is seen in the case of the pea-crab and various bivalve molluscs and ascidians, or Myzostoma and Antedon. Now many jelly-fishes are infested with amphipods such as Hyperia, and it is a reasonable deduction that these crustaceans may be feeding on the food material collected by the jelly-fish. Thus, if the young fishes which take shelter below the umbrella of a jelly-fish assist the jelly-fish by keeping down ecto-parasites such as Hyperia, then an intelligible explanation is offered of the association of young fishes with such an apparently voracious host as a large jelly-fish, for in return the jelly-fish in these circumstances would have less of its own food stolen. J. H. ORTON.

Oyster Store, Packing Shed Island,
West Mersea, July 2,
and The Laboratory, Plymouth, July 14.

Roche's Limits for Satellites.

THE notice in NATURE (July 15, p. 89) respecting Dr. Fountain's work on Roche's limit for satellites brings to my recollection some estimates which I made many years ago with respect to the stability of satellites moving close to the surface of Mars (Trans. Roy. Dub. Soc., 1897, vol. vi.).

The question arose in connexion with a theory accounting for the "canals" as resulting from stresses set up in the surface rocks of Mars by the proximity of such satellites. The doubling of the canals came out nicely and the curvature of the canals as mapped by Lowell, Douglass, and Pickering was in agreement. But the doubt arose as to whether former satellites of sufficient magnitude could have preserved their stability when circulating around the planet with the requisite degree of approximation.

Assuming that the satellite possessed the cohesive strength of basalt and taking the case of Phobos supposed to be moving in an orbit but 23 miles from the planet's surface (*i.e.* with but five miles separating the surfaces of planet and satellite), I found that the satellite, even at this distance, would be stressed only to one-seventh of its breaking strength.

J. JOLY.

Trinity College, Dublin, July 15.

Optical Definition and Resolving Power.

IN Mr. Mallock's letter on "Definition, Resolving Power and Accuracy," published in NATURE of May 27 (vol. 109, p. 678), reference is made to the measurement of star images on eclipse plates, from which one might infer that the evidence for the Einstein deflexion of light obtained in 1919 was of a very doubtful character.

I have had no experience in measuring star images; but there is little doubt that if the same order of accuracy can be obtained as is possible in measuring spectrum lines, the Einstein deflexion should be easily determinable with a focal length of 19 feet, provided that it can be disentangled satisfactorily from the scale correction.

In my method of measuring photographs of spectra the image of a line is not bisected by a thread, but a positive copy is superposed on the negative in the micrometer and the coincidence of the two images estimated. By this means the intervals to be measured are doubled, and an extraordinary degree of precision is attainable with practice, as is shown by the agreement between different measurers. I have often had occasion to repeat measures made by one of my assistants of the shifts of the solar lines with reference to the arc lines, and we rarely differ by an amount exceeding 0·001 mm. in the interval measured. This is the result of taking the means of six settings in each line, and the probable error derived from the accordance of settings is usually about half a micron.

Probably star images cannot be measured so accurately as this by the ordinary method of bisection, but a skilled measurer should be able to determine the position of a star easily within 0·005 mm. or, on the scale of the eclipse plates, within 0″·18.

J. EVERSHED.

Kodaikanal, June 24.

Interspecific Sterility.

DR. BATESON in his letter on interspecific sterility (NATURE, July 15, p. 76) seems to lay insufficient emphasis on certain facts. If one considers plant and animal species in general, it would appear that interspecific sterility is by no means so general as was formerly assumed to be the case. Among the Œnotheras, in which great numbers of species crosses have been made, complete fertility, in the sense that large numbers of fertile offspring are produced, is the rule unless the forms differ in chromosome number. Even species of Œnothera which come from widely separated regions and differ conspicuously in all their characters, including flower-size, are fertile in crosses. That a certain amount of gametic and zygotic sterility also frequently occurs is of course well known, and it is probably correctly interpreted in terms of lethal factors. But lethal factors are not peculiar to wild species, for numbers of them arise in the mutations of *Drosophila melanogaster*.

Among animals, interspecific sterility appears to be more widespread, but even here the Bovidæ are, I believe, all interfertile. The contrasted condition of the Equidæ, at least as regards the horse and the ass, is accounted for by the difference in their chromosome numbers. In the Drosophilidæ, where interspecific sterility is extreme, there is a considerable range in chromosome form and number. The two species, *Drosophila melanogaster* and *D. simulans*, which are extremely alike and have similar chromosome groups yet produce sterile hybrids, might be cited as corresponding exactly to Dr. Bateson's conception of interspecific sterility. But it is an extreme case, and there are probably more numerous instances to cite on the other side.

Dr. Bateson refers to the case of *Œnothera gigas* and agrees that tetraploids frequently do not breed freely with diploids. But he says that "the applicability of that example is exceedingly doubtful" because we "can scarcely regard an unresolved pair of twins" Dr. Bateson scarcely recognises the intimate character of the union involved. I formerly analysed (*Arch. f. Zellforsch.* vol. 3, pp. 525-552, 1909) the changes which have occurred in *Œ. gigas* in so far as this could be done by comparative cell measurements, and found that the cell units were not merely larger, owing to the doubling in the chromosome content of their nuclei, but that in various tissues they were altered in shape, the increase in one dimension having been much greater than in another. Moreover, the genetic behaviour of *Œ. gigas* indicates, as de Vries first contended, that some other change has taken place in the germplasm of this species, in addition to the doubling of the chromosomes.

I have only recently been convinced on this point by comparisons of *Œ. gigas* with the tetraploid forms obtained by Winkler (*Zeits. f. Botanik*, 8,