definitely associated with colony features or with other specific characters.

It is possible, however, to detect from his more complete descriptions the correlation of his B-forms with the cells of the S type colony and culture; and of his F-forms with the cells of the R type colony and culture. In my experience his D-forms are also most commonly found in R cultures, and I know of no special colony form that is characteristically associated with them. It seems probable that Kuhn's A-bodies (Pettenkoferia) have been most commonly observed by others in association with a type of growth that has been termed "mucoid." These forms are occasionally seen in *B. coli, B. typhosus, B. paratyphosus, B. anthracis* and presumably other species. Mr. Klimek in this laboratory demonstrated them in cultures of the Shiga bacillus on plates undergoing lysis. He also produced them by the action of lithium chloride, as Kuhn had done earlier.

These possible correlations between Kuhn's morphological cell types and colony form need not concern us further at present. A special significance, however, attaches to his "C-forms"; and a consideration of this point is the chief reason for the present communication dealing with Kuhn's studies.

Although I was familiar with his earlier observations and conclusions insofar as they were related to the bacteriophage phenomenon, I had not caught the true significance of his C-forms, perhaps because he reported few data on their filtrability. The matter was first brought to my attention by Dr. Schmidt-Kehl, of Würzburg, late in 1931. Since that time I have been in correspondence with Prof. Kuhn, who, in the meantime, has had opportunity to review our work on the G-forms.[3] I have, in addition, examined his most recently published work, as well as reprints of certain papers published in 1929 and 1930, which Prof. Kuhn kindly sent me.

Kuhn has not reported a special study dealing with the filtrability of his C-forms. But he mentioned the circumstance that he had succeeded in passing through Berkefeld N candles the C-forms of *B. coli, B. typhosus, B. suipestifer* and *B. diphtheriae.* In ten other species he observed C-forms but the filtrability of these was not discussed. I have no doubt, however, that all of them would have proved filtrable. Despite the few data on filtration reported by Kuhn, a careful review of his published works has convinced me that the G type cultures described by us in 1931 are identical with the C-forms described by Kuhn. They are similar in manner of production (in part), in the type of colony produced, in cell morphology, in viability, in filtrability (in part), in staining characteristics (gram-positive elements in young G cultures of gram-negative bacterial species),[4] in cultural details, in lack of virulence, in resistance to bacteriophage, and in matters concerning their reversion to the "normal" type—a phase of the subject to which Kuhn has devoted special attention and with considerable success. After recently reviewing the report of our work, Kuhn shares this opinion regarding the identity of the two culture forms. It is thus not without interest that, in approaching this problem from quite different angles, we have arrived at a common result, although with different interpretations of the phenomena observed.

I cannot agree with Kuhn regarding the interpretation of these variation phenomena among bacteria (a category of variation which he reduces from a pleomorphism to a dimorphism, embracing only the B- and C-forms). I cannot agree when he states that bacteria multiply only by simple fission, for I believe that reproduction by the formation of gonidia is now well established; and it was because we believed that we could recognize the relation between the gonidial granules and the filtrable forms that we designated them "the G type cultures." Furthermore, I can not accept Kuhn's conclusions regarding the significance of the Pettenkofer A bodies, and their relation to bacteriophagic lysis.

Despite these differences in interpretation, however, I believe that the observations recorded by Kuhn are, in themselves, of much value and significance. I desire, therefore, to make a somewhat belated acknowledgment of his important contributions to our knowledge of this new culture type which stands, as I believe, in an intermediate position between the filtrable, virus-like bodies and the more commonly recognized S and R type cells of many, if not all, bacterial species.

PHILIP HADLEY

UNIVERSITY OF MICHIGAN

[3] Philip Hadley, Edna Delves and John Klimek, "The Filtrable Forms of Bacteria," *Jour. Inf. Dis.*, 48, 1–159, 1931.

[4] This has also been found true of certain G-forms studied by Sherman (personal communication).

WHALING IN NORTHEASTERN JAPANESE WATERS

AT present the largest whaling station in Japanese waters is located in the Kurile Island group northeast of Kokkaido on the island of Etorofu. On the east coast of this island, in the Bay of Wannippu, whales from northern waters congregate during July and August for feeding and breeding. As far as known, this locality is one of the few places where both breeding and feeding is combined into one area. At times as many as a hundred whales have been known to come to this district in one week. It is thought that certain diatoms play an important rôle in attracting the whale to this isolated region. The

feeding ground is less than ten miles from shore and is less than a mile in area.

