compounds of plant origin which may be used as remedies of snake bites. The studies described here on interaction of alkaloids like aristolochic acid with phospholipase A_2 from *Vipera russelli* and *Trimeresurus flavoviridis* venoms at molecular level are obviously a prelude to providing rational basis for use of some folk medicines. More important, the scientific framework for this approach needs to be developed so that these plant isolates become a powerful alternative to antivenin therapy. The chapter by Stiles and Choumet (Chapter 9) reviews the antivenin therapy based upon monoclonal antibodies raised against phospholipase A_2 and the toxins. The next two chapters talk about the structural data and structure–function relationship work with monomeric and multimeric neurotoxins. In the latter, at least one of the subunits has phospholipase A_2 activity. Some snake venoms result in local myotoxicity (degeneration of muscle around the site of injection) whereas others act as general myotoxins (affecting widespread muscle groups). The last chapter in the book later on suggests that acylation of specific membrane-bound proteins could be a likely mechanism of myotoxicity. The two successive chapters (Chapters 12 and 13) provide the general picture about myotoxicity of phospholipase A_2 enzymes and that resulting from Bothrops snake venoms in particular respectively. The anticoagulant effect of these enzymes and their effect on platelet aggregation is adequately treated in Chapters 14 and 15. Identification of membrane receptors for the enzymes and the cellular effects of presynaptically acting phospholipases are covered in Chapters 16 and 17.

Thus, there is greater emphasis in the book on phospholipases which act as toxins rather than the less toxic enzymes. An extensive coverage of phospholipase A_2 makes this a rather valuable book for anybody working with this particular class of enzymes. Obviously, because of its rather narrow focus, this may not interest a general biochemist.

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The Legacy of Galileo

Galileo, Newton, Halley and Einstein in 90 Minutes. John and Mary Gribbin, Universities Press, 3-5-819, Hyderguda, Hyderabad 500 029. Price: Rs 45 each.

Some individuals, through their extraordinary contributions, etch their names on the canvas of time and become immortal. Galileo, Newton and Einstein are in this select club. Hence, it is always tempting to read and write about them. John and Mary Gribbin could not resist the itch to write about these great men. Instead of summarizing the contents of these little biographies, I will dwell upon some of the pieces that are not generally emphasized in popular biographies of these men.

Galileo was the first to stress the importance of experimentation as exemplified by his own experiments. In this context we refer to an interesting anecdote described by Gribbins. A Professor at Pisa, dropped two bodies of different weights from the Leaning Tower of Pisa and 'gleefully pointed out that they failed to hit the ground *exactly* at the same time' as claimed by Galileo. Galileo while responding to his critics correctly attributed this to an error in the experiment. He was the first to point out the possibilities of errors in an experiment and their proper evaluation.

The book has a vivid description of the society of those times. Galileo's father had promised a substantial dowry to Galileo's sister. Galileo had not only to meet this financial obligation but also had to give dowry to his second sister. He could not meet these commitments in his entire life and to add insult to injury, his brothers-in-law sued him in a court for not settling their dowries. This left such a scar on him that he forced his two daughters, whom he loved very dearly, to be nuns for life.

The authors bring out the interesting fact that Leonard Digges had built a refracting telescope way back in 1550. But Galileo went beyond constructing a telescope. He established on a sound footing the Helio-centric theory. Gribbins point out that Galileo attributed the eternal circular motions of planets round the Sun to a Principle of Inertia according to which bodies on their own always move in circles. It was Rene Descarte who realized that this concept of inertia applied only to motions in a straight line. But it was left to Newton to analyse motion in a curve.

This brings us to the book on Newton. If we do not believe the 'apple story', it is difficult to speculate on what made Newton to invent the Law of Gravitation. Gribbins argue out that that was a natural sequel to his discovery of the centrifugal force acting on a particle moving on a curve. A planet in an orbit would be driven away from the Sun by the centrifugal force. In order to keep it in its orbit there must be an equal and opposite force tugging it towards the Sun. Using Kepler's Law about orbital periods Newton discovered that this force of attraction should fall inversely as the distance from the Sun. Thus was born his Universal Law of Gravitational attraction.

