The all-night rite is highly formalized. One man functions as priest, with the help of three assistants. During the rite they pray for the worshipers at fixed intervals, while the other men and women pray to themselves in low voices. Early in the rite everyone takes four pieces of peyote; later, anyone may take as many more as he or she thinks proper. Most of the time is occupied in having each man, in rotation, sing four religious songs that correspond to hymns sung in white churches.

Peyote is also considered as a catholicon, or cure-all. If a sick person is spiritually clean, the Holy Spirit in the peyote will help him get well.

We can state categorically that these two circumstances—spiritual and medical—are the only ones under which peyote is eaten by members of the Native American Church.

Finally, something should be said of the communion meal eaten toward the end of the all-night rite. It usually consists of water, corn, fruit, meat, and sometimes candy; these symbolize the major foods important to the Indians, and they pray to God to give them adequate amounts. According to the antipeyote propagandists, the fruit and candy are eaten to get over a "peyote hangover"!

It will be seen from this brief description that the Native American Church of the United States is a legitimate religious organization deserving of the same right to religious freedom as other churches; also, that peyote is used sacramentally in a manner corresponding to the bread and wine of white Christians.

WESTON LA BARRE
Duke University

DAVID P. MCALLESTER
Wesleyan University

J. S. SLOTKIN
University of Chicago

OMER C. STEWART
University of Colorado

SOL TAX
University of Chicago

Pseudoscience and the DDT Scandal

JOHN PFEIFFER (SCIENCE, **114**, 47 [1951]) should be entirely correct when he urges that scientists and science writers combat pseudoscience with terse, articulate communications to the public. But is he? Is the production of pseudoscientific articles traceable to writers without scientific experience in most instances? Let us examine Mr. Pfeiffer's proposal in the light of recent experiences. The DDT scandal, which has scarcely blown over, will serve as an example chosen from among many candidates.

A prize-winning science writer published the following statement in the Pittsburgh *Post-Gazette* during 1949: " . . . the mysterious ailment known as 'Virus X' disease, which has been breaking out in increasing numbers of American communities, affecting millions, is actually DDT poisoning." The article begins "DDT, the great bug-killer, may turn out to be one of the most devastating biological weapons ever loosed by a people upon themselves." In the next two short paragraphs one finds such fearful phrases as "boomerang," "wildly indiscriminate use," "grim menace to man himself," "frank alarm," "poisoning power," etc.

This is only a small sample of the fantastic language used by science writers and scientists alike, I am sorry to report. One scientist declared before a congressional committee, "I would not touch DDT with a ten-foot pole." Again, a science article in the New York *Post,* April 9, 1949, carried the nerve-quieting headline: DDT AND YOU! HOW IT MANACES THE NATION'S HEALTH. The first paragraph reads as follows: "Back in December, 1945, two research scientists, Dr. Horace S. Telford and James E. Guthrie of Ashland, Ohio, published a report in the highly respected periodical, *Science,* which indicated that DDT spraying of pastures or woodlands where dairy cattle graze, might poison users of their milk."

The above are merely a few samples of the superlative and absolute phrases used to describe the "menace of DDT" to mankind. Obviously, we are dealing here with a disaster inflicted on mankind by criminally careless and unduly optimistic scientists, or we are confronted with heedless defamation and malicious gossip that amounts to a first-rate scandal, created by scientists and science writers, who have received prizes from leading scientific associations for their efforts to popularize science.

The investigations by Telford and Guthrie, used to introduce one lengthy, vituperative article, were carried out in the Ohio laboratory which I direct. True, those scientists found that DDT or a toxic derivative may appear in milk of dosed animals, but they demonstrated that the dosages must be large and regularly used. From that work and from additional data that were collected promptly and published quickly (*Soap Sanit. Chemicals* [Dec. 1945]), Dr. Telford concluded that DDT was relatively nontoxic when used as an insecticide, and that it might be used safely for controlling flies on cattle. I concurred in that decision, and DDT was widely used without detriment to anyone's health, notwithstanding the headlines proclaiming that the menace threatened millions. Before congressional committees reputable scientists have patiently repeated the refrain—not one American has sickened or died as a result of the insecticidal usage of DDT. On the contrary, much sickness, economic loss, and annoyance which can be traced to insect activity have been averted by the use of DDT. Actually, therefore, the disaster, the threatening menace, were purely verbal. Both in theory and in actual use the insecticidal dosages of DDT were well below levels that are toxic to humans, and the DDT menace proves to be a bad dream.

By use of the "logical" techniques and literary styles of fanatics, scientists have caused the scientific method to be identified with the bombastic procedures

prevalent among other ideologies. If we employ absolute, nonscientific, emotion-packed phraseology, and startling but meaningless metaphors to present our findings to the public, naturally the nonscientist will harbor grave doubts regarding the alleged objectivity of scientists.

