Letters

Science Books for Children

The launching of sputnik I and sputnik II has speeded up the re-evaluation of science education in this country.

For some years now it has been my thought that there ought to be an award for the best science book for young people, similar to the Newberry and Caldecott awards. The John Newberry Medal for the Most Distinguished Contribution to American Literature for Children has been awarded annually since 1922, while the Caldecott Medal has been presented to the artist of the most distinguished picture book of the year.

There is no reason why, in this scientific age of ours—or space age, if you will—the American Association for the Advancement of Science should not make an annual award of a medal, named for an illustrious scientist, in order to single out what the association considers to be the best book on a scientific subject for young children. This would help to develop the idea that the study of science is, after all, part of the study of the humanities; it would help to encourage writers of science books; it would help to bring the fields of literature and scientific endeavor together.

It is a truism that our children are the hope of the future. It is they who will be the scientists of the future. I believe, therefore, that establishment of an AAAS science award would be a worthy project, eminently fitting as part of our increased emphasis on science education for the very young. Science education is not only for college and high-school students; it must of necessity begin in the elementary-school grades. I would like to see an award of this type given for books that are published for children below the age of 12. An example of the kind of book that might be honored by such a prize is the beautiful little volume by Irma Eleanor Webber called *Up Above and Down Below,* which is meant for grades two to four in the public schools.

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Shorthand Notation

In *Science* recently [**127**, 297 (7 Feb. 1958)], H. C. H. Kernkamp describes a method for indicating castration by use of the sex symbols ♀ and ♂ with a portion of the circle removed.

Many laboratories develop a shorthand type of notation to indicate "physiological state." Our own is quite convenient and may be of interest. Castration is indicated by a cross superimposed upon the circle of the gender symbols; immaturity is denoted by incomplete symbols (the female symbol without the crossbar; the male symbol without the arrowhead); pregnancy, by making the vertical bar of the female symbol tangential to the left of the circle, as in the letter *p*; and so on.

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"Abominable Snowman"

Recent accounts [*Science* **123**, 1024 (1956); **126**, 858 (1957)] have given various interpretations of the Abominable Snowman or Yeti of the Himalayas. This note on the same subject is directed toward pointing out some aspects of the legend which have been overlooked. The interpretation that tracks in the snow ascribed to the Yeti may be made by man is valid in some instances, but it is clear that footprints cannot logically be attributed to even the most solitary hermit when they are made in remote glaciated terrain at great altitudes where local inhabitants simply would not travel.

The explanation that the Yeti tracks are made by red bears raises a number of difficulties. The footprints, such as those photographed by Eric Shipton in

1951 (*1*), do not resemble bear tracks. Frequently, genuine red bear tracks have been attributed to the Yeti, but when photographs of these tracks have been examined, the bear origin has been clearly established (*2*). Perhaps the greatest difficulty with the bear theory, and the point most often disregarded in statements concerning Yeti tracks, is the fact that the high-altitude red bear of the Himalayas (*Ursus arctos isabellinus*) is found only in the western Himalayas, whereas the origin of the Yeti legend and the source of all "genuine" Yeti tracks is in the eastern Himalayas. There is a fairly striking faunal difference between these two regions, and it is not legitimate, nor is it good zoogeography, to attempt to discredit the legend on evidence obtained from the western Himalayas or the plateau of Tibet. The Abominable Snowman, presumably, has no business in these parts.

Prior to the advent of the eastern Himalayan Sherpas into all sections of the Himalayas as members of expeditions, the mountain peoples from Kashmir to Kumaon had apparently never heard of the Yeti, although they have many other legends. In the eastern Himalayas, from the Everest area through Sikkim, residents of the high valleys continually describe the Yeti (in Sherpa, *ye* means high rocky places; *ti* or *te* or *teh* means a sort of being, perhaps a dwarf but not necessarily a bear) as a bipedal creature with reddish hair, varying in height from four to six feet. Their description fits, in many ways, a bipedal ape, although these people should have no certain knowledge of apes. It is improbable that the Sherpas, who are fine observers and who have a good acquaintance with bears from their frequent travels in Tibet, would repeatedly confuse a bear standing on his hind legs with the Yeti which they describe. Furthermore, in the high valleys of the eastern Himalayas, there are no reports of bears. The forest bear *Selenarctos thibetanus* has not been reported above tree line, much less at 19,000 or 20,000 feet. It is conceivable and possible that the bear of the eastern Tibetan plateau, the so-called blue bear, *Ursus arctos pruinosus,* may occasionally cross over the main crest of the eastern Himalayas, but, if so, this migration has not been reported, and the observant Sherpas deny it. Essentially there is a problem of interpretation involving footprints, which, although they do not resemble bear tracks (and are bipedal over considerable distances, unlike single or overlapping bear tracks), are alleged to be caused by bears in localities where bears are not known to exist.

