capacity and behavioural flexibility. Wasps and ants share such abilities perhaps including colour vision.

Ants as well as bees derive compass information from polarized light. The experiments of the Swiss physician Felix Santschi that Wehner reports took nearly a half-century before interpretation. Sanstchi noticed that harvester ants *Messor barabarus* always walked directly back home after a successful trip of foraging. Surprisingly an ant maintained its homeward course even after he had surrounded it with a cardboard cylinder screening off the sun and providing the ant with only a small patch of the sky. Only when he covered the opening with a ground glass plate did the ant walk in random directions. It took over forty years and Von Frisch's experiments (done without knowing about Sanstchi's classic work) to clarify that arthropods use polarization gradients to navigate. Wehner's article is a marvelous piece of exposition. It ends with the description of a robot that can navigate with polarized light.

Past work has revealed magnetic cues. From Walker's review one learns that insect magnetic compass responds to polarity rather than inclination of magnetic field. How insects detect magnetic polarity and fields needs yet to be resolved but the experiments are remarkable lucid. Insects possibly use these when they migrate, e.g. locusts, the dragonflies that move in large clouds some time or monarch butterflies.

Crustaceans have evolved to use fluid mechanical cues to extract information from their environment. These cues enable them to find resources, orient to water currents or escape predators. Since a fluid environment affects transmission and structure of relevant signals, a better understanding of the hydrodynamic context of mechanosensory and chemosensory behaviours becomes very important. Weissburg details the important properties of mechano and chemosensory signals in fluid media.

How does the mosquito get you? From CO_2 gradients to fungal infested feet, all have one common aspect namely chemosensory cues. Chemosensation as a mode of communication and orientation in insects is universal. It is ideal in fluid media. The most studied is pheromone-controlled anemotaxis. Kaissling discusses the prospects of combining precise behavioural experiments with neurophysiological studies in a truly expository manner.

How does the spider say walk into my parlour? It looks like with a guitar of sorts. For spiders vibratory signals are overwhelming behavioural cues. The vibratory world both in its richness and adaptations may provide us some very useful new insights. In their world they are exposed to all sorts of vibrations which they need to distinguish. Background vibrations include those from wind, prey vibrations and courtship vibrations, to name a few. The distinguishing features that have been identified in these are a conspicuously narrow frequency spectrum; low frequency for wind, high frequencies from prey insects and a high temporal order from courting male. Electrophysiological recordings and behavioural experiments have indeed shown spiders do use these clues. Barth's essay documents carefully a large body of results in this area.

Much has always been said about acoustical communication in insects. Possibly the largest fraction of biological noise (the sound variety) comes from insects and they use sound in a variety of ways. Some of the best examples studied are the cricket's courtship songs or the audio signals mantis uses to fool bats. Ants, bees and termites also use sound to communicate. These are part of the discussion by Kirchner. Phonotactic orientation in grasshoppers is the subject of a thorough study recorded by Von Helversen. Behavioural, electrophysiological and anatomical studies are combined to reveal neural pathways of acoustic information processing and mechanisms involved in acoustic communication and orientation.

Gadagkar crowns this volume with a very apt and erudite discussion of possibilities of evolution of communication and communication of evolution. I do not know what that second part of the title means but it rings well and he certainly has done a good job of communicating evolutionary thoughts. All in all this is a wonderful book to have in an institutional library.

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Trends in Microbial Exploitation. Bharat Rai, R. S., Upadhyay and N. K. Dubey (eds). International Society for Conservation of Natural Resources, Department of Botany, BHU, Varanasi 221 004. 258 pp. Price: India Rs 900 other countries US $40.

Microbiology deals with the microscopic forms of life. We are surrounded by a world of microorganisms. They are found in the air we breathe, the food we eat, the water we drink, within our bodies and our surroundings. The adage, 'What you cannot see won't hurt you' does not hold good for microorganisms. Having appeared first on this planet, microbes influence the life processes of all other living systems. They can thrive in habitats extremely hostile to human life and are more skilled than any scientist in their synthetic activities. They represent a richly diversed resource for obtaining several materials required for human welfare. The founder of microbiology Louis Pasteur said 'The role of the infinitely small is infinitely large'. The goal of microbiologists is to understand how microorganisms work and to develop techniques and technologies to use them for the benefit of man.

An international symposium was organized in 1996 at Banaras Hindu University, Varanasi, India to discuss the trends in microbial exploitation for the service of mankind. The above book is the compilation of various papers presented in this symposium by eminent scientists working in this area. The book contains 25 review articles highlighting major issues on exploitation of microorganisms for human welfare. The topics covered include microorganisms used for crop production, crop protection, bioremediation of environmental pollution, large-scale biodegradation, prevention of microbial corrosion and microorganisms as sources of food, enzymes and energy. Out of 25 review articles, 15 deal with the use of microorganisms in increasing crop production and include plant growth promoting rhizomicroorganisms, biofertilizers, mycorrhiza and biocontrol. There are four chapters dealing with the role of microorganisms in food, three on bioremediation of organic wastes, two on the recent advances in the production of microbial enzymes and one on mi-

crobial corrosion and its mitigation through microorganisms. These review articles have been contributed by microbiologists, botanists, plant pathologists, food technologists and chemical engineers.

The book is well illustrated with line drawings and graphs. A few photographs would have increased the quality of the book. The book in general is edited well and there are very few typographical errors. Some of the articles are of great value to readers and a few are of general nature. The book does not include articles on free living nitrogen fixing organisms other than cyanobacteria, bio-gas technology, and use of microbes for the production of industrially important products like organic acids, vitamins, vaccines. etc. Such chapters would have enhanced the value of the book.

The book will be useful to teachers and students of microbiology. The editors deserve compliments for bringing out this useful publication. Although a little expensive this publication is a welcome addition to the microbiology literature.

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Errata

Biotechnological potential of naturally occurring and laboratory-grown *Microcystis* in biosorption of Ni^{2+} and Cd^{2+}

L. C. Rai, Sarita Singh and Subhashree Pradhan
[*Curr. Sci.*, 1998, **74**, 461–464]

On page 461, column 2, para 3, line 3, the temperature printed as 29 ± 20°C should read 29 ± 2°C.

Review of acid rain potential in India: Future threats and remedial measures

Manju Mohan and Sanjay Kumar
[*Curr. Sci.*, 1998, **75**, 579–593]

In Figures 3–5, the borders of India in the indicated maps are not correctly represented. The maps as shown in no way indicate the opinion of *Current Science* or of the Indian Academy of Sciences with regard to the territorial borders of India.

MEETINGS/SYMPOSIA/SEMINARS

Contact Programme in Geochemistry

Date: January 1999
Place: New Delhi

The Contact Programme includes theoretical, analytical and field aspects. The main objective is to provide a minimal theoretical background and hands-on training, to study diverse geological problems following a chemical approach.

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Haldane Congress II

Date: 29 December 1999 – 2 January 2000
Place: Bhopal

Various areas of evolution will be presented through independent symposia – Evolution of chromosome systems, Natural selection and evolution, Evolution of land plants, Germplasm conservation and future of medicine, Biology of migrations, etc.

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