

pea-chick she had to sit one week longer than is requisite to hatch an ordinary chick, but in this there is nothing very unusual, for, as Mr. Spalding observes, the same thing happens with every hen that hatches out a brood of ducklings.* The object with which I made this experiment, however, was that of ascertaining whether the period of maternal care subsequent to incubation admits, under peculiar conditions, of being prolonged; for a pea-chick requires such care for a very much longer time than does an ordinary chick. As the separation between a hen and her chickens always appears to be due to the former driving away the latter when they are old enough to shift for themselves, I scarcely expected the hen in this case to prolong her period of maternal care, and indeed only tried the experiment because I thought that if she did so the fact would be the best one imaginable to show in what a high degree hereditary instinct may be modified by peculiar individual experiences. The result was very surprising. For the enormous period of eighteen months this old Brahma hen remained with her ever-growing chicken, and throughout the whole of that time she continued to pay it unremitting attention. She never laid any eggs during this lengthened period of maternal supervision, and if at any time she became accidentally separated from her charge, the distress of both mother and chicken was very great. Eventually the separation seemed to take place on the side of the pea-cock; but it is remarkable that although the mother and chicken eventually separated, they never afterwards forgot each other, as usually appears to be the case with hens and their chickens. So long as they remained together the abnormal degree of pride which the mother showed in her wonderful chicken was most ludicrous; but I have no space to enter into details. It may be stated, however, that both before and after the separation the mother was in the habit of frequently combing out the top-knot of her son—she standing on a seat, or other eminence of suitable height, and he bending his head forwards with evident satisfaction. This fact is particularly noteworthy, because the practice of combing out the top-knot of their chickens is customary among pea-hens. In conclusion I may observe, that the pea-cock reared by this Brahma hen turned out a finer bird in every way than did any of his brothers of the same brood which were reared by their own mother, but that on repeating the experiment next year with another Brahma hen and several pea-chickens, the result was different, for the hen deserted her family at the time when it is natural for ordinary hens to do so, and in consequence all the pea-chickens miserably perished.

I have just concluded another experiment which is well worth recording. A bitch ferret strangled herself by trying to squeeze through too narrow an opening. She left a very young family of three orphans. These I gave, in the middle of the day, to a Brahma hen which had been sitting on dummies for about a month. She took to them almost immediately, and remained with them for rather more than a fortnight, at the end of which time I had to cause a separation, in consequence of the hen having suffocated one of the ferrets by standing on its neck. *During the whole of the time that the ferrets were left with the hen the latter had to sit upon the nest;* for the young ferrets, of course, were not able to follow the hen about as chickens would have done. The hen, as might be expected, was very much puzzled at the lethargy of her offspring. Two or three times a day she used to fly off the nest, calling upon her brood to follow; but upon hearing their cries of distress from cold, she always returned immediately and sat with patience for six or seven hours more. I should have said that it only took the hen one day to learn the meaning of these cries of distress; for after the first day she would always run in an agitated manner to any place where I concealed the ferrets, provided that this place was not too far away from the nest to prevent her from hearing the cries of distress. Yet I do not think it would be possible to conceive of a greater contrast than that between the shrill peeping note of a young chicken and the hoarse growling noise of a young ferret. On the other hand, I cannot say that the young ferrets ever seemed to learn the meanings of the hen's clucking. During the whole of the time that the hen was allowed to sit upon the ferrets she used to comb out their hair with her bill, in the same way as hens in general comb out the feathers of their chickens. While engaged in this process, however, she used frequently to stop and look with one eye at the wriggling nest-full with an inquiring gaze

* The greatest prolongation of the incubatory period I have ever known to occur was in the case of a pea-hen which sat very steadily on added eggs for a period of four months, and had then to be forced off in order to save her life.

expressive of astonishment. At other times, also, her family gave her good reason to be surprised; for she used often to fly off the nest suddenly with a loud scream—an action which was doubtless due to the unaccustomed sensation of being nipped by the young ferrets in their search for the teats. It is further worth while to remark that the hen showed so much uneasiness of mind when the ferrets were taken from her to be fed, that at one time I thought she was going to desert them altogether. After this, therefore, the ferrets were always fed in the nest, and with this arrangement the hen was perfectly satisfied—apparently because she thought that she then had some share in the feeding process. At any rate she used to cluck when she saw the milk coming, and surveyed the feeding with evident satisfaction.

Altogether I consider this a very remarkable instance of the plasticity of instinct. The hen, it should be said, was a young one, and had never reared a brood of chickens. A few months before she reared the young ferrets she had been attacked and nearly killed by an old ferret which had escaped from his hutch. The young ferrets were taken from her several days before their eyes were open.