Copulation occurs most frequently during August. At times during the breeding season the male whales can be seen in pursuit of the females. Copulation itself lasts from two to three minutes and during the process the tails of the two can be seen together above the water. A young whale is usually about ten to fifteen feet long at birth and is quite able to take care of itself in a general way. The nursing period lasts from twelve to eighteen months and so reduces the mother in weight and quality of the flesh that such an animal is valueless to the whaling industry.

The age of the whale is calculated roughly by means of the quantity of the oil secured from the bone —the larger the amount the older the whale. Life is from thirty to forty years, and the breeding season begins at about the twentieth year.

At Toshimoe, on the eastern coast of Etorofu, the Oriental Whaling Company has established a cutting-in station. As a rule, this station secures a whale a day during the breeding season. Reducing the whale to canable size is accomplished in less than an hour, an amazing speed when one remembers that an ordinary whale weighs something over 30,000 pounds! The blubber oil is used for machine oil. The best grade is secured by means of steam pressure upon the bones. Such oil is best for fine lubrication, clock and watch oil. All parts of the whale are used, including the small intestines as food and the large intestines as fertilizer!

On the eastern coast of Etorofu the Sei whale is the most common. This whale is spotted with white, otherwise little different from the Arctic. Second in frequency is the Arctic, and rarest is the Sperm. On the west coast at Shana, where another breeding locality is found, the exact reverse is true, the Sperm whale being the most frequent, followed by the Arctic and Sei. This may be accounted for on the theory of warm waters, the east coast being in the cold stream and west coast being in the warm Japanese current. Since the establishment of the station at Toshimoe some twelve years ago, over 650 whales have been secured. Of these only twelve were Sperm, a hundred Arctic and the remainder Sei whales. Only once during the operation of the company has ambergris been found—that was off the coast of the main island of Japan, near Sendai. The profit resulting was something like $250,000. The cause, as is well known, is due to an irritation caused by the lodging in the small intestine of a small devil fish. Such infected whales have large raw sores over the body and produce an extremely bad odor.

MILES L. PEELLE

DEPARTMENT OF ZOOLOGY,
HOKKAIDO IMPERIAL UNIVERSITY,
SAPPORO, JAPAN.

SCIENTIFIC BOOKS

Flora of the Prairies and Plains of Central North America. By P. A. RYDBERG. New York Botanical Garden, Fordham Station, Bronx Park, New York, N. Y. 1932. $5.50 postpaid.

HERE in the plains and prairies we have labored with many manuals, claimed by none, divided by many. Now we come into our own with a manual of ferns and seed plants devoting itself exclusively to us. The region covered includes "the states of Kansas, Nebraska, Iowa, Minnesota, South Dakota, North Dakota and of southern Manitoba and southeastern Saskatchewan," together with most of the species in the prairie regions to the east and west across the plains to the Rocky Mountains.

Dr. Rydberg spent many of his earlier and some of his later years in studying the plants of this region. A few years ago he set out to embody this study in a manual that would cover this region exclusively. Although death unfortunately overtook him in the midst of proof sheets, the essential part of the manuscript was complete.

I like to think that the complete purpose of a taxonomic manual is to give names to plants, to show the relationship between plants and to furnish practicable or useful methods of identifying the plants that may be collected in the region covered by the manual.

The first of these purposes is thoroughly handled by this book, in accordance with the international code of nomenclature. The principal objection lies in the occasional "splitting" of certain well-known genera and less frequently of families. As it is a matter of opinion, therefore, of interminable argument, I can only say that the same systematic results could be obtained by using sections for the large genera and if the subrelationship is particularly necessary, the scientific name can then be written, to give but one example, *Astragalus* (*Geoprumnon*) *crassicarpus*. This would give the name, show the relationship and not take it quite so far from closely related plants that only the professional systematist would be able to keep track of it. This side of systematic botany, namely, practical utility, is not infrequently overlooked by the professional botanist, and yet it is