The fact is, Telford and Guthrie showed again that scientists can effectively evaluate the hazards inherent in the use of new products and can avoid most, if not all, of those hazards. Since no one was adversely affected by the widespread use of DDT as an insecticide, their conclusions seem valid. The contrary impression has been left in many a lay mind, because scientists have used the false and fantastic principles employed in so-called good writing of the present day.

In April 1949, I discussed the DDT scandal with a group of entomologists in Columbus, Ohio. I was urged to publish my findings and conclusions. I could state, for example, that Virus X and X disease were known before DDT was used. Therefore, the declaration that the insecticide was the sole cause of these conditions was based on a curious bit of retroactive and illogical reasoning. Although the article was much shorter than the scandalous bombast appearing in newspapers and magazines—although it was packed with facts instead of emotionalized fiction—publication was refused by several journals.

May I point out that this is a common experience of scientists producing honest, important, well-written, but nonsensational articles or statements. A brief quotation from a recent editorial (*Agr. Chemicals,* 6, 33) illustrates the statement:

> The viewpoint of the public, however, is somewhat jaded by newspaper stories which magnify the fears expressed by some witnesses that the country is being poisoned by use of these pesticides and that cancer, TB, polio, and heart disease are all products of these agricultural chemicals. Almost completely silent, however, are the newspapers, when sound (but unsensational) testimony is presented by witnesses of the caliber of Dr. Charles E. Palm, Dr. F. C. Bishopp, Dr. Frank Princi and Dr. George C. Decker, to name but a few of the many able and reliable scientists who have appeared.

Anyone who questions the ability of the above-named gentlemen to produce readable prose is referred to their several papers.

The articles that produced the DDT scandal and the *Saturday Evening Post's* editorial on the alleged suppression of Velikovsky's book do not differ in principle. Both took a minimum of reported facts, added a good dose of free fancy "to jazz it up," and described the result in bombastic terms. Both reject the honest relative phrase and employ the absolute sensational word. This is the essence of brief, modern "good writing," as opposed to an honest, scientific presentation. The effect upon the reader, whether the material is written by a scientist or by a *Post* editor, has frequently proved most unfortunate.

To generalize from such limited evidence may seem extremely hazardous, but space does not permit the marshalling of numerous other cases. To my way of thinking, the scientist or science writer who employs the sensational methods peculiar to so-called good writing in modern America will find ready acceptance of his productions by editors, but his literary activities will prove repugnant and embarrassing to his colleagues. The net result of his efforts will be a disservice to the advancement of science, for "good writing", or acceptable writing by modern standards, will rarely accommodate the important findings of science. I would like to explore further the reasons for this unfortunate situation, but this letter is already too long. I shall risk being classed as a defeatist by bringing it to a close.

Both this journal and the writer have in the past advocated a course of action similar or identical to that which John Pfeiffer advocated in SCIENCE. Unfortunately, experience clearly demonstrates that the recommended course of action leads to the same offense we deplore in lay writings, because it uses the same sensational techniques. Protestations that accuracy will avoid such pitfalls are useless, for the techniques employed in present-day "good writing" inevitably aggravate the tendency toward exaggeration among editors and scientists alike. Consequently, similar techniques lead to similar denouements, of which the DDT scandal and the *Post's* "Silly Season" are but two of many. The relative phrases of the laboratory, which are necessary to an honest, clear presentation of science, are not acceptable under modern standards, which demand the absolute or the sensational. The problem is more difficult than indicated by a simple shift from scientific terminology to popular phraseology. Its solution is desirable—even necessary and urgent—but not simple or easy.

PAUL D. HARWOOD

Dr. Hess & Clark Inc., Ashland, Ohio

Numbness, Body-Image, and the Japanese Illusion

A VARIATION of the Japanese illusion not described by Schilder (*1*), who made frequent mention of this trick in his monograph on body-image, shows how one can "feel a sensation" in someone else's finger.

To perform the Japanese illusion in the usual way, the arms are pronated and the wrists crossed so that the palms are facing each other; then the fingers are interlocked, and the clasped hands are brought toward the body and rotated until a view of the fingers is obtained. When a person thus entwined is asked by pointing to move a certain finger, he frequently errs by moving the finger of the opposite side. Apparently an optic agnosia of right and left fingers temporarily exists until rectified by movement.

The variation lies in performance of the trick jointly by two individuals, using the right hand of one and the left of the other. When a person who is doing the trick for the first time is asked to stroke, with a finger on his free hand, one of his partner's fingers in the clasped hands, he will often say in surprise: "It feels like my finger, but it's asleep!"