TABLE I

Effect of glycine, riboflavin and malonate on light-induced sporulation in Cercospora personata

Medium	Duration of light-treatment and % of colonies sporulating					
	0 min	1 min	5 min	15 min	30 min	60 min
Czapek's	1	1·5	1	4·5	9	15
do. with glycine	1·5	15·5	35	52·5	61	84·5
do. with riboflavin	1	9·5	11	19	26·5	28
do. with malonate	2	10	17·5	21	19	17·5

Czapek's medium either had the $NaNO_3$ replaced by glycine or was amended with riboflavin (2 μg/ml) or malonic acid (0·01 M)[2,3]. The media were inoculated with a suspension of spores prepared from a 10 days old light-grown culture. The inoculated plates, after 3 days in darkness, were exposed on the 4th day to varying periods of light (1 to 60 min) from black light lamps (40 W Sylvania BLB) at a distance of 10 cm). The percentage of colonies sporulating in each plate was determined after 24 hours. The results are presented in Table I.

It was observed that the proportion of colonies sporulating was greatly increased by glycine, riboflavin and malonate. With glycine more than 50% of the colonies had sporulated after exposure to light for only 15 minutes. In the control plates only 15% of the colonies showed sporulation even with 60 minutes of induction. Since a colony showing even a single spore was taken as 'sporulating' the extent of growth did not affect the results in this method. It could, therefore, be concluded that the sensitivity of the fungus to light was greatly enhanced by these compounds.

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University Botany Laboratory, R. N. SWAMY.
Madras 600 005, K. MANI.
August 3, 1977.

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TRYPANOSOMA NEINAVANA SP. N. FROM THE FISH, *BARBUS GRYPUS* HECKEL IN IRAQ

TRYPANOSOMES are not uncommon in fishes[1-4]; several species have been recorded from cyprinid fishes. *T. acanthobramae* from a cyprinid fish has been recently reported from *Acanthobrama marmid* Heckel from Iraq[5].

The present communication describes a second species from the blood of barbel, *Barbus grypus* Heckel, collected from river Tigris, Mosul, Iraq.

Fishes were collected with a sein during the summer of 1976 near Neamania village. Blood smears were made by streaking a drop of blood from the severed caudal artery on a clean glass microscope slide. Smears were air-dried, fixed with absolute methyl alcohol and stained with Giemsa's stain. Measurements were made by ocular-lens micrometer under oil-immersion objective.

Trypanosoma neinavana sp. n.

Diagnosis : Trypanosomatidae : Kinetoplastidae Honigberg, 1963, Polymorphic organisms ; slender, broad and intermediate sizes can easily be distinguished in the preparation. All the three forms have the following characteristics : flagellum relatively thin and long; undulating membrane present. kinetoplast oval to pyriform, relatively small, terminal at the end ; nucleus round to oval; cytoplasm alveolar with reddish-purple granules. No afflagellar organisms were seen but some were akinetoplastic, specially those of intermediate sizes. Dividing or crithidial stages were absent in preparations from circulating blood. Infection intensity was high ; one slide had more than 100 specimens.

Slender form : Less abundant than intermediate sizes with a slender body. Cytoplasm stains light blue, is less alveolar and contains no myonemes. Nucleus stains dark pink, is sausage-shaped, positioned lengthwise in the body, and occupies the entire width of the cell. The undulating membrane is indistinct in this stage, but clear in intermediate forms. Average dimensions in microns (15 specimens) : Total length, 36·21 (range 33·40–38·41) ; body length, 18·37 (16·7–20·01) ; length of free flagellum, 17·87 (16·7–20·01) ; nucleus length, 2·81 (2·51–3·34) ; nucleus width, 1·23 (0·84-1·67) ; distance from nucleus to kinetoplast, 12·53 (10·02–15·03) ; nuclear index (posterior extremity ' anterior extremity), 1·83.

