(figure 2). The arrangement follows a pattern found also in other insects, in which the function of some of the neurons has been elucidated. In *Manduca sexta,* neurons of groups 8 and 10 are presumably motoric and innervate the dorsal musculature[11]. Unpaired median neurons in the metathoracic ganglion of locusts, corresponding probably to those of group 12 in figure 2, were shown to produce octopamine and to inhibit the spontaneous contractions of the tibial extensor[12]. Cells of groups 2 or 3 apparently produce bursicon which is found within both the thoracic and abdominal transverse nerves[13,14]. No information is available on the role of other neurons shown in figure 2.

Since peptidergic neurosecretory granules, but no true cholinergic synaptic contacts, are seen in axon terminals within PTG of *Galleria*[5-7], the cells innervating the glands ought to be peptidergic. Comparison of the cobalt-filled preparations with the azan-stained sections of SG, T_1 and T_2, which were kindly provided by Prof. M. Raabe, and with the data of Delépine[15] indicated that 1 cell of the suboesophageal group 1 and both cells of group 3 in the thoracic ganglia are neurosecretory. Indeed, group 3 may be responsible for the inhibition of PTG which occurs in decapitated larvae after implantation of the thoracic but not suboesophageal or abdominal ganglia[3].

The number of perikarya localized in our study is small in comparison to the number and diversity of organs where the examined nerves terminate. This indicates that some neurons send axonal branches to several targets, and that specific influence on separate targets is achieved at the level of individual branches, similarly as suggested by Hughes[16] for the function of arthropod interneurons. This idea provides an attractive explanation of the multitude functions of insect neurohormones[17]. According to this scheme, the cells of group 3, which obviously release some of their secretion at the perisympathetic organs[14], transport peptidergic granules into PTG, where the release of granules is regulated by mechanisms pertaining to the axonal branches supplying the glands. Since the axonal transport to remote targets is characteristic of insect neurosecretory system, we suggest that regulation of neurosecretion at the axonal level is widespread in insects and enables simultaneous influence of separate targets by a single neurohormone.

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Radioimmunoassay of plasma progesterone, testosterone, total estrogens and immunoreactive gonadotropin in the nesting and non-nesting green sea turtle, *Chelonia mydas* (L.)

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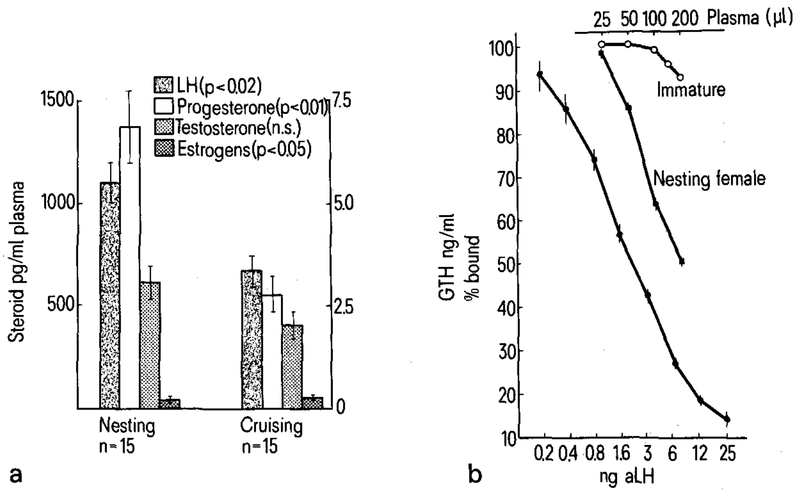
Summary. Plasma progesterone, testosterone, total estrogens and immunoreactive gonadotropin were measured in nesting and non-nesting sea turtles, *Chelonia mydas.* Progesterone and gonadotropin concentrations were significantly higher in nesting than in non-nesting turtles, testosterone was not significantly different in either group and total estrogens appeared to be slightly higher in the nesting group.

