concentration after 48 hr and in lowest concentration after 72 hr while in other exposure it was highly significant ($P < 0.001$).

The hyperglycemia followed by a decrease in hepatic glycogen suggests the increased glycogenolysis, possibly by the increased activity of glycogen phosphorylase. It is also possible that endosulphan in some manner stimulates the secretion of sinus gland. However, the hyperglycemia may be a physiological response to meet the critical need of brain for the increased energy in the form of glucose[8]. The increase in blood glucose could possibly furnish the high demand of glucose in brain which would in turn compensate to some extent for any potential decrease in brain glucose. The hypoglycemic response with concomitant decrease in hepatic glycogen might be attributed to the inactivation of the enzymes involved in the carbohydrate metabolism due to endosulphan stress. A similar decrease in hepatic glycogen[14] and increase in blood glucose[7, 8, 14] induced by endosulphan was also reported. Thus, it is probable to conclude that endosulphan stress induces glycogenolysis by increasing the activity of glycogen phosphorylase and the increased synthesis of the sinus gland which in turn causes the hyperglycemia to meet the energy demands due to stress.

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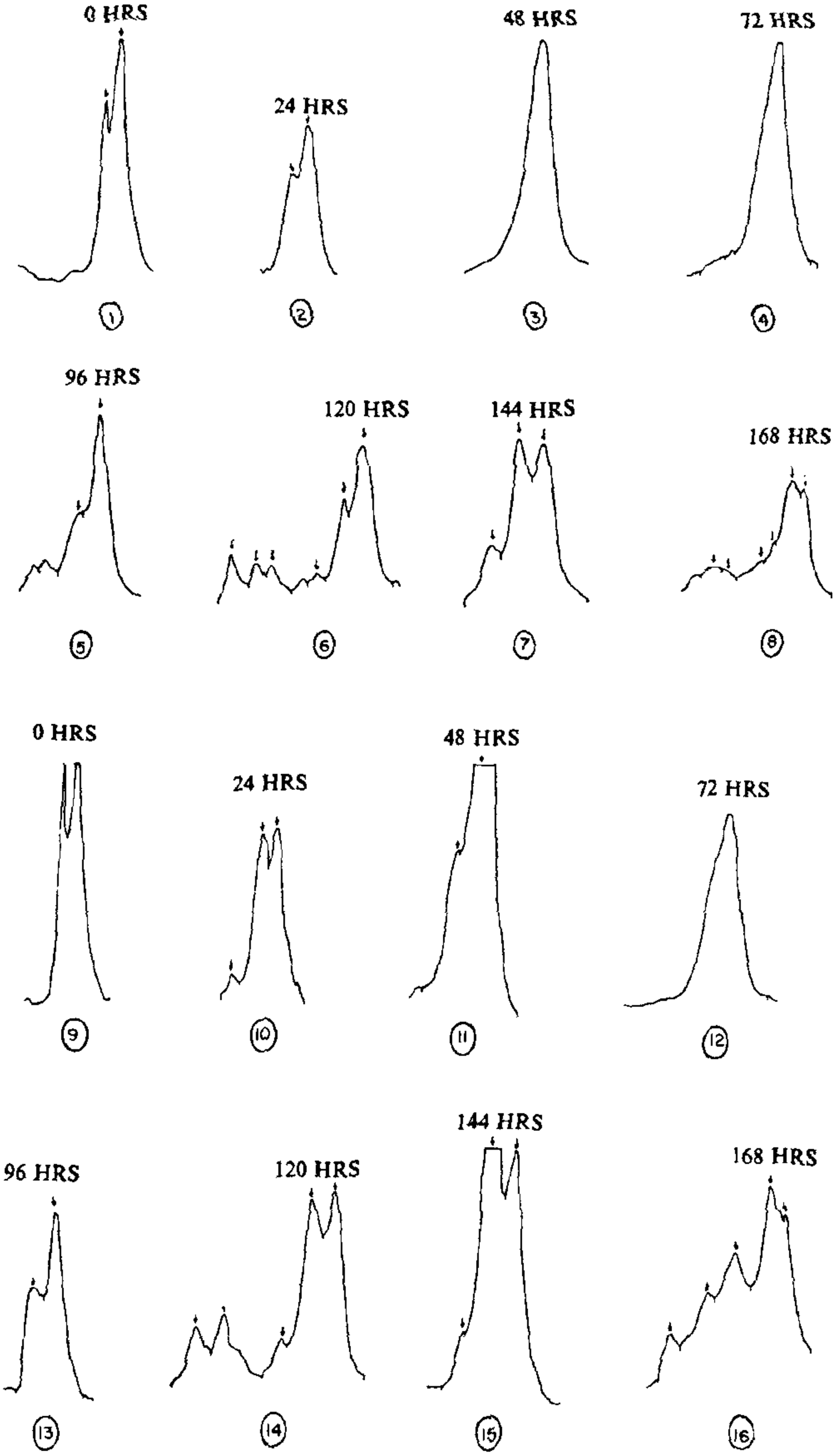
DEVELOPMENTAL PROFILES IN THE ISOZYMES OF α AND β-ESTERASES IN THE EMBRYOGENESIS OF SILKWORM *BOMBYX MORI*.

