



Aquaculture Medicine. Bright Singh, I. S. *et al.* (eds). Centre for Fish Disease Diagnosis and Management, Cochin University of Science and Technology, Kochi 682 016. 2003. 336 pp. Price not mentioned.

Aquaculture has emerged as the most promising food-production sector, with a consistent 11% annual growth. During recent years, the sector has been strangled by viral and other microbial diseases. Till date, no commercial vaccine for any disease of fishes has been made in India. It is in this context that the publication of a book on aquaculture medicine is timely. According to I. S. Bright Singh, the senior editor, aquaculture medicine is defined as a discipline to be practised at the field level on a wide range of issues related to diagnostics, antimicrobials and chemotherapeutics, probiotics, immunostimulants, vaccines and bacterins, anaesthetics, hormones, aquaculture pharmacology, population medicine, broodstock/seed certification, quarantine and so on; indeed the list is long and exhaustive. This book is claimed to represent an attempt to consolidate the state-of-the-art of processes and products in aquatic animal health management, which were presented by experts during the two national workshops, i.e. Aquaculture Medicine, 2001 and Aquaculture Drugs, 2002. The book contains 11 sections, each including a few articles on the above described issues. In all, there are 47 articles, including one by the reviewer.

There are many lessons for aquaculturists and funding agencies to be learnt from the book. Among the 47 articles, only 11 represent original contributions; the remaining are all reviews; many are authored by so-called experts, who have no publication to their credit on title of the review. Clearly, there is an urgent need for a huge investment to promote research and training for developing real expertise in this important food-production sector of our country. Again, among these articles,

only 17 are authored by scientists from a dozen and odd fisheries research institutions of the Indian Council of Agricultural Research (ICAR) and all the others are from fisheries colleges, and universities supported by the University Grants Commission. Incidentally, the following may also support this statement. A bioreactor has been designed by Bright Singh and colleagues at Cochin University of Science and Technology and is being fabricated for rapid removal of ammonia and nitrite from prawn larval rearing systems (p. 133). Likewise, a plant product has been identified by A. S. S. Hameed in a rural college and is being manufactured to contain viral disease. Therefore, the fisheries institutions under the ICAR alone cannot solve the huge and complex problems encountered by the aquaculture industry in our country. Thirdly, it is distressing to note that virtually no research work has so far been undertaken by the ICAR institutions, especially the Central Institute of Fisheries Technology, to develop techniques for microencapsulation or protocols for anaesthetics to handle and transport live fishes, which are virtually important for development of modern fisheries. Lastly, more than ten articles are authored by Bright Singh and his associates. For some reason, articles by experts like A. Chatterjee (Goa), A. S. S. Hameed (Tamil Nadu) I. S. Karunasagar, I. Karunasagar (Mangalore) and K. Pani Prasad (Mumbai) are disappointingly missing.

Bright Singh and his associates are to be complimented on bringing out this valuable book. Certainly, the book has pointed out the directions for future research and will serve as a useful starting point for those intending to practice aquaculture medicine. However, the reviewer is constrained to point out a large number of editorial errors. Among 47 articles, 11 alone have summary or conclusions. The section on 'References' in almost every article has received a raw deal by the respective author(s) and/or editors. For instance, volume and page numbers are missing for many references; the journal *Aquaculture* is wrongly spelt as '*Aqua culture*'; the standard abbreviations for journals are not followed; for instance, *Ind. J. Microbiology*, *Comp. Biochem. Physiology* (p. 177) and so on. A few grammatical errors (e.g. p. 89) and spelling mistakes (e.g. p. 269) may be seen. 'Technological use of ecological techniques...' is an example of language that is difficult to understand (p. 92).

However, the book represents the first milestone and has shown directions for future research in aquaculture medicine.

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Losing a Lost Tribe: Native Americans, DNA, and the Mormon Church. Simon G. Southerton. Signature Books, Salt Lake City, Utah 84116-3411 USA. 2004. 270 pages. Price US\$ 24.95.

The origin and history of indigenous populations before their supposed 'discovery' by exploring civilizations the world over, largely remain unknown. Indigenous cultures believe in totemistic tales of creation that are verbally passed down across generations. Moreover, written languages are non-existent for most of these populations. Their history is, therefore, often subject to conjecture, on the one hand, and scientific debate, on the other.

This book explores the origins of native inhabitants of the Americas and Polynesia as deduced from various scientific streams, as opposed to the beliefs of the Mormons. The Mormons, who are followers of the Mormon church or the Church of Jesus Christ of Latter-day Saints (LDS), believe that all native inhabitants of the America and Polynesia are descendants of dispersed tribes from Israel. This belief is attributed to writings in the *Book of Mormon*, the sacred text of the Mormons. Published in 1830, this book, which is based on inscriptions on gold plates apparently handed over to their prophet Joseph Smith by an angel, describes the arrival of many dispersed tribes from Israel into the New World and subsequently traces their history.

