at Madras, where the climate is tempered by the influence of the sea. It is interesting to observe the interval between the mean dry and wet-bulb temperature throughout the year, and the daily range of temperature; the latter varies greatly, amounting to nearly 34° at Hassan, in January. The highest shade temperature in the two years was 99°·5 at Chitaldroog, in April 1893.

THE *Quarterly Journal* of the Geological Society for May is an unusually thick number, and its contents cover almost as wide a range of geological subjects as could be brought together. Palæontology is represented by the presidential address on the history of the Crustacea by Dr. Woodward, who also contributes papers on Cretaceous Crustacea from Vancouver, and on the only known fossil Octopod; while Mr. C. W. Andrews discusses the Plesiosaurian skull, and Mr. P. Lake continues his work on a group somewhat neglected of late years by British geologists —the Trilobites—with a study of the Silurian species of *Acidaspis*. In stratigraphy, Dr. Hicks contributes a paper in which he claims the Morte Slates as Silurian, and reopens in a new manner the North Devon controversy, while Miss Elles and Miss Wood show that there are Llandovery beds in the Conway district. The British Cretaceous rocks are subjected to a most detailed correlation—as regards the Speeton series by Mr. Lamplugh, and as regards the Cenomanian by Messrs. Jukes-Browne and Hill; the former author urging that some of the strata dealt with are strictly Jurassic, while the two latter show that the true Cenomanian of France represents our Lower Chalk only, and not our Upper Greensand. The only Tertiary geology in the journal concerns the Basaltic plateaus of North-western Europe and the river-system of the old land across which the lavas were poured, described in a most interesting paper by Sir Archibald Geikie. This last paper, along with one on a part of the same subject—the Skye granophyres—by Mr. Harker, represents also the petrological contributions to the journal. Important evidence is adduced by Prof. Edgeworth David of a Permo-Carboniferous glaciation of Australia. Finally, Prof. Hull's paper on the geology of the Nile, and Mr. Hill's, on transported Boulder Clay, must not be forgotten.

AN elaborate monograph on "The American Lobster," by Prof. F. H. Herrick, forming a part of the *Bulletin* of the United States Fish Commission for 1895 (pp. 1-252), has been issued as a separate publication. The memoir contains the results of a masterly study of the habits and development or general biology of the lobster, and is illustrated with the lavishness which is a feature of official publications of the United States. Until comparatively recent years the lobster was singularly neglected by naturalists; nevertheless, Prof. Herrick gives at the end of his memoir a list of more than two hundred papers referring to the Crustacea, of which the lobster may be styled the king. The subjects of the chapters in the present contribution to this literature are: habits and environment, reproduction, moulting and growth, defensive mutilation and regeneration of lost parts, large lobsters, enemies of the lobster, the tegumental glands and their relation to sense organs, variation in colour and structure, structure and development of the reproductive organs, habits of the lobster from time of hatching until the period of maturity, history of the larval and early adolescent periods, and embryology of the lobster. It will be seen from this brief statement that Prof. Herrick has studied many phases of the general biology of the lobster, and in all of them he adds to the previous knowledge of the subject. His observations are of scientific value, and many of the facts described, more particularly those relating to the larval development and reproduction, have important economic bearings. After some statistics pointing to the decline of the lobster fishery in the United States, Prof. Herrick remarks: "Civilised man is sweeping off the face of the earth, one after another, some of its most interesting and valuable animals by a lack of foresight and selfish zeal unworthy of the savage. . . . Thus, as we shall see, the American lobster occupies only a narrow strip along a part of the North Atlantic coast, and while it is probably not possible to exterminate such an animal, it is possible to so reduce its numbers that its fishing becomes unprofitable, as has already been done in many places. The only ways open to secure an increase in the lobster are to protect the spawn-lobsters, or to protect the immature until they are able to reproduce, or to take the eggs from the lobsters themselves, and hatch them artificially." For the sake of the persons engaged in the lobster fishery, it is to be hoped that measures will be taken in time to prevent its further decline in the United States.

