

Quick coverage by snow was the second lucky step that preserved the body. As the skin does not show scars from maggots, Spindler believes that the man must have died during the late fall when cold weather and heavy snow set in. The only damage to the body consists of some minor wounds inflicted by scavenging animals.

The third factor was that the man was found in a chamber-like depression in the rock, where his body lay undamaged by the movement of the glacier. Normally, bodies frozen in glaciers "are transported all the way down the valley and tend to get mutilated beyond recognition," Spindler explains.

The latest news from an expedition sent this week to reexamine the site where the body was found clearly shows that the location of his body was anything but accidental. Investigation of the 6 x 25-meter chamber shows that the man had carefully put down his various weapons and rucksack within the chamber before lying down. New finds include a braided mat of grass, a bag, and a coarsely woven net of grass fibers, which may have been used as a carry bag. But more important is evidence that the man had been successful in his hunt and had food with him. He had a pile of berries and at the same position as his rucksack (and presumably inside it before decay set in) were residues of chamois skin, as well as animal bones and the skin of a smaller animal.

The man was plainly well equipped for traveling in the high mountains. He wore a fur jacket, trousers, and boots, stitched together with fine bands of leather, and stuffed with an insulating layer of hay. He was armed with a knife, ax, and a long bow, and carried at least 14 arrows in a leather quiver. X-ray examination reveals that some of the arrows had bone heads; others had only wooden points and may have been used for hunting birds, Spindler says.

But why exactly did he die? He was found lying with his face down, resting on one arm, a posture that forensic scientists say is common in victims of death by exhaustion or exposure. But it now appears that he had found shelter and he had warm clothing and food still left to eat. Was he sick? The autopsy that scientists are anxious to perform could conceivably provide an answer. Other clues too may turn up in a further excavation of the chamber planned to take place as soon as the spring thaw is over next year. Unbelievable though it may sound, we may yet learn the secret of the last lonely hours of a Bronze Age man who died 4000 years ago.

■ **FELIX EIJGENRAAM and ALUN ANDERSON**

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JAMA Gets Into an Indian Herbal Jam

Three authors who wrote about traditional Indian healing have conflicts of interest, the journal finds

WHAT CAN A PRESTIGIOUS MEDICAL JOURNAL do if the authors of a peer-reviewed article fail to disclose a financial conflict of interest that could seriously undermine the credibility of their publication? Precious little, perhaps, since a journal can't be a detective agency, and all journals have limited resources. But when the conflict of interest is disclosed, the journal can weigh in with a lengthy rebuttal, pointing out the conflict and taking issue

tem of India, rather than a trademark for a brand of products and services marketed since 1985 by the Maharishi Mahesh Yogi's complex network of research, educational, and commercial interests."

What's more, Skolnick reports, the authors, pathologist Hari Sharma of Ohio State University, endocrinologist Deepak Chopra, former chief of staff at New England Memorial Hospital in Stoneham, Massachusetts, and Brihaspati Dev Triguna, an Ayurvedic practitioner who runs a large pharmacy in New Delhi, had

Maharishi Ayur-Veda: Modern Insights Into Ancient Medicine

Maharishi Ayur-Veda: Guru's Marketing Scheme Promises the World Eternal 'Perfect Health'

IF THE CLAIMS of Maharishi Mahesh Yogi are true, those who follow him will be blessed with eternal youth, mental health, and the strength of an elephant. They will be able to walk through walls, make themselves "invisible," and fly through the air with the speed of lightning.

It is particularly notable that the Maharishi is the author of a book on the ecology of disease and emotional factors, a lot of these statements.

with the original article. And that's what the *Journal of the American Medical Association (JAMA)* did last week, in an attempt to resolve an ugly episode that has implications for all scientific journals and for scientists who could possibly be construed as having a conflict of interest.

The paper that caused the fuss was a "Letter from New Delhi," by three Indian scientists, published in *JAMA* on 22 May. The article purported to be a scientific evaluation of a traditional form of Indian medicine called Ayurveda. The article appeared to combine the theory of Ayurveda with an explanation of methods of diagnosis, and included citations on the clinical use of meditation and in vivo and in vitro studies on herbal medicine. That apparently sounded reasonable not merely to the *JAMA* editors who accepted it for publication but to the journal's peer reviewers—whose number and comments *JAMA* editor George Lundberg refused to disclose. Whether those reviewers were sufficiently savvy or not, the facts turned out to be, according to *JAMA* associate editor Andrew Skolnick, that the paper was actually a thinly disguised advertisement for the international Transcendental Meditation (TM) movement and its products.

Which brings us to last week's six-page counterattack. In that piece Skolnick writes: "The authors misrepresented Maharishi Ayur-Veda to *JAMA* as Ayurvedic medicine, the ancient traditional health care sys-

Nowhere men.
Maharishi in the Beatle days; recent JAMA headlines.



Bettmann

extensive past and present links, including financial ones, to the Maharishi's movement (best known for attracting the brief adherence of the Beatles in the late 1960s). Chopra, for example, was president, treasurer, and clerk of Maharishi Ayur-Veda Products International (MAPI), the company that distributes the movement's herbal products, until 1988. Sharma served as a consultant to several Maharishi-linked organizations, including MAPI. But none of those connections was disclosed on the pre-publication form *JAMA* requires all its authors to sign.

Chopra, reached in Los Angeles, where he is promoting his new book, "Unconditional Life" (Bantam, 1991), denies any conflict of interest. "I now donate my services," to the TM movement, he said. In fact, he said, the financial tie runs the other way—rather than receiving money from the Maharishi's movement, he gives money to it. "I generate a lot of money...and if I want

to donate some of it, that's my business," he told *Science*. He also said he thought there were people at *JAMA* who were "racist, bigoted, ignorant, ethnocentric, and prejudiced." Sharma's response was, "I'm not trying to hide anything. We said in our cover letter that I was a consultant to [the Maharishi Ayur-Veda Products International] and now I'm not." Triguna could not be reached for comment.

