to determine the heat evolved were also made with the calorimeter, turpentine being the liquid employed. In their original form, these did not succeed; but tolerably concordant results were arrived at by effecting the explosion in a cone of pasteboard, having its base uppermost, and forcing the whole of the fragments to fall through the truncated vertex into the turpentine. In this way, it appeared that a weight of the drops, amounting to 11·40 to 20·42 grammes, caused an elevation of temperature of 0·25° to 0·35°. The internal condition of the glass was found, by these experiments, to vary appreciably in drops of different sizes. Sometimes the product consisted chiefly of large fragments, sometimes it was principally powder. M. Dufour compares the state of the drops to a rigid enclosure bound together by highly-heated bars, themselves mutually connected in every direction. After cooling, the bars would all be under strain, from which, if released at one part, the whole would be set free. Now, Joule and Edlund have shown that a strongly-stretched wire, if allowed to return to its original volume, actually evolves an amount of heat, forcibly reminding one of that developed in the present instances.

In order to discover the part of the drop whence the fragments had been derived, its exterior was coloured. Thus it was found that the largest fragments came from the central, the finest powder from the superficial layer; and the pieces that were examined had, as might thence be expected, the form of a very flat wedge. The evolution of heat during the explosion might have been presumed to be accompanied by an increase in the density of the glass; but although this is a point somewhat difficult to ascertain experimentally, M. Dufour's paper is not without evidence in favour of such being really the fact.