In conclusion I may add, that a few weeks before trying this experiment with the hen I tried a similar one with a rabbit. In this case the ferret was newly born, and I gave it to a white doe rabbit which had littered six days before. Unlike the hen, however, she perceived the imposture at once, and attacked the young ferret so savagely that she broke two of its legs before I could remove it. To have made this experiment parallel with the other, however, the two mothers ought to have littered on the same day. In this case the result would probably have been different; for I have heard that under such circumstances even such an intelligent animal as a bitch may be deceived into rearing a cat, and *vice versa*.*

GEORGE J. ROMANES

Dunskait, Ross-shire, Oct. 10

Curious Australian and N. American Implement

A VERY interesting illustration of the occurrence of the same specialised implement in widely separated regions is found in the resemblance between the vermin hooks of the Australians and the same kind of weapon found among the Ute Indians. Several of the former were brought home by Wilkes' Expedition, and are found in the National Museum (Fig. 1). They



FIG. 1.—Australian vermin hook.

have highly finished handles, and the bone hook is fastened on with wrapping and gum. Of the latter, Major Powell, in his Colorado Report (1875), says, "These Indians all carry canes with a crooked handle, they say to kill rattlesnakes, and to pull rabbits from their holes" (Fig. 2).



FIG. 2.—Pai-Ute vermin hooks.

The Ute implement is very rude, consisting of a switch merely, with the bark stripped off, and a nail passed through the thick end at an acute angle, and firmly lashed with sinew. Major Powell's Fig. 45, entitled "The Human Pickle," has two of these hooks (or canes) in his hand.

O. T. MASON.

Washington, D.C., Oct. 13

OUR ASTRONOMICAL COLUMN

DOUBLE STARS. (1) β ERIDANI.—In the year 1850 the late Capt. Jacob calculated two orbits for this binary system, the second of which represents very fairly his subsequent measures to the end of 1857, a rather severe test for elements founded upon the data available in 1850. We look in vain for measures later than Capt. Jacob's, though it may be hoped this and other interesting objects

* *Asyrops* to what Mr. Spalding says about the early age at which the instinctive antipathy of the cat to the dog becomes apparent, I may state that some months ago I tried an experiment with rabbits and ferrets somewhat similar to that which he describes with cats and dogs. Into an outhouse which contained a doe rabbit with a very young family I turned a ferret loose. The doe rabbit left her young ones, and the latter, as soon as they smelled the ferret, began to crawl about in so energetic a manner as to leave no doubt that the cause of the commotion was fear, and not merely the discomfort arising from the temporary absence of the mother.

of the southern heavens have not been entirely neglected of late years. The public observatories are perhaps too closely occupied with other work to allow of much being expected from them in a class of observation peculiarly suited to the amateur astronomer, but there must be a grand field of operations for private observers, in southern double and variable-star astronomy.

Capt. Jacob's last orbit of β Eridani may be written thus:—

Peri-astron passage	...	...	...	1819.83
Node	...	...	...	110° 40'
Node to peri-astron in direction of motion	...	...	...	285° 50'
Inclination	...	...	...	46° 36'
Excentricity	...	...	...	0.323
Semi-axis	...	...	...	4" 25

Mean annual motion, $-3^{\circ}.3645$, or period of revolution 107 years.

The components are of equal brightness, and hence it is to be expected some measures may be registered 180° different from others; accordingly, to work the whole series into any supposable orbit it is necessary to add 180° to Sir J. Herschel's micrometrical measures (Cape Obs., p. 276), and indeed it will be seen that he has so recorded the angles of the 20-foot sweeps, p. 174.

The errors of the above orbit are, for

1835.00	Pos. ($c - o$) + 2° 5'	Dist. ($c - o$)	0" 00
1857.96	" - 1° 6'	"	+ 0" 03

The following are deduced from the same orbit:—

1875.0	Pos.	218° 9'	Dist.	3" 92
76.0	"	216° 3'	"	3" 89
77.0	"	213° 7'	"	3" 86

As the measures of this star are, so far, scattered in several volumes, they are collected here for convenience of reference. Dunlop's angle was evidently registered in the wrong quadrant, as is pointed out both by Sir J. Herschel and Capt. Jacob; the correct reading appears to be 343° 6'.

Dunlop	1825.96	Pos.	343° 1'	Dist.	2" 5 ²
Herschel	35.00	"	302° 3'	"	3" 65
Jacob	45.88	"	276° 0'	"	4" 16
"	46.83	"	277° 0'	"	4" 32
"	49.82	"	270° 0'	"	—
"	50.80	"	268° 73'	"	4" 32
"	51.79	"	266° 38'	"	4" 30
"	52.76	"	264° 84'	"	4" 14
"	53.99	"	263° 24'	"	4" 36
"	56.09	"	261° 12'	"	4" 70
"	57.96	"	258° 18'	"	4" 49

The place of β Eridani for the commencement of 1876. is in R.A. 1h. 35m. 5s., and N.P.D. 146° 49' 5".