Despite the wealth of information on the nesting behavior and a few other aspects of its life history (see extensive bibliography in Rebel[3]) the reproductive physiology of the economically important *Chelonia mydas* is virtually unknown. Preliminary work has shown that males of this species respond to mammalian FSH, but not LH by increasing testosterone secretion as do males of the freshwater turtle, *Chrysemys picta*[4] and that it is possible to distinguish sexually immature male green turtles from females on the basis of this response to FSH[5]. This study reports changes in immunoreactive gonadotropin and plasma sex steroids in sea turtles that were sampled while ovipositing (nesting) or in the internest period between successive clutches (cruising).

Samples were collected in vacutainer tubes by D.O. at Mariculture Ltd, Grand Cayman Island (courtesy of Dr. J. Woods) from turtles maintained at Mariculture Ltd or captured in Nicaragua during the months of April, May and June, and the plasma shipped to Boston in dry ice. In a number of instances 2 or 3 samples were taken from an individual turtle prior to and post nesting. Total estrogens, testosterone and progesterone were analyzed by radioimmunoassay (RIA) as detailed in Callard et al.[6]. Plasma gonadotropin was measured by RIA using an antibody raised against chicken LH[7], which cross reacts with pituitary extracts from *Chelydra serpentina*[8], *Chrysemys picta,* and with plasma from *Chrysemys picta*[9]. Parallel inhibition curves can also be demonstrated with *Chelonia mydas* plasma (figure b). Sea turtle pituitary was not available for testing. Figure a shows values of gonadotropin, total estrogens, testosterone and progesterone in blood samples obtained while animals were nesting (ovipositing) and cruising in open water between nesting periods. Values for both gonadotropin and progesterone are significantly higher in



a Plasma levels of GTH, progesterone, testosterone and total estrogens in nesting and cruising green sea turtles. *b* Cross reaction of plasma from nesting *Chelonia mydas* (■) and plasma from immature *C. mydas* (○), sex not known, as compared to purified chicken LH, fraction AE1, (●).

the nesting phase than during the cruising phase. Testosterone does not change significantly, but total estrogens appears lower (20±7 pg/ml) during the nesting than the cruising (44±7 pg/ml) phase.

The ovarian cycle of *C. mydas* is not known. Behavioral observations (Owens, unpublished) indicate that there is a short (1 week) period of estrus during which mating occurs. A period of about 1 month, during which advances by males are repulsed, elapses before the 1st nesting occurs. During the nesting period up to 10 clutches (mean = 6) of from 70-212 (mean = 120) eggs may be laid at 12-14-day intervals[3]. No blood samples were available from animals in estrus or in the period prior to the 1st nesting, but from what we know of the hormonal changes occurring during the annual ovarian cycle of *Chrysemys picta*[4], in which similar high levels of plasma testosterone occur, it is likely that peak estrogen levels in *C. mydas* probably occur prior to the 1st nesting period and that successive clutches require only slight increases in estrogen to stimulate continued vitellogenin synthesis.

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Variations des taux d'ecdystéroïdes au cours du développement de *Bombyx mori*; rapport entre ces variations et les phases de croissance et de morphogenèse

Variations of ecdysteroid content during *Bombyx mori* development; relation to growth and morphogenetic phases

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Summary. During the development of *Bombyx mori* (monovoltin race) ecdysteroid levels were determined in oocytes, eggs, and haemolymph of larvae, and in the haemolymph of pupae. In haemolymph, the only RIA reactive materials are ecdysone and ecdysterone. In oocytes and eggs, other ecdysteroids are also detected. During larval instars, the ecdysteroid levels are low whereas they are very high during morphogenetic periods. During embryonic diapause, the ecdysone titer decreases during the cessation of morphogenesis.

Les taux d'ecdystéroïdes ont été déterminés dans de nombreux groupes d'insectes. Cependant les données sont disparates; chaque insecte n'a été examiné qu'au cours d'une partie de son cycle de développement[1-13]; les dosages sont effectués par des techniques différentes: tests biologiques[1,3,4,9,10,13], dosages radioimmunologiques[2,8,11,12], chromatographie en phase gazeuse et fragmentographie de masse[5-7]. A partir de ces travaux il est donc difficile d'obtenir une vue générale de l'importance relative des ecdystéroïdes dans chaque phase du cycle de développement des insectes.

Par contre, chez un Lépidoptère, *Bombyx mori*, les variations du taux d'ecdystéroïdes ont été analysées au cours de toutes les phases importantes du développement: oocytes