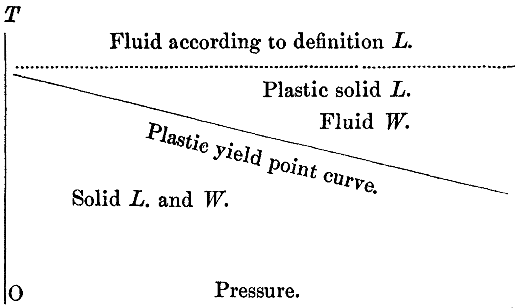

Figure illustrating varying conceptions, as to where the line between fluid and solid should be drawn.

Neither definition is absolutely rigorous, perhaps. It may be that every fluid can rest under a very minute amount of strain, and that every solid has plasticity.

No discussion of facts can settle usage, so I call for others, either here or in the scientific meetings, to express themselves as to what usage will best fit that of the past and present, and be most practical for the future.

ALFRED C. LANE

A CORRECTION

TO THE EDITOR OF SCIENCE: To a communication by the writer, which appeared in SCIENCE for January 18, 1907, the name of the U. S. Geological Survey was attached without authority of the director. The writer wishes to record his disavowal of any desire to commit the survey to an indorsement of the sentiments expressed in said note. For these he alone is responsible. In explanation he would add that the note was written before the writer became a member of the U. S. Geological Survey. It was not offered for publication, however, until about the time he was planning to enter on field work, when his new address was attached without due consideration.

Moreover, on deliberate reading, the writer is conscious that unintentionally there appears to be in the language employed a tone of discourtesy, which he regrets.

C. H. GORDON

January 22, 1907

SPECIAL ARTICLES

THE CASE OF ANASA TRISTIS

IN a paper read before the December meeting of the American Society of Zoologists in New York, illustrated by a very beautiful series of photomicrographs taken from smear-preparations, Miss Foot and Miss Strobell announced the following conclusions, which have since been published in a preliminary form in the January number of the *Biological Bulletin:* (1) There is no odd or 'accessory' chromosome in *Anasa tristis.* (2) The number of spermatogonial chromosomes is 22. (3) All the chromosomes divide in both maturation divisions. The so-called odd or accessory chromosome is only a 'lagging' chromosome, and it divides with the others in the second division. (4) The so-called 'chromosome-nucleolus' of the growth period is not a chromosome, but a nucleolus.

These results are at variance with my own, and since the differences in regard to the first three involve the important more general issue of the relation of the chromosomes to sex-production, I will make the following reply.

The fourth of the above conclusions, though materially different from my own, is not altogether irreconcilable with it. I have for some time had reason to suspect (in case of certain other genera) that a stage may have been overlooked in the prophases in which the odd chromosome temporarily loses its compact nucleolus-like form. For the study of this question smear-preparations offer decided advantages; and I am ready enough to admit that in regard to these stages Miss Foot and Miss Strobell may have made an important addition to our knowledge, though I still believe that the chromosome-nucleolus of the earlier stages is the odd chromosome. On the other and more vital points their results are irreconcilable with my own, and only these will further be considered here.

Since the announcement of these results I have carefully reexamined my old preparations (including those of Paulmier) and a series of new ones from material collected during the past summer. They include sections of material fixed in Flemming's, Hermann's, Bouin's and Gilson's fluids, of both *Anasa tristis* and *A. armigera,* that of the first-named species from Massachusetts, New Jersey, Michigan and Arizona. The reexamination not only confirms but fortifies anew at every point my former results. The evidence given by these preparations is, in my judgment, completely demonstrative that in *Anasa tristis:* (1) There is an odd chromosome that is one of the largest three spermatogonial chromosomes. (2) The number of chromosomes in the spermatogonia is 21, in the ovarian cells 22. (3) The odd or 'accessory' chromosome divides in the first spermatocyte division, but passes undivided to one pole in the second. Half the spermatozoa thus receive 10 chromosomes and half 11.

These facts appear with irreproachable clearness in a great number of cells, and with a uniformity of result that I think precludes the possibility of error. The number, size and grouping of the spermatogonial chromosomes, and the history of the odd chromosome in the second division, are clearly shown in Dr. Leaming's photographs (which will be published hereafter, should it seem desirable); and both these and the preparations are at the service of any who may wish to examine the evidence on which my conclusions rest. I may add that an odd chromosome also exists in the following genera of coreids that have not hitherto been reported on (the spermatogonial numbers in brackets): *Pachylis* (15), *Euthoctha* (21), *Narnia* (21), *Leptoglossus* (21), *Chelinidea* (21), *Margus* (23), *Catorintha* (25), *Leptocoris* (13), and in the pyrochorid genus *Largus* (*L. succinctus,* 13, *L. cinctus,* 11). In *Catorintha,* as in *Protenor,* the odd chromosome is the largest of the chromosomes. In *Metapodius,* alone among the coreids thus far examined, a pair of unequal idiochromosomes appear in place of the odd chromosome.