(2) O. Σ 387.—Between the epoch of Mr. Otto Struve's measures in 1844 and Baron Dembowski's in 1868, the angle in this binary has retrograded 77°, and no doubt if measures are obtained this year a very considerable further change will be manifested: yet the distance, if we except Secchi's estimate in 1856, has been found about half a second, as long as the star has been under observation. A first approximation to the elements may soon be practicable. The place of this object for beginning of 1876 is R.A. 19h. 44m. 6s., and N.P.D. 55° 0' 1". The number applies to the Pulkova Catalogue of 1850.

THE MINOR PLANETS.—No. 150 of the group of small planets has been reached, Prof. Watson, director of the Observatory of Ann Arbor, Michigan, having detected another member, apparently on the night of October 18; the place as yet doubtful, the telegrams through the French and English cables being discordant. It is stated to be of the 10th magnitude, and is therefore brighter than the great majority of planets discovered during the last few years. Considering the close scrutiny which the ecliptical region of the sky is receiving at the present day, we must surely soon be in a position to pronounce with some degree of confidence whether any trans-Neptunian planet as bright as stars of the 13th magnitude exists

within 2½° or 3° from the ecliptic, and in the event of greater inclination, the scheme of Prof. Peters, on its completion, may afford an equally definitive conclusion. There have been some curious alarms in this direction, as in the autumn of 1850, during observations of the minor planet Hygeia at Washington, when an apparently slow moving object was compared with the planet on more than one evening; but although sought for diligently on the supposition of its being a distant body, was not recovered, nor, we believe, has since been seen in the observed place. The change of position was larger than could well be attributed to casual errors in micrometric observations; but there seems to be no other explanation of this case, except admitting error of observation and the existence of a variable star of long period in that spot.

NOTES FROM THE "CHALLENGER"

PROF. WYVILLE THOMSON has just sent me from the *Challenger* an account of certain results of Deep Sea dredgings in the North Pacific. In these dredgings was obtained a Gymnoblasic Hydroid of such colossal dimensions that the largest form hitherto known sinks in comparison with it into utter insignificance. Prof. Thomson has determined the Hydroid as a MONOCAULUS or nearly allied form, and a beautiful drawing which accompanies his letter confirms this view.

The animal itself has not yet arrived, but the letter which gives an account of its capture contains so many points of general interest, that the following extract will, I feel sure, be acceptable to the readers of NATURE:—

"H.M.S. *Challenger*, N. Pacific, July 24, 1875.

"On the 17th of June, in the North Pacific, lat. 34° 37' N., long. 140° 32' E., depth 1,875 fathoms, temperature at bottom 1° 7' C., bottom grey mud, the trawl brought up three or four examples of what seems to be a species of MONOCAULUS, or something allied to it. The point which naturally struck us most was that the hydranth in a specimen measured fresh by Moseley and myself, was nine inches across from tip to tip of the expanded (non-retractile) tentacles, and the hydrocaulus was seven feet four inches high! On the 5th of July, lat. 37° 41' N., long. 177° 4' W., depth 2,900 fathoms, with bottom temperature the same as before, and a bottom of red clay with manganese nodules, the trawl, which was torn to pieces by having taken in too great a weight of nodules of manganese, brought up entangled in its outer netting another fine specimen of this same form. It was put in weak picric acid, and then into weak alcohol, and you have it in the short piece of test-tube among the horsehair. This specimen was not measured, but the hydranth was carefully sketched by Mr. Wild, and I enclose you the sketch.

"These delicate things, drawn up rapidly through the water from a depth of nearly four statute miles, and transported into such totally different conditions of temperature, pressure, &c., suffer greatly from the violent change: they are in fact almost knocked to pieces, and their finer tissues are in a nearly deliquescent state, so that our great anxiety is to get them at once into some reagent which will harden them somewhat. It is wretched to see them melting away absolutely under one's eyes: when put into any of our fluids they at once contract out of all form, but that cannot be helped. I thought it best you should have them as well preserved as we could manage, so I only gave them a cursory glance and sent them on.

"The hydrocaulus is enormously extensible—it is of a pale pink colour, and our specimens, when distended in the water, were about four feet or so long: one, as I mentioned before, which Moseley and I measured, was seven feet four inches high, but that one was stretched over the surface of the trawl net, and although it must of course have been capable in life of extending to that degree, it might not have been a normal attitude. When at what