solids in *Rhizostoma cuvieri,* 4.20 to 5.80 per cent. in *Aurelia aurita* and 3.70 to 4.25 per cent. in *Chrysaora hyoscella*) and the observations of Moebius[5] (who reports 2.06 to 2.10 per cent. in *Aurelia aurita*), and the non-acceptance of my data. It is somewhat surprising that Bateman does not report independent data of his own, since he used a large *Cyanea* in his own studies.

Unfortunately, I can not designate the species for which I have personal data, since no zoologist was available at the time the organism was secured. A photograph of the organism as secured, and as later dried down on a sheet of paper 23 × 30 cm has, however, been published.[6] This medusa was not *Gonionemus* sp., as Bateman erroneously assumes. In no place have I made any statement as to the water content of *Gonionemus.* Perhaps I am in error in wording my statements so that they might be interpreted as applying to all medusae, but I have said "a medusa,"[2] "one species of jellyfish (*medusa*),"[6] "the organism may contain," etc., and have recognized that the physiological condition of the organism, *e.g.,* presence of egg masses, etc., may make for a higher solid content. However, I still believe, from my own observations, that some salt-water medusae have a water content exceeding 99 per cent. and hope that investigators having access to such material will reinvestigate this question, for it is those organisms with the low solid content which present the interesting physiological problems.

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THE PHYSIOLOGICAL BASIS OF THE TWISTING HABIT IN PLANT GROWTH

IN connection with the interesting paper of Dr. William Seifriz in a recent number of SCIENCE[1] on the spiral habit of growth, correlated with the twisting of the stem or trunk of many plants, considered as a result of physiological rather than environmental conditions, it was thought that it might be of interest to add a bit of evidence which has been obtained in this laboratory.

In the course of an experimental program on the genetic effect of x-rays, an investigation has been undertaken of the physiological abnormalities of seedlings of the citrus fruits grown from irradiated seed. It is hoped at a later time to publish the results in full, but two seedlings are of interest at the moment. From the time of sprouting, these young plants showed a decided tendency to spiral in a counter-clockwise direction. Both plants twisted so markedly that the trunk was bent from the vertical and the leaves, during early life, were crushed against the stem. After six months the habit was abandoned, and the later growth was normal. Both plants showed some evidence of tissue inversion and other characteristic x-ray injuries during early life.

The seeds used in the work were obtained from a citrus experiment station, and represented a normally quite stable seed bed stock. Before treatment, they were soaked in distilled water for fifteen minutes and left in a moisture-saturated atmosphere for twelve hours. They were then dried on filter paper and were given doses of 2,400 roentgens of radiation from a thick-walled tungsten-target Coolidge tube operated at 200 k.v.p. and 30 ma. current. The seeds were then planted in flats in a mixture of sand and peat moss and maintained in a greenhouse, protected from wind and from sharp temperature change. Since the source of light was the sun, since undue mechanical shock was avoided for the seedlings, and since but two of the entire group showed any tendency to twist, it seems logical to assume tentatively that in this case a typical spiral growth, resulting in extreme twisting of the stem in a developing tree, was the result of a physiological rather than an environmental condition —possibly x-ray induced abnormal mitoses.

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AN UNUSUAL CRETACEOUS CIRRIPED

THE decision of the International Commission on Nomenclature (Opinion 118) that *Scalpellum gabbi* Wade[1] is a *nomen nudum,* on account of the extremely cautious wording of Wade's account of it, seems to make some further action necessary to place this rather unusual barnacle on a satisfactory basis. Wade figured the carina and an upper lateral plate. These are not known to belong to one individual, and it is even possible that they do not belong to the same species; but it happens that the carina was selected by Charles Darwin as the essential plate in diagnoses of fossil species of Scalpellum, most of which are known by detached plates. Wade's figures of the carina are ample for the recognition of the species, which is quite peculiar among Cretaceous forms for the subcentral position of the umbo. Only four other Cretaceous species, all European, have this advanced form of carina. It may be doubted whether Scalpellum developed this type of carina so early, and it may turn out that these Cretaceous species belong to

[5] K. Moebius, *Ibid.,* 5: 586. 1882.
[6] R. A. Gortner, *Gamma Alpha Record,* 22: 42. 1932.
[1] SCIENCE, January 13, 1933.