We all know that Newton became a Fellow of the Royal Society of London for his invention of the reflecting telescope. The authors rightly give credit again to Leonard Digges for being the first to make such a telescope. Gibbins also highlight an interesting event in Newton's life. Within a few years after becoming the King of England, James II, a catholic, ordered that a Benidictine monk Francis be conferred the MA degree by the Protestant dominated Cambridge University. Newton then, an unknown personality, risked his life by openly criticising the King and was mainly responsible for the University's refusal to award the MA degree to Francis. He and the other Cambridge Fellows were asked to explain their conduct to one Lord Chancellor, Judge Jeffreys who in the previous year had got 300 people hanged for opposing the King.

Undoubtedly Galileo and Newton are household names. Halley, by contrast, is remembered only when a comet appears in the sky. Thus his biography is very welcome. Many unknown facets of this colourful personality have been brought out by these authors. Halley was born rich and had the full support of his father in his scientific pursuits. When he was just 20 years old, his father financially backed his sea voyage from St. Helena to South Atlantic. His study of the southern sky during this tour led to his well known book *Catalogue of the Southern Stars*. For this work he was elected a Fellow of the Royal Society of London. He became financially broke

after his father's death and to make a living he resigned from the Fellowship and became a Clerk of the Society. Later, for his other astronomical discoveries he was re-elected a Fellow. The authors rightly stress Halley's very important discovery concerning stars. This came about after his friend Newton took over as the President of the Royal Society. The Royal Greenwich Observatory had been set up so that Flamsteed could prepare a more accurate astronomical table to improve navigation. But Flamsteed was extremely reluctant to part with his data. When he refused to budge to Newton's directive, the Queen stepped in and appointed Newton to get this data. Newton in turn assigned this job to Halley. Halley added a lot of his own data to the ones supplied by Flamsteed. While on this job he carefully compared the stellar co-ordinates he had on hand with similar data of Hipparchus of second century B.C. He found, to his amazement, that the recently measured co-ordinates of most of the stars agreed with the ancient data but for a few of the stars. Halley boldly suggested that these stars had actually moved in the intervening centuries. Thus he shattered the myth that stars are fixed objects in the sky.

Now we come to the biography on the most celebrated scientist of this century, namely Albert Einstein. This biography has nothing new in it. All that I can say is that this can be recommended to one who has not yet read anything about Einstein. Unfortunately, the book creates a wrong impression when the text implies that the Bose–Einstein statistics (BES) is used when the total number particles is not conserved and that the Fermi–Dirac statistics (FDS) is used when the total number of particles is conserved. It is textbook knowledge that the BES is used for particles with integral spin while FDS is used for particles with half-integral spin. Finally, Gribbins end Einstein's biography with the statement:

'Number two to Newton in physics rankings is surely a position he would be proud to hold – though he may have to share that number two slot with Richard Feynman.'

I think that many will not agree with this elevation of Feynman to the level of Einstein.

These eminent personalities have profoundly transformed our understanding of the physical universe in general and astronomy in particular. I would strongly recommend these little books to every undergraduate student and to readers outside the domain of physics. These books amply supply what is, unfortunately, totally missing in our educational system. They will, hopefully, motivate and inspire the bright young students who have been of late opting out of basic sciences. The University Press has done a service to the student community by publishing these books.

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MEETINGS/SYMPOSIA/SEMINARS

International Training Course on Seismic Monitoring, Data Analysis and Exchange

Date: 15–30 November 1998
Place: Hyderabad

The course covers the basics of seismology, seismometry, data acquisition, analysis and exchange, observatory practice and earthquake source mechanisms.

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Second Meeting of the Asian Seismological Commission and Symposium on Earthquake Hazard Assessment and Related Topics (ASC98)

Date: 1–3 December 1998
Place: Hyderabad

The Symposium will cover earthquake prediction, hazard assessment, lithospheric processes, physics of earthquakes, induced seismicity, heat flow and thermal structure, seismic disaster mitigation, network development, etc

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