THE additions to the Zoological Society's Gardens during the past week include a Caracal (*Felis caracal*) from India, presented by Captain E. F. Carter; a Spotted Cavy (*Cælogenys paca*) from Trinidad, presented by Dr. F. G. C. Damian; a Common Otter (*Lutra vulgaris*), British, presented by Mr. Henry Laver; a Blue and Yellow Macaw (*Ara ararauna*) from South America, presented by Mrs. Browning; a —— Deer (*Cariacus paludosus*, ♂) from Paraguay, two Green-winged Doves (*Chalcophaps indica*), two White-backed Pigeons (*Columba leuconota*) from India, four Alligators (*Alligator mississippiensis*) from the Mississippi, four Dandin's Tortoises (*Testudo dandinii*) from the Aldabra Island, deposited; two Thick-tailed Opossums (*Didelphys crassicaudata*) from South America, four Gouldian Grass Finches (*Poëphila gouldiæ*), two Crimson Finches (*Estrelda phæton*) from Australia, purchased; a Sœmmerring's Gazelle (*Gazella sœmmerringi*, ♂), two Striped Hyænas (*Hyæna striata*), an Egyptian Ichneumon (*Herpestes ichneumon*), two Libyan Zorillas (*Ictonyx lybica*), two Fennec Foxes (*Canis cerdo*), two Ruppell's Vultures (*Gyps rüeppelli*), four Egyptian Vultures (*Neophron perenopterus*) from Egypt, received in exchange.

OUR ASTRONOMICAL COLUMN.

THE RING NEBULA IN LYRA.—The appearance of the brightest of the ring nebulæ, as seen with the Lick 36-inch refractor, is described by Prof. Barnard in *Ast. Nach.* No. 3354. The aperture of the ring was filled with a feebler nebulosity, which was estimated to be nearly midway in brightness between the brightness of the ring and the darkness of the adjacent sky. This aperture was more nearly circular than the outer boundary of the nebula, so that the ends of the ring were thicker than the sides. The following end of the ring had a slightly greater extension, which was less bright than the ring itself, and the entire nebula was of a milky colour. The central star was usually seen, but was never a very conspicuous object. The brightest region of the nebula lies in the northern part. Micrometric measurements of the nebula gave the following mean results:—

Position angle of major axis ...	65°·4
Outer major diameter	80″·9
Inner major axis	36″·5
Outer minor axis	58″·8
Inner minor axis	29″·4

A magnifying power of 520 was generally employed.

VARIABLE STAR CLUSTERS.—The discovery of a large number of variable stars in certain star clusters was announced a few months ago by Prof. E. C. Pickering (NATURE, vol. liii. p. 91). Since then a special investigation has been made of the variables forming part of the cluster M.5 Serpentis, N.G.C. 5904 (*Ast. Nach.* 3354). Forty-five photographs of this cluster have been measured by Miss Leland, and the measures include the greater portion of the forty-six variables previously discovered. The periods of these variables are in general very short, not exceeding a few hours. One of these, designated No. 18, which follows the centre of the cluster about 6′ and is south 5′, has a probable period of 11h. 7m. 52s., or 0·4638 days. The coordinates of the light curve of this variable are as follows:—

Days.		Mag.	Days.		Mag.
0·00	...	13·50	0·25	...	14·73
0·05	...	13·87	0·30	...	14·73
0·10	...	14·35	0·35	...	14·72
0·15	...	14·70	0·40	...	14·65
0·20	...	14·72	0·45	...	13·56

It thus appears that the star remains about minimum brightness during half the period, while the maximum luminosity is of relatively short duration; the decrease in light is rapid, and the rate of increase still more rapid. The succession of changes does not seem to correspond with those of any previously known class of variable stars.

RECENT RESEARCHES ON RÖNTGEN RAYS.

THE novelty of Prof. Röntgen's skeletal photographs has almost worn off, and the field of research opened up by his observations is now mainly occupied by scientific workers, who are endeavouring to analyse the rays, and to extend the knowledge of their characteristics, rather than to produce startling pictures capable of exciting the wonder of the general public. But though the interest of scientific dilettantes has waned, the investigators who remain in the field are still so numerous that it is hardly possible to keep in touch with the multitude of observations published; and published in some cases, perhaps, a little prematurely. A number of interesting results have been recorded from time to time among our "Notes"; but so many papers and communications have been received during the past few days, that they are now brought together for readier reference, as has been done in several previous issues of NATURE.

Attempt to Polarise Röntgen Rays.

Dr. John Macintyre, whose observations on the capabilities of Röntgen rays have formed the subject of several letters and notes in these columns, has sent us an account of an attempt to polarise the rays. Different views have been expressed about the possibility of polarising the rays by means of tourmalines, and although Dr. Macintyre's experiments seem to indicate a negative result, they are of such importance that they deserve to be put on record.

The source of electricity was the main, and the measurements across the terminals (with Lord Kelvin's cell-tester and ampere gauge) were 10 volts and 10 amperes. The spark of the Rhumkorff coil was 6 inches, and a mercury interrupter was used. An ordinary Crookes' focus tube, enclosed in cardboard to exclude all light, was excited by the above, and the vacuum carefully arranged to give the maximum fluorescence by gently heating the bulb with a spirit-lamp. Screens of barium platino-cyanide, potassium platino-cyanide, and lithium-rubidium-platino-cyanide were tried. The two tourmalines were got as nearly alike as possible, the measurements of each being: length, 47 mm.; breadth, 12 mm.; thickness, 2 mm.; and the experiments were carried out in a dark room.