That the tracks, or at least the sources of the legend, may stem from Himalayan langurs does not seen likely or pertinent. These forest monkeys are well known to

the mountain peoples, and the Yeti footprints can scarcely be confused with langur tracks. That the unique footprints may be the result of the high-altitude effects of evaporation and sublimation is not borne out by fresh Yeti tracks, where some detail of the foot is clear. High-altitude footprints do enlarge and may alter in shape, but this obvious alteration, which may surprise the casual traveler from the lowlands, is promptly recognized by an individual with experience in snow at high altitudes. It is not correct to assume that only the naive have seen the tracks, and it is equally erroneous to assume that the Yeti is only the imagined maker of all sorts of ablated footprints.

There has been a curious silence in the scientific literature concerning the two unusual scalps found in separate monasteries in the Khumbu region of eastern Nepal. A mammologist of the Zoological Survey of India, Biswamoy Biswas, has examined the scalps, and it has been demonstrated that they are not artifacts (*3*). Photographs of the scalps are quite remarkable in that they indicate a somewhat conical occipital extension, as if the skull possessed prominent temporal and nuchal crests. There is in the scalps the distinct suggestion of a large anthropoid ape. Coincidentally, the footprints photographed by Shipton closely resemble a cast of a foot of the mountain gorilla made by Carl Akeley in East Africa (*4*).

This cast, which was made on a dead specimen, exhibits a prominent hallux somewhat proximal to the remaining toes and perhaps more adducted than it would be in life. The line of toes arches in a slight semicircle, with the fifth digit close to and somewhat beneath the fourth digit, so that it could be inconspicuous in a footprint. The sole and heel of the foot are broad, with the lateral and medial borders approximately parallel. The general outline, the relationship of the hallux, the position and angle of the toes, and the inconspicuous fifth digit strongly suggest the Yeti footprint. Indeed, there are no other footprints which can approach the likeness of the Yeti track. Although it is true that foot impressions in the snow are open to wide subjective interpretation, it would seem to be a conservative assumption that the Yeti track, as it appears in good photographs, resembles Akeley's gorilla cast much more than it does any normal footprint of a bear.

In addition, there are reports of reversed "knuckle" prints such as might be made by an ape and, in fact, there are all sorts of tenuous indications from various Yeti tracks which can be interpreted to point toward the ape origin of the footprints. Among the apes, the mountain gorilla sometimes inhabits relatively high altitudes (its presence on snow fields has been recorded) in an alpine ecological zone not unlike that found in the Himalayas. The zoogeographical status of the eastern Himalayas as an area where relictual genera are frequent suggests that the existence of a relictual high-altitude ape with relatives in the tropics of Africa and Southern Asia is not an illogical supposition. Similar distributions are found among other mammal groups which at one time were widespread in Asia.

Whereas it is perhaps presumptuous to assume, at this time, that the Yeti is in reality some large anthropoid ape, it seems that this possibility has not been eliminated or sufficiently considered in the current arguments of the Yeti critics.

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References

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2. F. S. Smythe, *The Valley of Flowers* (Norton, New York, 1949), pp. 150–151; M. S. Mani, "The abominable snow-man," *Turtox News* 35, 172 (August 1957).
3. *The Statesman, Calcutta* (4 March 1954 *et seq.*); R. Izzard, "The abominable snowman" (Doubleday, New York, 1955).
4. C. Akeley, "Gorillas—Real & Mythical," *J. Am. Museum Nat. Hist.* 23, 433 (1923).

I certainly have never denied the possibility of the existence of an "abominable snowman," whether it be a giant ape or some other unknown creature. I am only adhering to a basic tenet of scientific procedure when I ask for something in the way of positive proof of its reality. Unfortunately, those who claim to have seen the "snowman" seem never to have a rifle at hand, nor even a camera. Inference and argument are entertaining and admittedly suggestive; but the real proof of the pudding is in the eating thereof. Collateral evidence, such as footprints, is subject to diverse interpretations. In this connection, I cannot help but recall the "orang pendek" and the "Loch Ness monster." If someone supplies me with the cadaver of an undoubted "snowman," I will be only too glad to dissect it and report, to the best of my ability, on the creature's zoological affinities. Until such proof of its existence, or other proof which is just as convincing, is at hand, I reserve the right to be skeptical. Of particular pertinence in this instance is the observation of W. K. Brooks that "suspended judgment is the greatest triumph of intellectual discipline."

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