These defenses notwithstanding, several experts on meditation and on traditional Indian medicine to whom *Science* showed the original *JAMA* publication concluded that the "Letter from New Delhi" was shoddy science to begin with. "Anyone who knows the literature would have written this up as absurd," says David Holmes, a psychologist at the University of Kansas, referring specifically to the article's claims about the metabolic effects of Maharishi-style meditation. In fact, one *Science*-chosen post-publication reviewer comes down hard not only on the Indians but on *JAMA*: "It's an embarrassment and a disappointment, and it raises serious questions about the editorial policies at *JAMA*," said Carl Thoreson, professor of education and psychology at Stanford.

Experts in herbal pharmacology agreed. "When I first saw the article, I was surprised it was published in *JAMA*," says Varro Tyler, distinguished professor of pharmacognosy (the study of drugs from natural sources) at Purdue University, who has served as a consultant to *JAMA* in the past. Tyler was particularly disturbed by presentation of animal data suggesting anticancer benefits from two Maharishi Ayur-Veda products with no identification of their composition. "Any time you cite a drug by trade name, [without identifying] its components, that raises a big red flag. A knowledgeable person would want to know what the ingredients are, so he can look them up."

Editor Lundberg believes his journal was partly let down by its peer reviewers. "I do believe that a different set of reviewers might have provided us with a very different outlook," he told *Science*. "We have 8000 reviewers, and used 2500 in the last year, so it's a question of finding the right ones at the right time. What our peer reviewers did not help us understand was the substantial difference between traditional Ayurvedic medicine and Maharishi Ayur-Veda, and the commercialism of the entire movement. We were distinctly fooled." Lundberg also points out that the 22 May letter was published as part of an international issue of *JAMA* and was designed to provide "different points of view, from other cultures." If the paper had been a conventional research article, it would not have been published, Lundberg says.

The value of Ayurveda as a traditional form

of Indian medicine is hardly the hottest biomedical research topic around, and on the face of it, the current controversy in *JAMA* may seem like a narrow sectarian dispute. But, in fact, it raises questions that are universal for scientific journals. One is, of course, how journals can protect themselves against authors with deeply hidden financial conflicts. And there may be no foolproof safeguards. The practices *JAMA* followed in this case were identical to those it uses for all its articles, Lundberg says. The journal has required financial disclosure since 1985; since 1989 it has required all authors to sign a standardized disclosure form—and on this form Chopra, Sharma, and Triguna failed to disclose their involvements with the TM movement (although, as Sharma notes, they were identified as consultants to the Maharishi company in the cover letter that originally accompanied their article).

If authors fail to disclose information, says Lundberg, "we don't know what else we can do besides telling them to sign the form and making sure they do it." He acknowledges that "sometimes we do get a signed disclosure that doesn't ring true and we'll do further investigation. We know the system works well," he adds, but concedes "it's not perfect." Indeed, it wasn't the journal's vigilance, but that of its readers, that saved the day. Within days of the 22 May article, the journal was inundated by letters, including "very sharp criticism from a number of substantial critics."

Pointing up the universality of these problems, *JAMA* isn't the only journal touched by the uproar. The *New England Journal of Medicine* (*NEJM*) also requires financial disclosure from authors, but that system failed to prevent publication of a favorable (unsolicited) book review of Chopra's book "Quantum Healing" (Bantam, 1990) by physician John W. Zamarra of Brea, California. Zamarra failed to disclose to the journal his "long-time connection with the TM movement" and his association with the Maharishi Ayur-Veda Medical Center in Pacific Palisades, according to the current *JAMA* report. Says *NEJM* editor Jerome Kassirer: "We can't be detectives about everything. So much depends on the veracity of the author. If we were to investigate every relationship, we would do nothing else."

Kassirer thinks the problem could get worse before it gets better. As pharmaceutical firms increase support for biomedicine, and more researchers become involved financially in the biotech industry, the need for scrutiny grows. "More attention is being paid to the potential for financial gain," says Kassirer. But, he adds that, in general, the facts are on the table. "For the most part, we know what the relationships are, because they tell us." But not always, as the current case suggests.

■ ROBERT BARNETT and
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Leroy Hood to Move North

Just 10 months after making an "agonizing" decision to turn down a joint appointment as director of the Human Genome Center at Lawrence Berkeley Laboratory and as a professor at the University of California at Berkeley, immunologist Leroy Hood has met an offer he apparently couldn't refuse. The University of Washington announced this week that it is creating a new Department of Molecular Biotechnology for Hood to chair. Hood, who has been at the California Institute of Technology for 31 years and currently heads a 65-person lab there, will take up his new job in the summer of 1992. A university spokesperson says no other faculty members have yet been recruited for the department.

The new department, which the university has created with a \$12-million gift from Microsoft Corp. founder and chairman William Gates III, will concentrate on the development of tools for molecular biology research. The idea is to capitalize on what Gates and the university see as the growing interdisciplinary convergence of biology, computer science, applied mathematics, and physics.

As *Science* went to press, Hood was traveling and unavailable for comment. According to a university press release, however, he has already devised a "5-pronged approach" to research in the new department that emphasizes the use of computer technology, especially image analysis and simulations, in the study of biological functions such as immune response. Another line of effort will concentrate on the production and effective use of biological databases. The department's curriculum will have a strong interdisciplinary focus that will include training in physics, engineering, computer science, mathematics, and chemistry.

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