the 2nd c-wave seemingly behaves just like a positive off-response under some stimulus conditions, such as all traces of the right column in Figure 2 as well as the traces of 10 sec and 20 sec of the left column.

It is well known that appropriate applications of ether are effective for isolation of P_I, P_{II} and P_{III} components in ERG[3]. Therefore, we studied on the movements of the 2nd c-wave under the ether anesthesia sufficient to abolish the c-wave (P_I) and the light peak. Figure 3 shows that the 2nd c-wave was replaced by a large slow positive potential following the enhanced fall of the b-wave (P_{II}), and its peak time was between 140 sec and 180 sec. This value was far longer than that of the 2nd c-wave.

Attention must be paid to the shape of the potential variation produced during a period from the beginning of the light stimulus to the peak of the large slow positive potential. The shape of the b-wave, which shows a reduced rise and an enhanced fall, infers that activity of P_{III} component predominates over that of P_{II} component. If we ignore the small rise of the b-wave, the remaining potential variation seems to be similar in shape to an isolated late receptor potential (P_{III}) of retina, picked up by microelectrode techniques. Thus the 2nd c-wave seems to correspond in configuration to the tail of the isolated late receptor potential.

This working hypothesis may be supported by the report of KNAVE et al.[4,5]. They recorded a slow cornea-negative potential in sheep by conventional electroretinography, and they considered it to be a late receptor potential. Although their recording period was not long enough, their potential closely resembles in movements our remaining potential. Therefore, we have a strong impression that the 2nd c-wave is based on the tail of the late receptor potential of the retina.

We have confirmed the 2nd c-wave also in the human and chicken eye as well as in the cat, but not in the frog.

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Interactions Between Two Identified Cells in the Visceral Ganglion of the Snail, *Helix pomatia*

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Summary. An interneurone, making excitatory synaptic connections with a second neurone has been identified in the brain of *Helix pomatia*. The results suggest that the connection is monosynaptic.

Interneurones mediating a variety of synaptic actions to several postsynaptic cells have been identified in *Aplysia*[2,3], *Helix*[4], and *Planorbis*[5]. These systems are an advantage in the study of synaptic transmission as well as for detailed pharmacological studies once the transmitter compounds have been identified. For this reason, attempts were made to identify an interneurone in the suboesophageal ganglia of the snail, making monosynaptic connections with other cells. This report describes the interaction between 2 identified cells in the visceral ganglion of *Helix pomatia*[6].

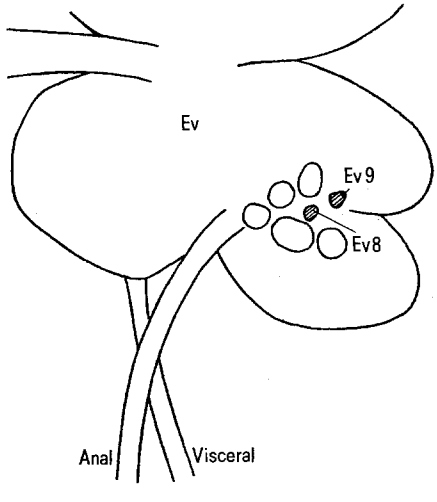

Fig. 1. Diagram of the ventral surface of the visceral ganglion showing the positions of the 2 cells postulated to be in monosynaptic connection. Ev denotes the ventral surface (v) of the visceral ganglion (E).

Materials and methods. Standard electrophysiological methods were used. The snail brain was removed from the animal together with the attached nerve trunks and pinned onto a 'Silastin' block. The preparation was placed in an organ bath containing 10 ml of Ringer (NaCl: 80 m*M*; KCl: 4 m*M*; $CaCl_2$: 8 m*M*; MgC_2: 5 m*M*; *Tris* buffer: 5 m*M*; pH: 7.4). The neurones to be impaled were exposed by dissecting away the outer connective tissue. Simultaneous recordings were made from cell pairs using glass microelectrodes containing 1 *M* KAc. A Tetronix 502A oscilloscope was used and permanent recordings were obtained on a Watanabe pen recorder. Each cell could be depolarized by the bridge or stimulated intracellularly with a stimulator independently of the second cell.

Results and discussion. Chemically mediated synaptic pathways were demonstrated in approximately 4% of tested different cell pairs in the central ganglia. Over 300 cell pairs were tested. One consistent interaction was demonstrated which showed the characteristics of a monosynaptic-like connection. A strong 'one for one' connection was demonstrated between 2 small cells on the ventral surface of the visceral ganglion. The location of the cells within the ganglion is indicated in Figure 1. Ev denotes the ventral surface (v) of the visceral ganglion (E)[7]. The presynaptic cell was designated Ev9. The properties of the postsynaptic cell, Ev8, have been studied previously[6].

