phases) or of both or of maturing secretion globules (secretory phases). These cytoplasmic organelles sometimes give rise to the structures which can simply be homologized with the 'Golgi apparatus' of earlier workers[1–6]. To the best of author's knowledge no one has so far specifically denied the existence of the 'Golgi apparatus' in the vertebrate intestinal goblet cells.

It is intended to find out whether the reasons already put forward by the leading antagonists[7,8,11–14] for the appearances of such deceptive 'Golgi reticula' in a variety of other animal cells from time to time, and also put forth by the author himself[15] in the exocrine cells of pancreas, hold good in case of the cells under discussion and also whether there is any extra reason hitherto not described.

It appears that, in the vertebrate intestinal goblet cells, 'Golgi apparatus' may be formed due to the following causes:

1. The preliminary fixatives used in the classical methods cause adherence of the already aggregated lipid bodies (especially in the Golgi zone) and so the over impregnation is facilitated.

2. 'Golgi networks' may be formed simply by the indiscriminate deposition of silver and osmium between crowded secretion globules (mucus droplets).

3. The chemicals used in the various classical methods (e.g. cadmium chloride, chromic acid etc.) are protein precipitents and hence these disrupt the lipid bodies (which in these cells are lipoproteinous histochemically) which serve as segregating membranes for the mucus–which also have proteinous moiety[16]. These disrupted and closely apposed lipid sheaths are then heavily impregnated and give the appearance of typical 'Golgi reticula' in these preparations.

4. Filamentous mitochondria, particularly of rats, are appreciably impregnated by osmium and silver. When such heavily impregnated mitochondrial filaments along with still more heavily impregnated and disrupted lipid bodies (*vide supra*) aggregate in large number in the 'Golgi zone', particularly in recovery phases, these lose their individual identity and give the appearance of typical 'Golgi apparatus', constituting of haphazardly dispersed tortuous solid strands.

In addition, there has been observed, after employing various histochemical techniques[17–19], an intense PNA (not RNA; see KANWAR[20]) concentration in the 'Golgi'- and basalzones of the goblet cells. These PNA-rich areas take up intense blue diffuse haematoxylin (particularly in case of the fish) stain (sufficient to obliterate other finer cellular details) in preparations which do not at any stage involve $K_2Cr_2O_7$ treatment ($K_2Cr_2O_7$ dissolves PNA). These PNA-rich areas, which have sufficient diffuse lipids, also reveal intense metallic impregnation in various 'Golgi preparations'. Since the mucus droplets are neither impregnated nor stained with haematoxylin, these appear as hyaline spaces intermingled with intensely stained or heavily impregnated scanty cytoplasmic strands. All this gives the appearance of a typical 'basket-like Golgi apparatus' of BOWEN[3].

More or less similar explanation, holding basophil cytoplasmic strands responsible for such deceptive appearances, has recently been put forward by MALHOTRA[21] who worked on the vertebrate neurones.

The above observations, denying the very existence of the 'Golgi apparatus', are fully supported by TAYLOR[22], who studied the mammalian intestinal goblet cells under electron microscope.

Résumé. L'auteur montre que l'appareil réticulaire classique de Golgi dans les cellules caliciformes intestinales des Vertébrés est un produit artificiel. Diverses raisons sont alléguées pour expliquer ce fait.

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Pure Males and Females from Hermaphroditic Strains of *Ophryotrocha puerilis*

Ophryotrocha puerilis is a proterandrous hermaphroditic Polychete worm[1]. HARTMANN et al.[2] showed that reversal from female to male phase can be obtained in this species by means of various environmental factors, and BACCI[3] demonstrated that the action of such factors has different expression in the Mediterranean and Atlantic subspecies which are named *O. puerilis puerilis* and *O. puerilis siberti* respectively[4].

Selection experiments both for the prolongation of the male and for the anticipation of the female phase[5] were positive in both directions and the minus selection produced at generation some 4 individuals that showed oocytes at a length of 11 or 12 chaetigerous segments, which practically did not undergo a male phase. The plus selection produced (also at generation 4) individuals that reached the length of 25 or 26 segments and died without showing any oocyte during the whole life. Such experiments thus demonstrated the existence of multiple sex genotypes in *Ophryotrocha puerilis*.

Experiments on sex determining mechanisms were resumed in 1959 on a strain of *O. puerilis siberti* from ROSCOFF[6] and they gave results exactly comparable to those obtained in classic research work on polygenes.

The prosecution of selection experiments in the ROSCOFF strain has at present led to the production of pure males in generation 5: two individuals have reached the length of 42 chaetigerous segments (which is the maximum length so far observed in *Ophryotrocha puerilis*) always remaining in the male phase (Fig. d). One of them has been employed in a cross with a female phase individual of 13 segments and the other has been kept isolated and it is now showing clear signs of senility. About 100 individuals of the generation 5 to which the two pure males