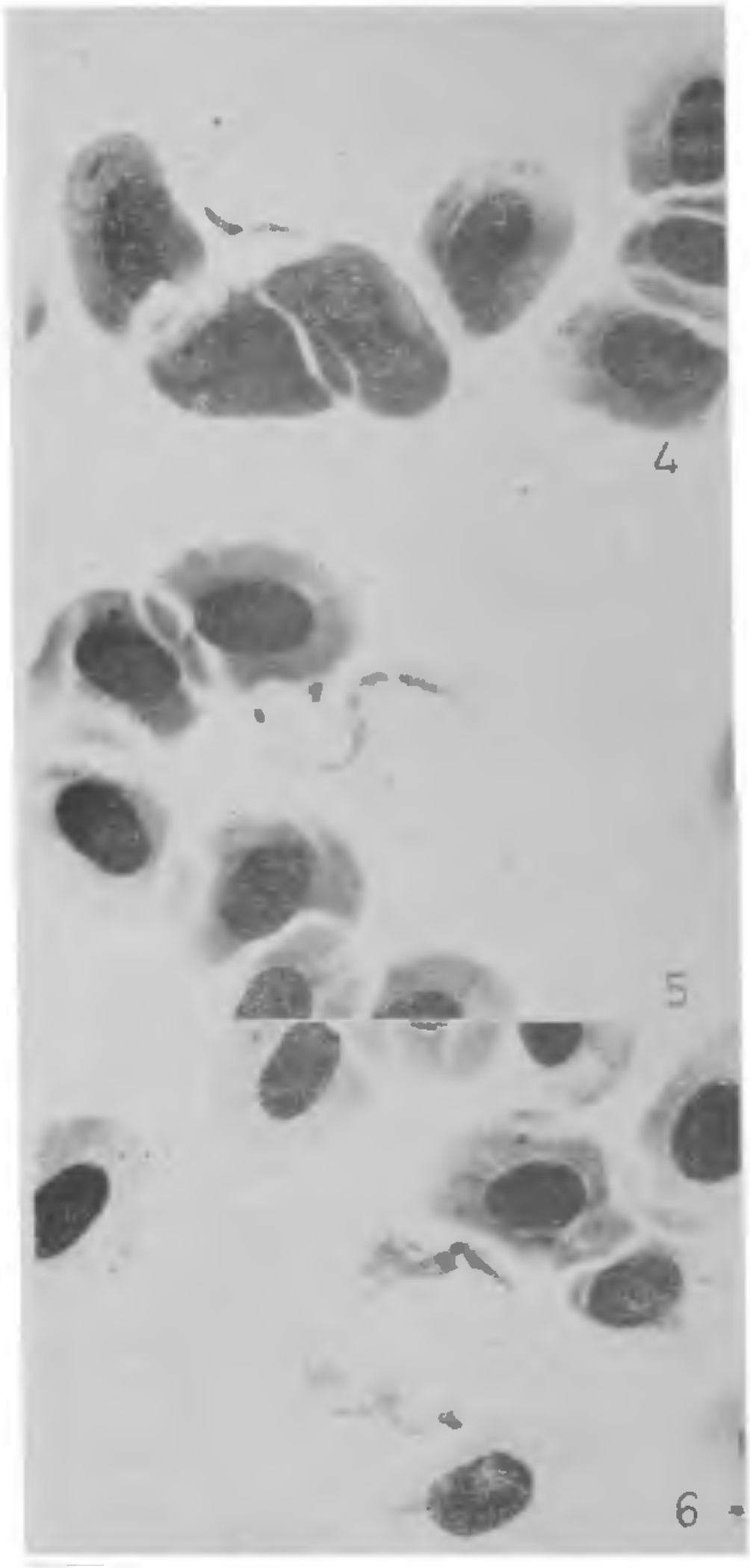
Broad form : Relatively rare. Cytoplasm stains intense blue, 2–3 parallel myoneme fibrillae.

Myonemes do not reach the two extremities. Nucleus stains light blue, is usually round to oval situated near the middle of the body. Undulating membrane is relatively narrow and indistinct. The average dimensions in microns (10 specimens) : Total length, 47 (range 46·76–50·10) ; body length, 30·39 (30·06–43·73) ; length of free flagellum, 17·54 (16·7–18·37) ; nucleus length, 4·18 (3·34–5·01) ; nucleus width, 2·5 (1·67–4·18) ; distance from nucleus to kinetoplast, 15·87 (15·03–16·7) . nuclear index, 1·27.