N. B. KRISHNAMURTHY, S. R. RAMESH and (late) M. R. RAJASEKARASETTY*
Department of Post-Graduate Studies & Research in Zoology University of Mysore, Mysore 570006, India.

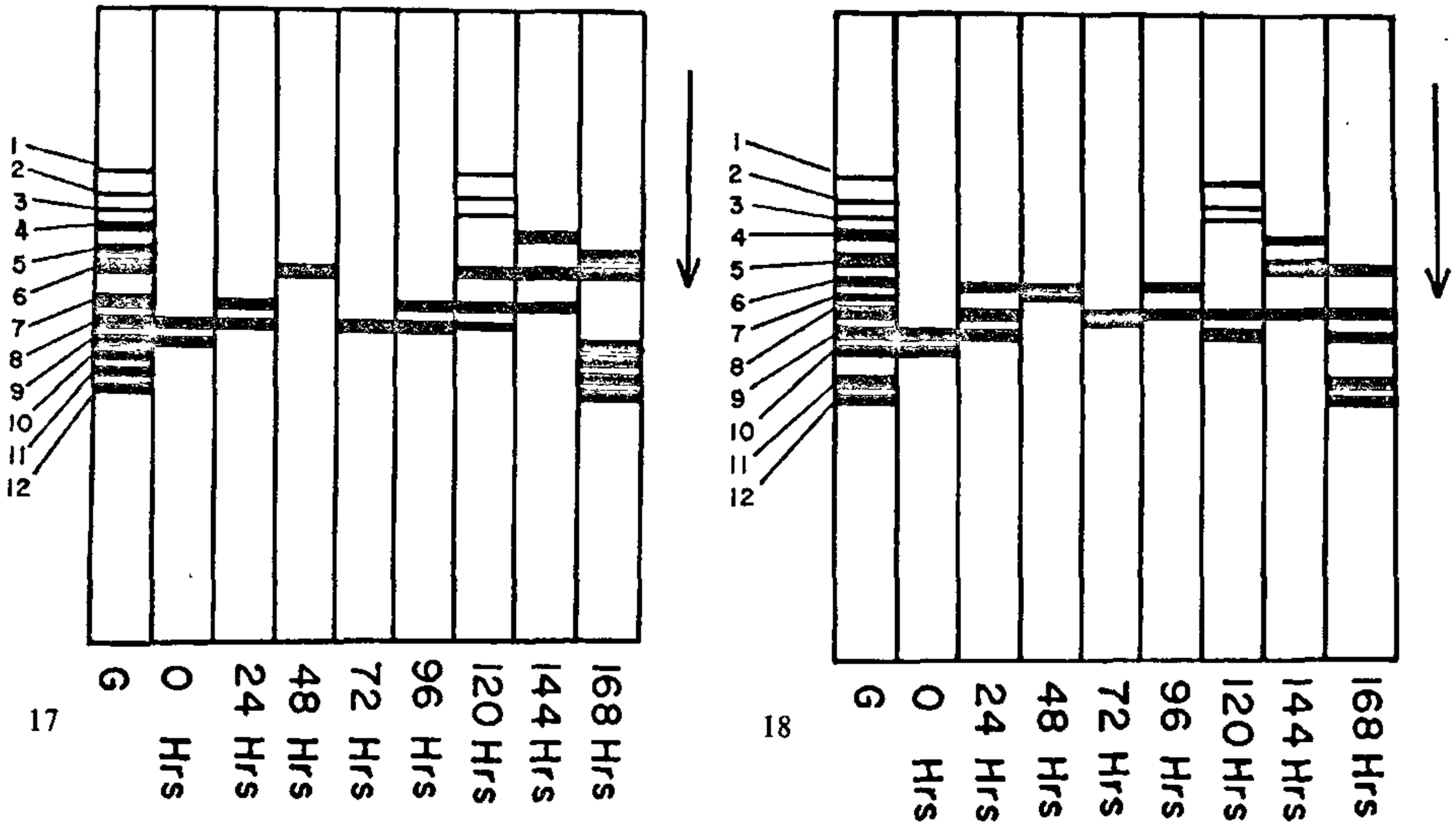
"DRAMATIC evidence of changing patterns of gene function is furnished by a number of multibanded systems in which various electrophoretic forms appear and disappear or change in relative concentration as development proceeds"[1]. The use of electrophoretic technique to analyse multibanded systems (*viz* isozymes) during the development has yielded useful information with regard to biochemical variation and nature of gene action in various plants and animals.

