organizations in India, they have to return the fellowship amount plus a soft interest on it within a reasonable period. Appropriate mechanism will have to be formulated to recover the money from the defaulters. Maybe the Government could allow them to go abroad only with temporary student passport for this purpose.

Every year about 1500–2000 students enroll for Ph D in India through the NET process. Even if a small percentage of these students seriously think of joining universities/institutes, and decide to take up this fellowship, we get a reasonably good number of personnel trained in some of the best laboratories in the world to meet the growing demands of faculties in our country. Does this idea sound stupid? Will it work? Is it a big gamble? I do not know. Let us not be cynical or fear about the failure of a scheme even before it is implemented. Let us be optimistic and give this a try for few years. It is not that big a risk. We have nothing to lose if it fails, but lot to gain if it works.

TUSHAR KANTI CHAKRABORTY

Indian Institute of Chemical Technology, Hyderabad 500 007, India
e-mail: chakraborty@iict.res.in

Is the dissection of animals in zoology redundant?

Dissection of both animals and plants was practised by biologists to observe internal organs and determine their structure and function, which were till then unknown. Animals are killed for dissection, but only parts of plants are dissected.

The dissection of animals has been practised in zoology courses in colleges and universities. Earlier, dissection provided students with an opportunity to observe, examine and document the characteristics of an organism under study. Unfortunately, this method has been altered to assess the skill of students in dissection and in the display of internal organs. Rather than real learning taking place, animals are needlessly slaughtered. Even though the dissection of a single animal is enough to educate a group of students, individual students are given animals to dissect.

In zoology-practical classes, dissection of various animals such as earthworms, cockroaches, leeches, starfish, crayfish, frogs, sharks, fishes, reptiles, pigeons, mice, rats, etc. is common. The dissection of nervous, circulatory, digestive and reproductive systems and other vital organs such as the heart, brain, kidney and liver in various animals is part of the zoology practical curriculum. In addition, wild frogs (Figure 1) are dissected in animal physiology to estimate the quantity of proteins, glycogen and cholesterol present in various tissues. As dissection in routine practical classes and examinations is compulsory, animals such as frogs and fish of a single species are collected in thousands and supplied to colleges and universities every year. Undoubtedly this practice has endangered the existence of certain species of animals.

Students who dissect animals in zoology courses never deal with these animals later unlike veterinary or medical students. Dissection in veterinary and medical courses is absolutely necessary because these students, as qualified professionals treat various ailments and conduct operations to save lives. Moreover, in the veterinary and medical sciences, dissection is performed on dead animals and human beings.

Figure 1. Dissected frog.

In my opinion, dissection in zoology is beneficial to neither students nor animals. Moreover, in this age of advanced technology, photographs of dissected animals and recorded video clippings of dissections are more useful in understanding the internal organs of animals than dissection used to assess the skill of the students. Today, virtual dissections and interactive tutorials utilizing 3D constructed images and models of many organisms are available on the web. All these resources can be utilized as alternatives or supplements for teaching students. Some of these sources demonstrate how to perform the dissection, while others provide the names of the internal organs. Instead of killing animals for dissection, the zoology curriculum should utilize website sources to help students to understand the anatomical structures of various organisms.

The killing or torturing of animals for dissection is not the only issue. Indiscriminate large-scale collections of the same kind of species will create an imbalance in nature and drive a particular species to extinction. It is high time that alternatives to animal dissection in colleges and universities be adopted to save the lives of precious organisms.

M. G. VENKATESHA

Department of Zoology, Bangalore University, Jnana Bharathi Campus, Bangalore 560 056, India
e-mail: venkatmelally@gmail.com