be true the correspondence of plastid and golgi region would be even closer than at present supposed.

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ON THE GENERA CTENOGOBIUS AND RHINOGOBIUS GILL, TUKUGOBIUS HERRE, AND DROMBUS JORDAN AND SEALE

ON my trip to the Philippines in 1931 I obtained 997 species of fishes, a wonderful testimonial to the richness of aquatic life in the waters of that favored group of islands. In studying such a large number of species it was necessary to reexamine closely numerous genera; this was especially true in studying the 88 species of gobioid fishes secured.

In 1858 Gill imperfectly defined the genus *Ctenogobius* from a Trinidad species and there has never been a satisfactory limitation of the genus since. The latest characterization by Koumans in 1932 is the best yet written, but is too inclusive and overlooks important characters.

In 1859 Gill described *Rhinogobius similis* from Japan, but he never published a description of the genus. Ever since authors have confused *Ctenogobius* and *Rhinogobius,* although an examination of the type species will show good generic differences.

In 1927 I described *Tukugobius* from the Philippines, largely on the character of the ventrals.

Recently I have examined a large series of *Rhinogobius similis* Gill, from Japan, and the related species from Japan and Formosa, and have compared them with the three species of *Tukugobius* described by me from Luzon. They are all very closely related and are all evidently true *Rhinogobius.* In all of them the ventrals are very short, forming a nearly circular powerful adhesive disk, with a characteristic thick bilobed or deeply crenate frenum. They are very much like the ventrals of the genus *Sicyopterus* and closely related genera of the *Sicydiini,* except that they are free and not adherent to the belly, as in *Sicyopterus.*

Tukugobius Herre is therefore an exact synonym of *Rhinogobius* Gill.

Ctenogobius Gill has the ventrals of the ordinary goby type, and we may refer to it most of the species given by authors under *Rhinogobius,* which have a truncate or emarginate tongue and naked opercles and cheeks.

In 1905 Jordan and Seale created the genus *Drombus* to receive a new Philippine goby, but their generic distinction was not well drawn. It is, however, a valid genus, distinguished chiefly by having 6 to 9 rows of teeth in each jaw, and having the nape scaled to the eyes.

Rhinogobius, Ctenogobius and *Acentrogobius* have been used as dumping grounds and more or less interchangeably for divers sorts of gobies. By limiting the name *Rhinogobius* to those gobies agreeing with *Rhinogobius similis* in the peculiar formation of their ventrals we can eliminate at least a part of the confusion. If gobies were two feet long, Dr. Jordan once said, they would be well known. As it is, few people are willing to scrutinize them closely enough to work out their real similarities and differences.

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BIOLOGY AND THE PRINCIPLE OF REPRODUCIBILITY

IF a discipline is a science, *i.e.*, if the phenomena which it considers may be treated logically by the scientific method of experimentation, prediction and confirmation by further experiment, these phenomena must be reproducible. That is, if two undisturbed systems of the type being considered are at any time identical, they must remain identical through all time, or until one of them is disturbed. Furthermore, there must be a correlation between systems displaced with respect to each other in time. If system A at time t_1 is identical with system B at time t_2, then system A at a later time $(t_1 + T)$ must be identical with system B at time $(t_2 + T)$.

The phenomena of the inorganic world are reproducible in this sense, although the results of simultaneous identical experiments on identical systems are not necessarily identical. The famous indetermination principle of Heisenberg states that, if a great number of identical systems be divided into two groups, then the results of simultaneous measurement of a certain quantity on each member of a group will be distributed about a mean value: this mean and the distribution will be identical for the two groups. It states further certain relations between the widths of the distributions arising from the measurement of certain pairs of quantities. The actual uncertainty in the result of a single observation is appreciable only for systems of molecular dimensions, and in macroscopic systems the reproducibility is of the rigid type known as causality. It is well to remember, however, that an uncertainty of this type is only a necessary, and not a sufficient, condition for inferring supernatural intervention.

It is obviously of prime importance to know whether biological phenomena are reproducible. The answer of the uncompromising vitalist is "No!", the uncompromising mechanist answers "Yes: Causally so." Adherence to the extreme vitalistic view-point makes the scientific study of biology logically impossible, since the course of an event observed in the past