Preliminary studies on the ontogenetic variation in acid and alkaline phosphatases have been carried out[2] in two races of silkworm *Bombyx mori*. The present studies were undertaken to analyse ontogenetic differentiation of isozymes of α and β-esterases as a biochemical parameter to understand the genetic programming involved in various stages of development.

The egg stage in silkworm *B. mori* lasts for 168 hr at 27°C with a relative humidity of 70–80%. The eggs of a polyvoltine pure Mysore race of *B. mori* formed the material for the present studies. The eggs were collected on polythene sheets and were maintained at 27 ± 1°C with a humidity range of 70–80%. The eggs (200 mg) homogenized in 0.1 ml of glass distilled water, centrifuged for 5 min at 3000 rpm served as the sample. Fresh samples were prepared for each assay. Electrophoretic assays were made at intervals of 24 hr using polyacrylamide gel as the supporting medium, as described by Rajasekarasetty *et al*[3] with a slight modification where 0.05 ml of the supernatant of fresh homogenate mixed with 0.05 ml of 40% sucrose solution was loaded on each gel and electrophoresed at 150 volts for 3 hr. The tray buffers, staining buffers



Figures 1–16. Diagrams of densitometric scans of the gels assayed for α-esterases (scans 1 to 8) and β-esterases (scans 9 to 16).



Figures 17 & 18. Diagramatic representation of Zymogram patterns of α-esterases (figure 17) and of β-esterases (figure 18). The column marked 'G' represents the total number of isozyme variants encountered in each of the enzyme systems.

and procedure of staining are similar to those described earlier[4].

In order to understand the differential gene action which is manifested in the form of differential activity of an isozyme during development, the stained gels (after fixing) were scanned at 440 nm for α-esterase isozyme and at 540 nm for β-esterase isozyme with the help of a spectrodensitometer (Kratos SD 3000) attached with Kratos SD 3000 Density computer and an integrator printer (Hewlett Packard 3390A). When scanned in spectrodensitometer, the number of isozymes is indicated by the record of a peak and the concentration or change in concentration of the isozymes during different stages of development is expressed in terms of varying dimensions of peaks and the percentage area occupied by the peaks. This variation in dimensions of peaks is directly proportional to the optical density of the isozyme band (figures 1–16).