FIGS. 1–3. *Trypanosoma neinavana* sp. n. from the blood of *Barbus grypus* Heckel. Fig. 1. Slender form. Fig. 2. Intermediate form. Fig. 3. Broad form.

The identification of trypanosomes from fish involves the host and its geographical location, measurements, and structural characteristics[6,7]

In mensural analysis, the present parasite does not seem to resemble any of the known cyprinid trypanosomes. In body size it is dissimilar to *T. Lucisci, T. carassi, T. remaki, T. barbi, T. tincae, T. danilewskyi* and *T. abramidis* or trypanosomes described from other fish families. In the length of the free portion of flagellum, the present form has a relatively long flagellum. It is longer than in *T. barbi, T. tincae, T. abramidis* and *T. carassi.* It is slightly shorter than that of *T. remaki* and *T. leucici.* Many polymorphic species of trypanosomes in their broad form, have a short flagellum while the present parasite differs in having a relatively long flagellum. In this respect it is similar to *T. gachuii* described from *Ophicephalus gachua* in India[8].



FIGS. 4–6. Photomicrographs of *Trypanosoma neinavana* sp. n., × 2,300. Fig. 4. Slender form. Fig. 5. Intermediate form. Fig. 6. Broad form.

A single species, *T. barbi,* was described from the genus *Barbus* (= *Barbus fluviatilus*) in France[9]. The present parasite differs from *T. barbi* in several respects, such as polymorphism, presence of myonemes and a long flagellum in the broad form, host species and in the measurements.

In Iraq, the only fish trypanosome, *T. acanthobramae* was recovered from *Acanthobrama marmid* Heckel (Family Cyprinidae)[6]. The present species differs

distinctly from *T. acanthobramae* in several aspects. It exhibits pronounced polymorphism, the broad form has evident myonemes in its cytoplasm, the undulating membrane is small and lastly the free portion of flagellum is thin and slightly small.

It seems clear from the above that no known trypanosome corresponds to the present form. It is therefore designated as *Trypanosoma neinavana.*

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Zoology Laboratory, ZOHAIR IBRAHEEM FATTOHY.
College of Agriculture and
Forestry,
Hammam Al-Alil, Mosul, Iraq,
July 26, 1976.

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REVIEWS

Mathematical Analysis. By Professor V. Ganapathy Iyer. (Tata McGraw-Hill Pub. Co. Ltd.), 1977 Pp. 352. Price : Rs. 21.

A good training in real analysis is a must for any student or researcher in mathematics. Though the book under review is meant to provide a basic course in real analysis at the Master's Degree level in Indian Universities, Prof. Iyer seems to have taken pains in designing the course suitable for an active working mathematician also. In fact, copious references mentioned at the end of each chapter well substantiates this aspect.

In the light of his matured experience of a quarter century in teaching and guiding research, Prof. Iyer has rightly observed that a sound knowledge of techniques and results in classical analysis is essential for a proper understanding of the later developments like topology and functional analysis. The learned author further observes "it is my firm conviction that attempts to bypass them or assume them under general results in the later developments lead, at best, to superficial knowledge of these developments".

The different topics of analysis, usually found in different books, are brought together into one volume by the author. An exhaustive treatment is given to Lebesgue measure and integral including Fubini's theorem. The detailed discussion of infinite series and classical summability methods including Ttuberitn theorems—generally not given the same attention in many books on analysis—deserves a special mention. The chapters on infinite series and summability methods constitute the second part of the text. The first part includes chapters on the Real Number system, Real valued functions, Lebesgue measure and integral, Riemann-Steiltjes integrals, Cauchy-Lebesgue integrals, Metric spaces, L-spaces and Topological spaces, Fourier series and transforms.

The style of presentation and inclusion of well-chosen illustrations and problems bespeak the sound pedagogical judgement of Prof. Iyer. The author has struck the golden mean between the prolixity of class-room notes and the brevity of advanced texts. His style is crisp and clear, obviously in control of how the subject should be taught.

Prof. Ganapathy Iyer's book is not just one more addition to the list of already existing ones on real analysis by Indian authors. In fact it stands above all its predecessors in that while it has avoided their drawbacks, Prof. Iyer's text provides something positively substantial to a student of analysis.