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Stimulation of the presynaptic cell elicited a steady train of spikes which resulted in the appearance of small depolarizing potentials in the postsynaptic cell. The interaction was one way. Hyperpolarization of the postsynaptic cell by 50–60 mV greatly increased the amplitude of the potentials indicating that the latter are excitatory postsynaptic potentials (EPSP's). In Figure 2A the strict one for one relationship between the presynaptic spikes and the EPSP's can be seen. There was a delay of 20 msec between the presynaptic spike and the onset of the EPSP. The duration of the EPSP was between 200 and 250 msec. The amplitude of the EPSP was 1 mV at a membrane potential of −100 mV.

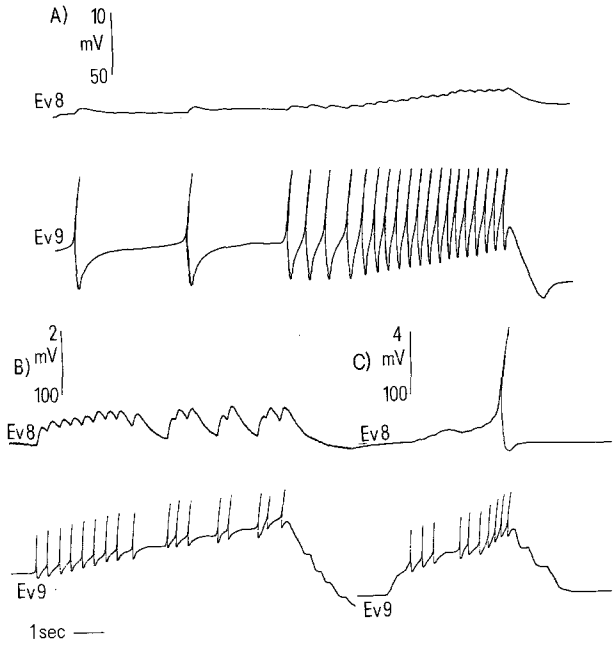

Fig. 2. Responses recorded in the postsynaptic cell (upper traces) when the presynaptic cell (lower traces) is stimulated to fire spikes. A) Each presynaptic spike gives rise to 1 EPSP. EPSP's summate if they are evoked close enough together. B) Facilitation and summation of EPSP's produced by a train of presynaptic spikes. C) EPSP's summate to cause the postsynaptic cell to fire an action potential.

The one for one relationship was maintained as the frequency of firing in the driver cell was increased (Figure 2A). The EPSP's began to summate as soon as the frequency of firing in the driver cell was increased to 2 spikes per sec. Figure 2A shows summation of the EPSP's depolarized the membrane by 5 mV. During the depolarization individual EPSP's could be seen clearly. Often, summation of EPSP's caused the postsynaptic cell to fire an action potential (Figure 2C). With repetitive stimulation of the driver cell the EPSP's were facilitated as well as summated (Figure 2B). After prolonged periods of firing in the driver cell, EPSP's increased in both amplitude and duration. Unitary PSP's reached an amplitude of 2 mV and increased in duration to as long as 1 sec from an initial duration of 200 msec. The delay between stimulation and response remained constant at 20 msec.

The results suggest that the input onto the follower cell is monosynaptic. Preliminary investigations have suggested that acetylcholine or glutamate could be the transmitter compound released by the presynaptic cell onto the follower cell[6]. It therefore appears that the presynaptic cell is an interneurone. Experiments show that it receives an excitatory input from the anal nerve[6].

This system requires further investigation into the monosynaptic nature of the synapse, but already promises to be useful for the study of cell-cell interactions.

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Ultrastructural Changes in the Dorsal Root Ganglia Evoked by Thalidomide in Rabbits[1]

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Summary. Administration of the teratogenic drug thalidomide to pregnant does produces ultrastructural changes in foetal ganglion cells, Schwann cells and axons in the posterior root ganglia corresponding to forelimb segments deformed by the drug. Ultrastructural changes in ganglia appear on the 13th day of gestation, i.e., preceding the appearance of limb malformation.

Among teratogenic substances capable of producing deformities in the major systems of the human body, the maximum activity is exhibited by thalidomide[3,4]. Nevertheless, the various mechanisms of dysmorphogenesis and in particular thalidomide teratogenesis are poorly understood. McBride[5,6] reported that thalidomide toxicity is associated with derangement and decreased numbers of ganglion cells of the dorsal root and postulates that it is the diminution in number of sensory nerve fibres which interferes with peripheral organ development.

To seek confirmation of this hypothesis, the ultrastructure of sensory neurons of the dorsal root ganglia of New Zealand White Rabbits deformed by thalidomide was compared with that of untreated controls. Sensory neurons were examined on the 13th, 15th, 17th and 21st days of gestation because these days correspond to important stages in development of limbs: on day 15 digital tissues begin to condense in the forepaws and by day 17 separation has occurred of the digits of the forepaws, as well as complete reduction of the webbing. Day 21 marks the end of organogenesis in the rabbit (Edwards[7]).

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