The present analysis revealed a total of 12 bands for both α-esterases and β-esterases in different stages of embryogenesis. Different isozymes are numbered after preparing a composite diagram of the zymograms. The fast moving isozyme (nearer to the anode) is numbered as 1 and the subsequent numbers represent the other isozymes in the order of decreasing mobility (figures 17 & 18). The number of isozymes and their relative concentration was found to be different in all the 8 stages analysed. In the case of α-esterase, 6 isozymes were encountered at 120 hr and 168 hr and 2 isozymes at 0 hr, 24 hr, and 96 hr of development, while only one isozyme was active at 48 hr and 72 hr and 3 were active at 144 hr of development of the egg. The pattern obtained for β-esterase was found to be different; in that, at 120 hr and 168 hr of development, 5 isozymes were encountered, at 24 hr and 144 hr, only 3 isozymes of β-esterase were found to be active, while at 0 hr, 48 hr and 96 hr of embryogenesis, 2 isozymes were encountered and only one was found to be active at 72nd hour of development of the embryo.

The data show that different isozymes are synthesised at different stages of embryonic development in varying amounts. This shows subtle difference in the expression of different genes in the same race of *B. mori* during development.

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2 December 1982; Revised 7 December 1983

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ANNOUNCEMENTS

INTERNATIONAL SYMPOSIUM ON CHARACTERIZATION AND CONTROL OF ODORIFEROUS POLLUTANTS IN PROCESS INDUSTRIES

The International Symposium on Characterization and Control of Odoriferous Pollutants in Process Industries organized by the Belgian Filtration Society will be held during 25–27 April 1984. The Symposium is placed under the patronage of the Commission of the European Communities.

The following list details some of the different themes which will be covered: 1. Industrial olfactometry, 2. Interaction between the odoriferous pollutants and the physicochemical parameters which cause alterations of odour level and intensity, 3. Odour irritation, general chemical sensitivity in colour perception, 4. Odour transport from emission sources into the environment, 5. Prevention techniques for odoriferous emission, 6. Abetment techniques for odour control.

All theorists and researchers, practising engineers and equipment manufacturers are cordially welcomed to participate in the symposium.

For further information please contact: SOCIETE BELGE DE FILTRATION, Monsieur F. Gillard, Secretary of the Symposium, Vole Mincketers, 1, B-1348 LOUVAIN-la-NEUVE (Belgium).

TWO-DAY CONFERENCE ON THE RECURSION METHOD AND ITS APPLICATIONS

The Two-day Conference on 'The recursion method and its applications' sponsored by the Institute of Physics Solid State Subcommittee and the S.E.R.C.'s Collaborative Computer Project No. 9 on the Electronic Structure of solids, will be held during 13–14 September 1984 at Imperial College, London.

The Recursion Method provides a well-conditioned procedure for evaluating local electronic density of states and real space Green functions in general. Central to the Method is the Lanczos algorithm for matrix diagonalization. Important advances have been made in treating the infinite matrices which arise in solid state physics.

The following topics will be included: Asymptotic behaviour of the recursion coefficients; Generalized moment method; Cyclic matrices; Perturbation Theory; Real-space response functions; Defects and crystal structure; Lattice gauge theory; Dedicated Lanczos computer.

A number of leading specialists in America and Europe have indicated their willingness to participate. A provisional program will be circulated during May 1984. Anyone wishing to submit a contribution should send a brief abstract before 8th June 1984 to the Conference Organiser:

Further details may be obtained from: Dr D. G. Pettifor, Department of Mathematics, Imperial College, London SW7 2BZ, UK.