To put things into perspective, the author Simon G. Southerton, a plant geneticist and once a practising high-priest in the LDS church, begins his account by examining the history and prevailing social currents at the time of the colonization of America and goes on to critically analyse

the present-day scientific data on the period in question. What largely emerges from this history is a story of discrimination, oppression and massacre of the natives of this land at the hands of the early settlers. The colonizers, all believers in some form of the Christian faith, classified the natives as savages, heathen and inferior, thus absolving some, if not all, of the guilt of invasion. On the other hand, having found no mention of the New World and its inhabitants in world history, the invaders set about trying to link the natives to just about every possible human race on earth.

In a further twist, various theories subsequently began to emerge regarding how the Native Americans had overthrown a civilized, superior race in the most barbaric manner and claimed the land as their own (again justifying the settlers' motivations to conquer the Americas). This theory even found support among Europeans, who now began to talk about the 'mound-builder myth', which apparently corroborated the above theory. In the early 1770s, a series of mounds were discovered in the Ohio Valley. Besides containing skeletal remains, the mounds revealed the presence of copper jewellery (some inlaid with gold and silver), decorative pipes, breastplates and ornaments. The sheer number of the mounds, their architecture and workmanship of the contents impressed the invaders. To the settlers, the Native Americans seemed completely incapable, too 'backward', to have ever built these mounds. This was thus considered proof that a 'light skinned superior race' had existed earlier, but had been overthrown by the Natives. This superior race had supposed Old World connections and was likened to the Lost Tribes of Israel.

It was in this social atmosphere of speculation, discrimination and complete misunderstanding of the Native Americans that Joseph Smith published the *Book of Mormon*. It described the arrival of the dispersed tribes from Israel to America, which, upon arrival, split into two factions, the 'fair-skinned, civilized Nephites' and the 'savage, dark-skinned Lamanites'. The Nephites were supposedly more culturally and technologically advanced than the Lamanites, which degenerated into a society with questionable morals. A major part of the *Book of Mormon* is devoted to the series of battles that were fought between the two factions and which ultimately resulted in the death of all Nephites. To the settlers, this historical account was plausible and accounted for the natives in America, although it portrayed them as savages.

Having lightly traced the history of colonization, the author reviews scientific literature on New World chronology and human genealogy, including the molecular genealogy of Native American and Polynesian populations. Human genealogical studies reveal that the first humans emerged between 100,000 and 200,000 years ago in Central Africa. They eventually radiated all over the world, aided by climatic changes that caused sea levels to drop, exposing land bridges between continents over which our ancestors could cross.

Archaeological expeditions in the Americas have revealed important findings such as the primitive stone spear points found among bones of bison and mammoths. The dating of these artifacts using dendrochronology and radiocarbon analysis suggests that the Clovis culture existed about 13,000 to 13,500 years ago. This period approximately coincides with other major geographical events of that time, including the last glaciation when sea levels dropped dramatically and the land bridge between Eurasia and America was exposed across the Bering Strait. The founder populations may have travelled across the land bridge to an uninhabited continent and rapidly colonized it. The sudden disappearance of large mammals like the giant sloths, camels, mastodons and the saber-toothed cat, which are known only from the fossil history, suggests that they were possibly hunted to extinction then. This time frame is also likely to account for the development of an astonishing diversity in native American cultures, with the rise, over time, of about 1500 languages. Interestingly, Amerindians also share certain physical characteristics with Asiatic populations like the Mongoloid sacral spot, Mongoloid eye fold, relatively flat faces and prominent cheekbones.

In the molecular studies, over 7000 DNA samples were procured from 175 recognized and existing native groups. Analysis of mitochondrial DNA and Y-chromosome DNA was carried out to examine both maternal and paternal lineages. Around 96.5% Native Americans share mitochondrial DNA from the four (named A, B, C and D) founding maternal lineages and, remarkably, these DNA lineages are found only in Asian populations and nowhere else in the world. Male genealogical studies show that the most common Native American lineage Q is closely related to Asian Q lineages, as they share common DNA markers. It is also possible to estimate the age of ancestral lines

from coalescence analysis, as the rate at which mitochondrial DNA acquires mutations is known. Initial age estimates varied widely, but subsequent work has suggested that the founding populations split from the parent populations approximately 10,000 to 17,000 years ago. Native American molecular genealogical studies are, therefore, in agreement with our existing body of geological and historical knowledge.

Similarly, scholars have traced the ancestry of present-day Polynesians using archaeological, linguistic and genealogical methodologies. There are clear and conclusive links between the people of Polynesia and South East Asia. Colonization of the Micronesian, Polynesian and New Guinea islands is linked to the sea-faring voyages of the first founder populations. They were possibly excellent sailors, possessed brilliant navigational skills and developed outrigger canoes. There is evidence suggesting that these canoes carried women, children and livestock – these were thus voyages of colonization, not of discovery. The arrival of the first populations on these islands also coincides with the extinction of another species group; this time, the ground-dwelling flightless birds became easy targets for marauding human beings.

To summarize, Asians are the ancestors of both native Americans and Polynesians. The Israeli connection that the *Book of Mormon* claims, thus, appears to be non-existent.

This book is rather well-written and thus easy to read. The author has gathered evidence from a variety of sources and presented it vividly. This makes for a rather informative source book for those interested in Native American history. It should, however, also find a place on the shelves of the scientific reader, as it documents very well how scientific research across multiple disciplines can significantly contribute to our understanding of historical events in the eras long past.

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