[1] U. S. Geol. Surv. Professional Paper 137, p. 191, plate 62, figs. 3, 4, 6, 7.

the less evolved Smilium group, a question which can be settled when specimens are found with plates in place. I propose to restrict *Scalpellum gabbi* Wade to the carina represented in his plate 62, figs. 3 and 4. The figures are inverted.

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STREAM DOUBLE REFRACTION EXHIBITED BY JUICE FROM BOTH HEALTHY AND MOSAIC TOBACCO PLANTS

IN previous papers[1,2] we reported that juice from tobacco plants infected with tobacco mosaic virus exhibits a stream double refraction characteristic of sols containing rod-shaped particles. Juice from healthy tobacco plants did not show double refraction. The juice was always obtained by freezing the tissues, followed by thawing, pressing and centrifuging.

Since the publication of these results we have found that centrifuged juice from unfrozen, macerated, healthy leaves regularly exhibits stream double refraction, and juice pressed from healthy tissues which have been frozen, thawed and pressed may sometimes show stream double refraction if uncentrifuged.

After juice from unfrozen, macerated, healthy tobacco leaves was subjected to Vinson's[3] safranin—Lloyd's reagent treatment for purifying tobacco mosaic virus—the purified preparation failed to show stream double refraction; however, purified virus from unfrozen mosaic leaves exhibited strong stream double refraction and, like the unpurified virus, could usually be diluted with 200 parts of water before double refraction disappeared. These results apparently indicate that all the detectable doubly refractive material was removed from the healthy juice, but that none was removed from the infective juice by the purification treatment, and suggest the possibility that much or all of the doubly refractive material in the juice from diseased plants may be different from that in juice from healthy plants. However, the present evidence is insufficient to warrant conclusions as to whether the virus particles are or are not responsible for all or part of the double refraction exhibited by juice from diseased plants.

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SCIENTIFIC BOOKS

Principles of Genetics; A Text-book, with Problems. By E. W. SINNOTT and L. C. DUNN. McGraw-Hill Book Company, New York. Second edition, xvi + 441. 1932. $3.50.

Recent Advances in Plant Genetics. By F. W. SANSOME and J. PHILP, with foreword by SIR DANIEL HALL. P. Blakiston's Son and Company, Philadelphia. x + 414. 1932. $4.00.

THE two publications cited above are of interest from the light they throw upon the rapid evolution of genetics within recent years, entirely apart from the information which they may lay before the student. It was not so long ago that genetics was concerned chiefly with 3:1 ratios or modifications of such ratios. The original concept of the gene was independent of its location in the chromosome and the intimate behavior of chromosomes was of relatively little interest to geneticists. Cytologists seemingly had tired of working out the alteration of generations in lower forms and the relatively few who remained in the field of cytology appeared interested in the structure of chromosomes and their behavior in nuclear division without much concern as to what differences in structure and behavior mean to the organism and its offspring. A change has taken place in the attitude of geneticists toward cytology which has been especially marked within the last half dozen years. Chromosomal behavior has become the foundation upon which modern genetics is now being built as is shown by the two texts under review.

The American text by Sinnott and Dunn is a revised edition of their 1925 publication. Two new chapters have been added, one on the contribution of genetics to evolutionary theory, and one on the relation between genetics and development. The chapters on the application of genetics in plant and animal breeding, on inheritance in man and on the problems of eugenics have been eliminated. The treatment of biometric methods has been rewritten by D. R. Charles and placed in an appendix. Among the topics which have received new or extended treatment may be mentioned the induction of mutations by radiation; recent analysis of chromosomal changes; segmental interchange between chromosomes; the cytological demonstration of crossing-over; mapping of genes in chromosomes by cytological methods; chromosomal and genic balance; and the physiological interpretation of the facts of heredity. At the end of each chapter are given a dozen or more reference problems aimed to stimulate the student in extending his grasp of the subject under discussion by study of original sources

[1] *Proc. Soc. Exper. Biol. Med.*, 30: 155–157, 1932.
[2] SCIENCE, 77: 26–27, 1933.
[3] *Phytopath.*, 22: 29, 1932.