In the first experiment, on placing one tourmaline between the source of the Röntgen rays and the screen, and directly in contact with the latter, a distinct shadow was seen due to absorption of the rays. On placing the second tourmaline parallel with the first, a difference in density of the shadow was immediately observed. When the tourmalines were gradually turned at right angles to each other, a dark square area could be seen where the two crossed. A source of error was, however, suggested in this experiment. One of the tourmalines could not be in as close contact with the screen as the other; and on account of the manner in which the Röntgen rays pass from a point on the platinum plate in such a Crookes' tube, differences were observed in the shadows of the four arms of the cross formed by the tourmalines. For example, (1) if the horizontal tourmaline were next to the screen, and the vertical one behind it, the two arms above and below the square dark central area were less sharply defined than the two arms on each side of it, and consequently the shadows appeared to be different. (2) Although on the square portion corresponding to where the tourmalines crossed, one got a darker shadow still, it might only be due to the difference in thickness of the two layers.

A second observation was then made. One of the tourmalines was broken in two portions, and one of these was placed parallel with and the other perpendicular to the other tourmaline. Again the dark square area was seen by direct vision. Dr. Macintyre could not say, however, that the density was greater than where the other portion of the broken tourmaline was laying parallel with the whole one. This rather suggested that the square dark area was caused by difference of density only. In a third series of observations photographs were taken with different exposures—one with a single flash of the tube, due to one interruption of the coil; others with much longer exposures, but in all the same difficulties in distinguishing between the two conditions arose. (Copies of these photographs have been received from Dr. Macintyre.) In the first photograph a shadow of one tourmaline was obtained, proving the absorption of some of the Röntgen rays. In the second photograph, of one whole tourmaline and a portion of the other, a greater density can be noted where two layers are lying parallel with each other than where only one tourmaline interferes with the rays. The third photograph shows the unbroken tourmaline covered at one part by a portion of the broken tourmaline lying parallel with its axis. The other part of the broken tourmaline is placed at right angles, and Dr. Macintyre raises the question whether the density of the square area is greater than where the two tourmalines are lying parallel with each other. In his opinion, the photographs bear out the observations by direct vision, and appear to give negative results; and an examination of the two photographs which form the result of his crucial experiment, leads us to conclude that there is not any appreciable difference of brightness between them.

Röntgen Rays and the Resistance of Selenium.

Mr. J. W. Giltay, Delft, Holland, has sent us the following important communication on the influence of Röntgen rays upon the resistance of selenium.

Some weeks ago, the possibility of Röntgen rays having an influence on the resistance of selenium occurred to me. I made a preliminary experiment to put this idea to the test, but, probably owing to the poor state of my induction coil, I failed to get any effect. Want of time prevented me from trying again with another coil.

I told my failure to Prof. H. Haga, of Groningen University, who kindly undertook to investigate the subject. The selenium cell I made for him was of the Shelford-Bidwell type (NATURE, November 18, 1880), the working surface was 20 × 44 mm. The resistance of this cell was in darkness 31,600 ohms, in diffuse daylight it was about 15,300.

Prof. Haga with this cell got the following results, which I publish in this letter with his full approval.

The Crookes' tube he used was of the ordinary pear form (not a focus tube), and highly evacuated, giving undoubtedly a very strong Röntgen effect. The induction coil was one of Ruhmkorff's, of a length of 60 cm.; the battery for driving the coil consisted of five accumulator cells.

The distance between the selenium cell and the under part of the tube was 3 cm. The cell was covered with pasteboard, and over this was laid a thick sheet of zinc. The resistance of the cell was now measured by the bridge method, one dry cell acting as the battery, contact being of course made only momentarily. The resistance in the dark was found to be 31,600, as I remarked before. Now the induction coil was started and worked during just one minute; the resistance of the cell was then immediately measured again, and found to be exactly the same. This proved the wires carrying the induced currents and the coil itself to have no influence on the cell.

Now the zinc plate was removed and replaced by two thin aluminium sheets (two instead of one, to prevent heat rays falling on the cell). The coil was now worked during one minute, and immediately after stopping it the resistance of the cell was taken. This was now found to be 26,400.

The resistance was not measured *during* the radiation, else it would probably have been found to be a little less than 26,400, but immediately after the coil having been stopped. The measuring of the resistance took about one minute. After having left the cell at rest during 20′, the resistance had risen to 29,500 again.

Prof. Haga made several experiments, always with the same qualitative results.

A simple kind of bolometer, consisting of strips of tinfoil (11·85 Ω) did not show any change of resistance by Röntgen radiation.