What is the explanation of this contradiction of results? Is *Anasa tristis* a kind of cytological Jekyll and Hyde which presents itself in different guise to different observers? Possibly; for I have found in *Metapodius terminalis* that certain individuals possess a small unpaired chromosome and an odd spermatogonial number (23), while other individuals, unquestionably of the same species, lack this chromosome and have an even spermatogonial number (22). I believe (but am not certain) that a similar relation occurs in *Banasa calva.* The unpaired chromosome is here of different nature from the usual type (as I shall show hereafter); but such cases show that differences of result regarding the number of chromosomes should not too hastily be attributed to error on either side. As regards *Anasa,* I can only state that the same result is uniformly given by many different individuals, from widely different localities (including Woods Hole, where the material of Miss Foot and Miss Strobell was procured) and after all the methods of fixation. The contradiction is, I think, probably due to the difference of method employed, Miss Foot and Miss Strobell having placed their faith in smear-preparations, while I have relied on sections. Without undertaking any discussion of the relative merits of the two methods, I may say that whatever be the disadvantages of sections for the purposes of photomicrography, really well fixed and stained sections are certainly competent for the demonstration of such points as are here at issue, while they have the advantage of leaving the topographical relations undisturbed. But the certain determination of the number of chromosomes in a given species by means either of smears or of sections, demands a more critical treatment than the mere matter of counting (or photographing) the number that may lie in a given field of view or even in many fields. The real task is to determine the relation normal to the species by the elimination of occasional variations (such as certainly occur in some species) and of plus or minus errors due to accident; and this again is not merely a matter of frequency of occurrence, but also of evidence given by the nature of the chromosome-groups taken in detail and as a whole. As far as sections are concerned, it is almost too elementary to require mention that a minus error may arise from the failure of one or more of the chromosomes to lie within the plane of section. This might be due either to a position that is normally at a different level from the others, or to accident. The first of these possibilities is eliminated by side views, which show that at full metaphase the chromosomes lie in a flat plate; while the early anaphases show the daughter chromosomes separating in two flat parallel plates. The second possibility is, I think, wholly excluded in the case of *Anasa* by (1) the great number of cells from different individuals that show 21 chromosomes (often a smaller number, in my experience never in a single instance 22); (2) the equally constant appearance of 22 chromosomes in the female; and above all (3) the fact that in *Anasa* and some of the other genera *the smaller number in the male is shown by the size relations to be consistently owing to the absence of a particular chromosome*—in *Protenor* always one member of the largest pair that appears in the female, in *Anasa* always a member of one of the largest two pairs. It is manifestly impossible that this should be due to accident. As to the passage of the lagging odd chromosome without division to one pole in the second division, I do not think the most critical observer who examines the demonstrative evidence given by very large numbers of cells in my preparations can have the slightest doubt.

I, therefore, think that as far as the first three points are concerned, my results on *Anasa* will sooner or later receive full confirmation at the hands of other observers. Paulmier himself, after reexamining his own preparations, was thoroughly convinced of his error regarding the spermatogonial number—an error that was a natural one at the time his work was done. The most careful search has failed to discover the original of the group from which he figured 22 chromosomes, or any other agreeing with it in number. Montgomery's confirmation of my result as opposed to his own earlier one is known. The consistent and cumulative corroboration given by so many other genera of Hemiptera (including one of the Homoptera recently studied by Miss Stevens), some of them far more favorable for study than *Anasa*, speaks for itself.

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January 20, 1907

NOTES ON ORGANIC CHEMISTRY

DIAZONIUM PERCHLORATES

THE chemical activity of perchloric acid and the fact that, under certain conditions, it is explosive, are matters of common knowledge, it is also generally known that many of the diazonium (diazo) salts, such as benzenediazonium nitrate, $C_6H_5N:NNO_3$, are likewise explosive and their instability is often very great. It might be anticipated, therefore, that diazonium perchlorates, if they could exist at all, would prove to possess an unusual degree of energy and that their study, although it might be attended with danger, would yield results of considerable general interest. A number of such compounds have recently been described, simultaneously, by D. Vorländer,[1] and by K. A. Hofmann and H. Arnold.[2] The object of the former was to endeavor to discover some basic substance which, with perchloric acid, would form a sparingly soluble salt that could be employed instead of potassium perchlorate for the quantitative determination of the acid. This result has not been attained, but it is found that an immediate, voluminous precipitate is formed when phenylacridine sulphate is added to a 1 per cent. perchloric acid solution, and that a turbidity is produced when a 0.1 per cent. solution of the acid is used. Hofmann and Arnold desired to obtain some sparingly soluble diazonium salts. The preparation of *benzenediazonium perchlorate*, $C_6H_5N:NClO_4$, is very simple. Aniline (2 grams) is mixed, at a temperature of 0°, with water (200 c.c.), concentrated hydrochloric acid (6 c.c.), commercial perchloric acid (10 c.c.) and sodium nitrate (1.5 grams). The perchlorate immediately crystallizes out in colorless needles, which are strongly doubly refractive. Even in the moist state this compound explodes with great violence if rubbed or struck with articles of stone or iron. When dry the explosive power of the substance is, of course, very much greater. If a few centigrams are dropped on blocks of hard wood, deep holes are torn in them, but the explosion is so local in its effect that vessels of thin glass, placed a

[1] *Ber.* **39**, 2713 (1906).

[2] *Ibid.*, **39**, 3146 (1906).