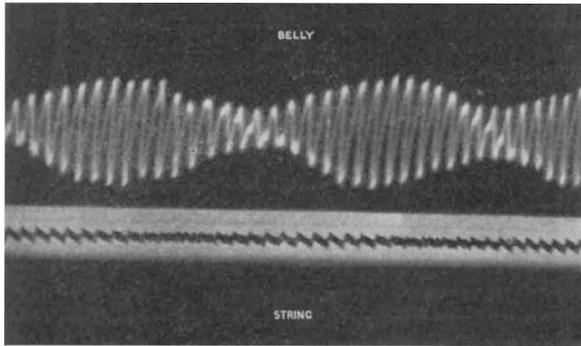


The accompanying photograph showing the simultaneous vibration-curves of the belly and string of a 'cello amply confirms the foregoing explanation suggested by theory, and is itself of interest. It will be



Time Axis —————>

seen that the changes in the vibrational form of the string are about a quarter of a cycle in advance of those of the belly, and that in both curves the octave is conspicuous when the amplitude is a minimum.

C. V. RAMAN.

The Indian Association for the Cultivation of Science, Calcutta, May 20.

THE ETHNOGRAPHY OF CENTRAL INDIA.¹

THE publication of this work recalls the tragical fate of its author, who soon after the final revision of the proof-sheets sailed for India and lost his life in the s.s. *Persia*, sunk by a German submarine in the Mediterranean. The book is the result of a long study of the races of the Province, begun when the author was placed in charge of the census operations in 1901, and since steadily prosecuted, in spite of very indifferent health. He enjoyed opportunities denied to the writers of the volumes on Northern India—Mr. Crooke for the United Provinces and Mr. Rose for the Punjab, who dealt with regions where the all-absorbing Brahmanism and militant Islam had caused much of the more primitive beliefs and usages to disappear. Sir H. Risley, in his account of the tribes of Chota Nagpur, and Mr. Thurston, in those of the Nilgiri Hills, were dealing with people believed to be indigenous, or at least settlers of whose coming no information is now available, and their religion and organisation are of a very primitive type. The people considered by Mr. Russell are perhaps even more interesting—Gonds, Baigas, Korkus, and the like, about whom little has hitherto been known.

The scheme of Mr. Russell's work differs from that of others in the same series, inasmuch as in his Introduction and throughout the caste and tribal articles he has not confined himself to a mere description of the religious and social life. He has taken occasion to discuss questions such as the character and origin of the local totemism

¹ "The Tribes and Castes of the Central Provinces of India." By R. V. Russell, assisted by Rai Bahadur Hira Lal. Four volumes. Vol. i., pp. xxv+426. Vol. ii., pp. xi+540. Vol. iii., pp. xi+589. Vol. iv., pp. xi+608. (London: Macmillan and Co., Ltd., 1916.) Price 42s. net, four vols.

and animism, the Corn Spirit, the sanctity attached to opium and alcohol, the pig as a sacred animal, the buffalo as representing the Corn God, the respect paid to the umbrella and to counting, and so on. In the course of these digressions he quotes largely from standard words on anthropology, such as Sir J. G. Frazer's "The Golden Bough," "The Religion of the Semites," by Prof. Robertson Smith, "The History of Human Marriage" and "The Origin and Development of Moral Ideas," by Prof. Westermarck, and other standard authorities. This method possesses some advantages, inasmuch as it tends to popularise the principles of anthropology, and his work is learned and interesting. But it is doubtful if this advantage justifies the space which is occupied by these discussions. They are unnecessary to the trained anthropologist, and it is a question how far this learning is likely to be assimilated by the persons—the officials, European and native, of the Province—who will chiefly use the book. Further, it must be remembered, as appears from



FIG. 1.—Bahrūpia impersonating the Goddess Kālī. Reproduced from "The Tribes and Castes of the Central Provinces of India."

Prof. Ridgeway's latest book, reviewed recently in these columns, many of these principles are still the subject of active controversy.

The scheme of the work is purely ethnographical. Anthropometry, in India at least, has fallen into some discredit since the death of Sir H. Risley, partly because it is now realised that the materials on which he based his conclusions were incomplete, partly because the groups which he discriminated have been shown to be less completely isolated than he supposed.

Much space might have been saved by compression. If, for instance, a set of standard accounts of birth, marriage, and death observances were once for all prepared, it would save constant repetition, and it would be necessary only to refer to variations from the normal practice. But the author has followed here the example of other writers in the series. When these monographs come to be revised, the scheme of arrangement might with advantage be reconsidered.



FIG. 2.—Jain Ascetics with cloth before mouth and sweeping brush. Reproduced from "The Tribes and Castes of the Central Provinces of India."

In these criticisms we must not be supposed to underrate the value of this important contribution to the ethnography of India. Every article shows the assiduous care with which the facts have been investigated; the articles are well arranged, and in the case of the less known tribes, like the Gonds, Bhils, and Korkus, much novel information is supplied, while other less distinctively local groups, like Marathas, Jats, Gujars, and Rajputs, are adequately dealt with, the articles displaying full acquaintance with the work done in other Provinces, which is invariably quoted with full acknowledgment. In almost every page there are accounts of quaint usages and beliefs of the highest interest. The work is provided with an excellent set of photographs, and its format

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is what might have been expected from the reputation of the publishers.

The untimely death of Mr. Russell is a serious loss to anthropology, and it is sad to think that it occurred on the eve of the publication of a book which was the work of his life, and will do much to preserve the memory of his learning and devotion to science.

BIRDS' SONGS AND THE DIATONIC SCALE.

A LETTER from Dr. R. H. Bellairs, of Cheltenham, appeared in the *Times* of June 14, describing the performance "by a wild bird, probably a thrush, of the arpeggio of the common chord in tune, absolutely in tune." This was followed by other letters, of which the *Times* printed three and gave a summary of the rest. Their contents amount to this: blackbirds do occasionally sing a few notes in our diatonic scale; thrushes less often. Only one other bird was mentioned, "the whitethroat or willow-wren," which leaves the identity of the species doubtful; and neither whitethroat nor willow-wren has ever even dimly suggested to me the use of our musical scale. But as the voices of blackbird and thrush do now and then make this suggestion, I will venture, at the Editor's request, to say a few words on the subject.

Few ornithologists are musicians, and few musicians are ornithologists, so that a knowledge of the elementary facts of the two sciences (if I may for the moment consider music as a science) is not a common acquisition. But if we are to judge of the songs of birds by reference to the diatonic scale, we must be quite clear about the following two facts: First, our present musical scale is an artificial selection, the result of a long evolutionary process, from innumerable possible intervals within the octave, and does not seem to be based on any natural human instinct, prompting to one particular selection rather than another. (See the article "Scale" in Grove's "Dictionary of Music," or Dr. Pole's "Philosophy of Music," chaps. v. and vii.)

Secondly, the vocal instrument of a bird is not constructed so as to produce with any readiness the tones of any scale consisting of fixed intervals. The pitch of the bird's notes is regulated by muscles attached to the windpipe, which is as elastic as the body of a worm; and a moment's thought will show that this is not an apparatus suited for producing a fixed succession of sound-intervals. Our reed instruments are more like the bird's organ than any others, but they are of hard material, with air-holes and a mechanism based on mathematical principles.

Combining these two facts, we may safely conclude that it needs a muscular effort, and probably a strong one, for a bird to produce anything like a tune on our scale; but at the same time it is not impossible where the notes are produced slowly and deliberately, as in the blackbird's song, and to some extent in that of the thrush. It would seem that these birds are occasionally prompted to such