and third. One of them, which lasted ten seconds, was so powerful that not a single house remained uninjured. A general panic reigns in the town. Many of the inhabitants, including the Cardinal-Archbishop, have taken to flight. It is impossible to estimate the whole extent of the damage. The number of persons injured is at present estimated at thirty.

THE eruption of Vesuvius continues to increase in activity. Two large streams of lava are at present (November 8) flowing from the crater to the base of the cone.

IN Prof. Huxley's article on the *Challenger* Publications last week, line 11 from top of p. 2, col. 2, should read "*direct* and but little modified descendants," instead of "*dried*," &c.

OUR ASTRONOMICAL COLUMN

HARTWIG'S COMET (1880 *d*).—In a circular issued by Prof. Winnecke from the Observatory of Strasburg on the 1st inst., he gives reasons for assuming that the comet detected by Dr. Hartwig on September 29 may have a much shorter period than was conjectured in his first circular. On calculating parabolic elements from the Strasburg observations of September 29 and October 8, and one by Prof. Auwers at Berlin on October 17, MM. Ambronn and Wislicenus, students in the University of Strasburg, found the middle observation could not be more closely represented than with an error of something over two minutes of arc. Prof. Winnecke, as was stated in our previous notice, considered he had reason for suspecting the identity of Hartwig's comet with that of 1506, and a further examination of the historical descriptions has led him to direct attention to the comets of 1382, 1444, and 1569, and with the perihelion passage fixed to July 13, 1444, and October 15, 1569, he finds geocentric positions which he regards as in sufficient agreement with the records. A period of revolution of about 62⅓ years is therefore obtained, and an ellipse with this period has been adapted by Dr. Schur and Dr. Hartwig to the observations on September 29 and October 14 and 24. The resulting elements are as follow :—

Perihelion Passage, 1880, September 6·58949 M.T. at Berlin.

Longitude of perihelion	83 33 28	M. Eq. 1880·0.
,, ascending node ...	44 33 30	
Inclination	38 8 56	
Log. excentricity	9·990180	
Log. semi-axis major	1·196457	
Log. mean diurnal motion	1·755321	

The error of the place deduced from this ellipse on October 14 is + 28″ in longitude and the same in latitude, and it is remarked that the error in longitude does not admit of being destroyed without an increase of error in latitude. This, however, Prof. Winnecke suggests, may arise from the assumed period of 62⅓ years being really a multiple of the true one. The comet approaches near to the orbit of Mercury at the ascending node, though at the present time not sufficiently close to occasion any change in the character of the orbit. Still at some past epoch the effect of perturbation may have brought the orbits into coincidence or nearly so, and Prof. Winnecke hints that the planet Mercury might have been the means of impressing an elliptical form on the comet's orbit.

It is clearly a case in which those observers who are in the possession of very powerful instruments may render most material service towards deciding whether we have to do with a comet of comparatively short period. If it is practicable to secure good observations for position after the next period of moonlight, it may then be possible to obtain evidence *pro* or *con*, by direct computation of the orbit, though unfortunately observations did not commence until the comet had reached the extremity of the parameter, or in other words had attained an angular distance of 90° past the perihelion point.

DISCOVERY OF A COMET.—Lord Lindsay notifies the discovery of a comet at his observatory, Dunecht, during the night of the 7th inst., by Mr. Lohse in the constellation Lacerta ; the position at 15h. 30m. in R.A. 22h. 45m. 54s., Declination 42° 33′·7 ; daily motion in R.A. + 6m. 58s., in Decl. + 1° 8′. This is far from any position which the expected comet of 1812 could occupy on the above date.

CERASKI'S VARIABLE STAR.—Mr. Knott obtained a very complete observation of the descending and ascending light-curve of this newly-detected variable on November 2 ; the minimum appears to have occurred about 11h. G.M.T. The period will be somewhat less than 2½ days.

PHYSICAL NOTES

PROF. LORENZ has given in *Wied. Ann.*, No. 9, a development of his theory of "refraction-constants" (published before in Danish), and described experiments bearing on it. The problem contemplated was to find that function of the refractive index, freed from dispersion, and of the density of a body, which is constant with varying density of the body, supposing the molecules themselves unchanged. It is assumed that bodies consist of molecules in whose intervals light is propagated with the same velocity as in vacuous space ; further, that the bodies are isotropic, and their molecules of spherical form. Herr Lorenz arrives at a simple expression for the refraction-constant, the constancy of which, as also the correctness of the assumption as to light moving with the same velocity in the intervals of molecules as in vacuo, had to be proved. He determined the refraction constants of several bodies in the liquid and the vaporous states, viz., ethylic ether, ethylic alcohol, water, chloroform, ethylic iodide, ethylic acetate, and sulphide of carbon. The refraction was determined with sodium and lithium light, and at temperatures of 10°, 20°, and 100°. He found that in passage of the substances from the liquid to the vaporous state the refraction-constant varies very little (only about 5 per cent. at most). Dispersion also showed great constancy. Another Danish physicist, K. Prytz, has extended the inquiry to some ten other substances (*loc. cit.*), and confirmed the assumption of refraction constants.

WITH regard to electricity, Herr Hoorweg (*Wied. Ann.*, No. 9) divides all bodies into two groups, (*a*) those in which the conductivity rises with the temperature (dielectrics), and (*b*) those in which it decreases with rise of temperature (adielectrics). He endeavours to prove by experiment (1) that both dielectric bodies with adielectric, and adelectric with each other, yield contact electricity ; (2) that this electricity has always the same sign as that which arises with gentle friction or pressure. (The sometimes different action of strong friction is ascribed to the influence of the raising of temperature.) Not only does electricity arise through the different heat-motion at the places of contact of two heterogeneous substances, but this cause is fully sufficient to explain all development of electricity.

HERR NARR has lately obtained some interesting results in experimenting further on the behaviour of electricity in gases, and especially *in vacuo* (*Wied. Ann.*, No. 9). In the middle of a hollow brass sphere on a glass support was suspended a metallic ball by means of a platinum wire passing (insulated) through a metallic stopper to an electrometer. Vacua could be produced in the sphere. A charge of electricity imparted to the conducting system underwent the same process of dispersion *in vacuo* as where the space was full of gas. The outer surface of the hollow sphere, one minute and also one hour after the charging, had the same electricity as the conducting system. Herr Narr further finds that the process of dispersion in gas-filled space is not perceptibly influenced by the hollow sphere being insulated or being connected to earth, if the original charging be done while the sphere is connected to earth ; the dispersion constant diminishes in both cases, at least at the beginning. But if the conducting system be charged while the hollow sphere is insulated, the latter has in this state one minute, and likewise one hour to one hour and a half after, electricity of the same sign with the conducting system, and the first connection of the hollow sphere to earth occasions a temporary outflow. Herr Narr shows reasons for believing that the electricity on the hollow sphere finds its way through the gas-space.

A NEW series of experiments of extended range, by Herr Roth, on the compressibility of gases, is described in *Wied. Ann.*, No. 9. The relations between pressure, volume, and temperature, in the case of carbonic acid, sulphuric acid, ammonia, and ethylene, are studied. The results are mainly confirmatory of van der Waal's formulæ.

A NEW balance designed to be easily transportable, light, and yet stable, without fixing to the table, and to serve in inspection of widely various weights (by Government officials in Hungary), was lately brought before the Buda-Pesth Academy by Herr von Krasper (see *Wied. Beibl.* No. 9, p. 638). Among other features,