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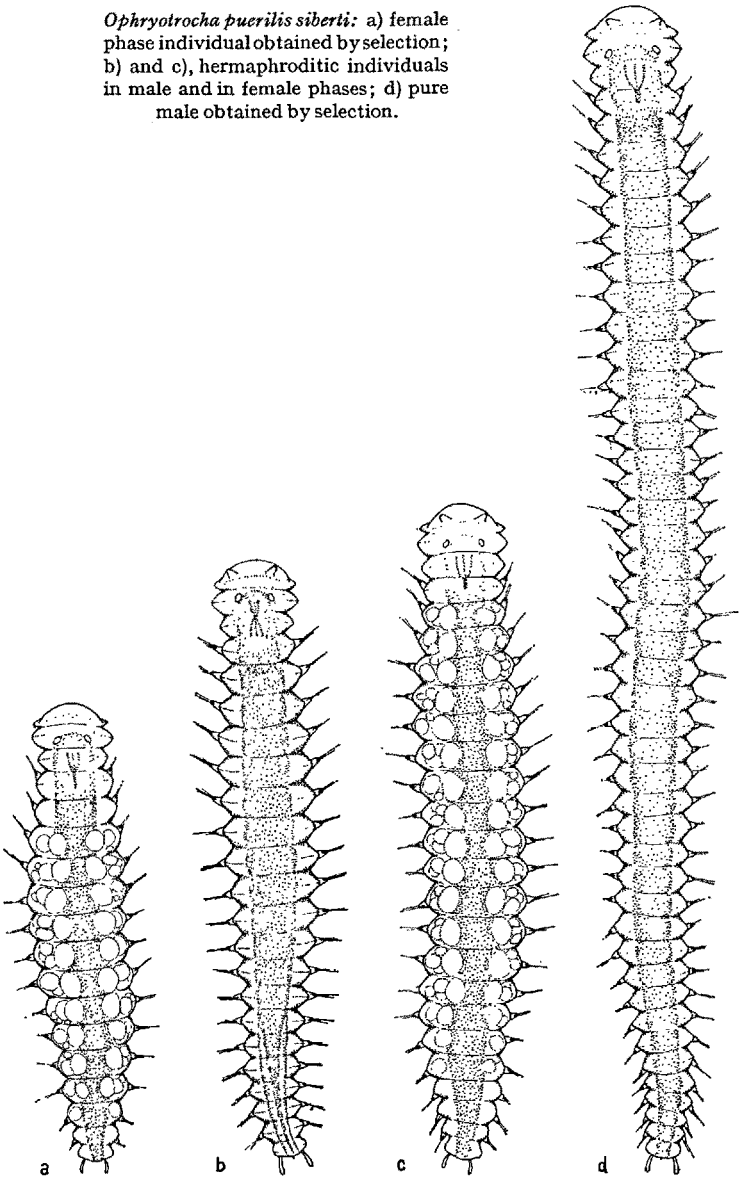

Ophryotrocha puerilis siberti: a) female phase individual obtained by selection; b) and c), hermaphroditic individuals in male and in female phases; d) pure male obtained by selection.

belong have already shown oocytes at a mean length of 23 segments. This mean will reach a higher value when other male phase individuals have passed to the female phase. It must also be pointed out that, although oocytes appear rather early in some of the individuals of the group, they are very scarce as compared with the oocytes developing in female phase individuals that have not been selected for the prolongation of the male phase.

Individuals that change to the female phase at 13 segments have appeared (Fig. a) in a group of 52 individuals that begins to show oocytes at a mean length of 16 segments. Although they cannot be considered as pure females, they undergo a male phase of very short duration.

It can therefore be concluded that selection of multiple sex genotypes has certainly produced pure females in a strain of the Mediterranean subspecies[5] and it has originated females with an extremely reduced male phase in the present experiments. Pure males have now been produced and males that died at 26 segments in previous experiments were also probably pure males carrying some deleterious mutants, as already pointed out[5].

The progressive reduction of female or of male phase at each generation, until male or female individuals appear, demonstrated the possibility of evolution of predominantly male or female strains (in short of monogenic strains) from hermaphroditic strains showing polygenic sex determination. The problem of the relative duration of sex phases in hermaphrodites is thus converted into a problem of sex ratios, which was already explained by a similar genetic mechanism[7]. Developmental patterns peculiar to each species decide whether polyfactorial (or polygenic) sex determination will give rise to unbalanced hermaphrodites[8] or to gonochoric species showing peculiar sex ratios.

Riassunto. La selezione di genotipi sessuali multipli in ceppi originariamente ermafroditi di *Ophryotrocha puerilis* conduce alla produzione di maschi e di femmine pure. La determinazione polifattoriale del sesso può pertanto modificare sia la durata relativa delle fasi sessuali che il rapporto sessi. Ermafroditi non bilanciati e specie monogeniche sono ugualmente originate da un meccanismo di poligametia sessuale.

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Xanthindehydrogenase in Organen von *Drosophila melanogaster*[1]

Nicht-autonome Erbmerkmale sind der phänogenetischen Analyse besonders leicht zugänglich. Denn hier können durch extrazelluläre Einflüsse die Merkmalsbildungen beeinflusst und eventuell auch Folgen von Erbschäden überwunden werden. Daraus sind Einblicke in die Genwirkung zu erwarten.

Unter den *Drosophila*-Mutanten, die den Pterinstoffwechsel beeinflussen, erwiesen sich *rosy* (*ry*[2,3]), *maroon-like* (*ma-l*[4]), *bronzy* (*bz*[4]) und *sepiaoid* (*sed*[5]) im Transplantationsexperiment als nicht-autonom. Die vier Mutanten sind chemotypisch insofern sehr ähnlich, als sie nur geringe Mengen von Drosopterinen und kein (*ry*, *ma-l*, *bz*) bzw. wenig (*sed*) Isoxanthopterin bilden. Der völlige Mangel von Isoxanthopterin bei *ry*, *ma-l* und *bz* beruht auf dem Fehlen von Xanthindehydrogenase-Aktivität[6–8]. Implan-

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