asparagine were absent, as were the two unidentified spots which appeared in *Anagasta* haemolymph after five days. The changes are summarized in Table 1.

Table 1. CHANGES IN AMINO-ACID COMPOSITION OF HAEMOLYMPH OF HOST AND PARASITOID

Sample from		Free amino-acids				Other	Unidentified
		Phe	Leu	Pro	Asp	13	A and B
(1) Health *Anagasta* larvae		+	+	+	+	+	−
(2) *Anagasta* parasitized by *Devorgilla*	day 5	−	+	+	+	+	+
	day 8	−	−	+	+	+	+ +
(3) *Devorgilla* larvae	day 5	−	−	−	−	+	−
	day 8	−	−	−	−	+	−

Electrophoresis of haemolymph proteins of healthy and parasitized *Anagasta* caterpillars and of 3rd instar *Devorgilla* larvae was carried out using 'Oxoid' cellulose–acetate strips[13]. Pooled samples from twenty individuals were collected in tubes previously coated with phenyl thiourea, and centrifuged at 1,200 r.p.m. for 20 min; the supernatant fluid was used in 2 μl. samples for electrophoresis at 150–200 V d.c. and 0·4 mA/cm for 12 h. After electrophoresis the strips were incubated at 90° C for 20 min and stained with 0·2 per cent amido-black in methanol and glacial acetic acid (90:10 by volume).

The haemolymph of parasitized caterpillars had two more visible bands on the electrophoretic strip than that from healthy ones. These bands were faint in the preparation from five day parasitized hosts but large and distinct in the eight day parasitized hosts. Faint indications of two bands in the same position were found in the patterns developed by electrophoresis of five *Devorgilla* larvae extracted by Sodeman's method[15]; this suggests that the "new" protein fractions may have their origin in the contained developing parasitoids. Changes in the amino-acid composition of haemolymph have been observed in *Melolontha* grubs infected with *Bacillus fribourgensis*[6], in beetle larvae infected with bacteria and in silkworm and cutworm larvae infected with viruses[8,9]. Our work shows that changes in free amino-acid and protein content occur also in moth caterpillars after attack by endoparasitic Hymenoptera. In view of a recent report[15] of the isolation of a protein-like component of *Galleria* haemolymph which induces oviposition by the ichneumonid *Itoplectis conquisitor*, we suggest that the present observed changes in protein composition of parasitized hosts may provide the stimuli by which female *Devorgilla* can distinguish between healthy and parasitized hosts when probing them with the ovipositor.

A full report of this work is in preparation.

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Separation of Parasites in Sucrose Gradients

SUCROSE gradients have been used widely for the separation of cellular and subcellular particles, but rarely for the separation of whole organisms either from one another or from debris. Red blood cells, infected with malaria and trypanosomes, can be separated from uninfected cells in sucrose gradients after low speed centrifugation[1]. This simple technique can also be applied to various parasitic Protozoa and Metazoa.

A convenient gradient ranges from 0·8 M to 0·1 M sucrose in an appropriate saline. One millilitre of the sample containing the parasites is applied to the top of an 8 ml. gradient which is centrifuged at 1,200*g* for 1 min. This method has been used to separate the parasites in the caecal contents of rodents, in the rectal contents of amphibians and in the tissues of molluscs. In general, bacteria were found at 0·2 M, smaller flagellates at 0·3 M, larger flagellates at 0·4 M, ciliates and opalinids at 0·5 M, nematodes at 0·6–0·7 M and helminth eggs at 0·7 M. Developmental stages of digeneans from macerated gastropods and lamellibranchs separated out in 0·5 M sucrose. None of the parasites treated in this way showed any signs of deterioration when transferred to a more normal medium. This simple technique has been used for the separation of parasites one from another, and from debris, for teaching purposes but has considerable potentialities in the estimation of numbers and mass of parasites, the initiation of cultures and the concentration of material for histology and electron microscopy.

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Accumulation of DDT Residues in *Triphoturus mexicanus* from the Gulf of California

CONTAMINATION of marine fish by chlorinated hydrocarbons, especially by DDT and its congeners*, could threaten their future or continued utility as a food source if residues accumulate to the point of incipient toxicity on detrimental sublethal effects[1]. Little is known about the distribution of DDT residues in marine fish beyond listed concentration values for certain species. Most investigations have dealt with concentrations of residues in tissues or large pooled, unsorted samples of commercially caught fish (refs. 3 and 4; the latter covers exclusively marine studies). From this limited information, we know that fish of a single species caught in adjacent areas have markedly different contents of residues, probably because of differences in the magnitude of local sources of estuarine or airborne pesticides[2–5]. This heterogeneity of exposure poses problems for the interpretation of residue data from fish caught in these areas. In an attempt to obtain size-class data about concentrations of residues, relatively free from the effects of pesticide "hot spots"[6], *Triphoturus mexicanus*, a midwater fish from an area relatively remote from areas of pesticide application, was chosen for analysis.

Samples of midwater fish were collected in a six foot Tucker trawl at several locations in the Gulf of California.

* Metabolites of *p,p'*-DDT, *o,p'*-DDT and other constituents of technical DDT; only *p,p'*-DDT, *p,p'*-DDD, and *p,p'*-DDE were detected in concentrations greater than trace values in the analyses.