

Finding the phenylbutazone: battle over a Derby winner

**Expert witnesses clash in
urine test hearings that cost
Dancer's Image \$122,600**



Photos: UPI

Smith: no doubt in my mind



Umbreit: woefully inadequate

by Christopher Weathersbee

Dancer's Image was the first horse to cross the finish line of the Kentucky Derby May 4. But whether he is entitled to the \$122,600 purse is still up in the air and the subject of a continuing scientific squabble.

Shortly after the race a chemist employed by the State of Kentucky made a shocking report. He said that a sample of the horse's urine taken after the race contained phenylbutazone, an analgesic and anti-inflammatory drug used to treat gout, arthritis and bursitis.

Kentucky law forbids the presence of any amount of this drug, no matter how small, in a horse's system during a race. The theory is that a horse that has performed poorly in the past because of sore legs can be treated with phenylbutazone before a race and made to run well. Bettors judging past performance would be misled, while those in the know could clean up. In addition, running a horse with leg ailments can result in damage to the animal.

To check for phenylbutazone and other forbidden drugs the state routinely runs urinalyses on all horses that show in a race. The chemist, Kenneth W. Smith, has run over 20,000 such post-race analyses; the check of Dancer's Image was the first case in which he had detected phenylbutazone.

Owner Peter Fuller and his trainers

denied any knowledge of how the drug might have been given, though they said the horse had been under treatment for a sore ankle with a much less potent, legal drug called Azium. Nevertheless the trainers were barred from Kentucky racing for 30 days by the State Racing Commission, and Churchill Downs racetrack withheld the winner's purse.

Now, after a stormy hearing, the State Racing Commission rather ambiguously has ruled that while Dancer's Image is the winner of record, the finding of phenylbutazone disqualifies him from participating in the purse distribution. Fuller, saying he is not surprised that the commissioners did not "repudiate their own employe," indicates he will appeal the ruling to the courts.

The major part of the attack on the state's case by Fuller's attorneys is directed at Smith, and the expert witnesses brought in by Fuller are not at all kind to the state chemist.

Dr. Gerald R. Umbreit of Chadds Ford, Pa., calls the series of six tests used by Smith "woefully inadequate" and says that Smith's testing lab "clearly does not understand" the procedures it uses in such analyses. What ends up being challenged most, however, is the implication, drawn by Smith and his colleagues, that racing chem-

istry is a science unto itself and that when a scientist presents evidence in legal proceedings he can rely on what the defense calls "the honor system."

Expert witnesses brought in by the state in Smith's behalf argue that racing chemistry is indeed a special science, that detection of drugs that have been through a horse and are mixed with their metabolites in horse urine is qualitatively different than is detecting the drug after it has been experimentally added to urine.

Further, they maintain, a scientist's affidavit that he obtained such-and-such a result should be sufficient for the case. They point out that in some of the tests used by Smith, evidence of a positive result is transitory and photographs would be difficult to obtain.

Smith has used the six-test series he employed May 4 to detect phenylbutazone in a number of experimentally dosed animals. The first step is to extract drug and metabolites from the urine. This is done by acidifying the sample, then shaking it with chloroform. The chloroform dissolves out phenylbutazone, a known metabolite called oxyphenylbutazone, possibly other as-yet-unknown metabolites, and others of the many substances chloroform is capable of dissolving.

Next sodium hydroxide solution is



Winning on guts or phenylbutazone?

used to dissolve phenylbutazone and other substances out of the chloroform. This solution is used in tests.

The first test, called Vitali's color test, is performed on a spot plate with four drops of the extract. If there is a nitrogenous organic compound present the sample turns black.

While the Vitali's test is highly sensitive, it is unspecific, since there is a host of nitrogenous organic compounds.

Next comes spectrophotometric analysis to determine the extract's ultraviolet absorption. In the pure state phenylbutazone shows peak ultraviolet absorption at a wavelength of 265 millimicrons. Smith says that mixed with its metabolites and extracted from horse urine the peak comes between 259 and 261 millimicrons. Two versions of the spectrophotometer analysis, he says, were positive for the sample.

Then another color test is run, Mandelin's test. This also tests for the presence of nitrogenous material. If positive, an orange ring appears around the sample on the spot plate. In seconds this ring turns green, then brown.

In the final two tests, cupric chloride ethylenediamine and palladous chloride ethylenediamine are crystallized out in the presence of the sample. Smith says phenylbutazone alters the crystal structure of the two compounds in a characteristic way. He says these

GRADWOHL

School of Laboratory Technique



Be a medical lab technician! Big demand, good salaries. One-year course for H.S. grads. Enter monthly. Co-ed. Internationally known. M.D. supervised. G.I. approved. Placement service. Catalog:

Stanley Reitman, M.D.,
3528 Lucas Ave., St. Louis, Mo. 63103



SEE MIRACLE OF BIRTH

\$4.98 POST PAID WITH
SIX QUAIL EGGS

(\$3.25 Without Eggs.)
You get the new clear plastic dome CHICK-BATOR with 6 Bobwhite Quail Eggs (available year-round) and Egg Hatcher's Guide Book. Complete — nothing else to buy. Send check or Money Order today

G.Q.F. MFG. CO., DEPT. CL, BOX 152, SAVANNAH, GA.

BOOK ORDER SERVICE

For the convenient purchase of any U.S. book in print you may avail yourself of Science News Book Order Service, 1719 N St., N.W., Washington, D.C. 20036. We pay postage. 25¢ handling charge if price is less than \$2.00. Regular retail prices on all books.

TELLS HOW TO SELL YOUR INVENTION

If you have an invention that you believe has merit, write us at once for copy of copyrighted booklet "How to Go About Selling Your Invention." We work with manufacturers, and booklet reveals present markets, qualities of a saleable invention, current royalty rates being paid by manufacturers. Booklet is FREE, is offered to encourage new ideas we might submit to manufacturers. Just send name (no drawings please) to Kessler Sales Corp., Dept. D-411, Fremont, Ohio 43420

Paper-cover edition \$1.75

Cloth-bound edition \$2.95

THE 1969 WORLD ALMANAC CAN UPDATE YOUR ENTIRE REFERENCE SHELF

Gives you all the latest data on hundreds of subjects . . . government, politics, economics, history, law, sports, nations, world leaders, celebrities, and many more. Puts a million facts at your fingertips in one easy-to-use, concise volume. Whatever the subject, the 1969 World Almanac is the last word!

For over a century, the authority!

THE 1969 WORLD ALMANAC IS
NOW ON SALE!

SLIDE RULE USERS

Does Your Slide Rule Provide Enough Accuracy?

Or do you have to check important calculations? This remarkable cylindrical slide rule gives the accuracy you need! Scales are 66" long for reliable results to four or even five figures. Has C, D and five place Log scales.

Patented spiral construction packs 3 66" scales into easy-to-read pocket size calculator. Only 6" closed, 10" open. Very easy to use. Full instructions provided. Simple to learn.

Lifetime chrome steel construction. Can't warp or break. No fragile glass cursor. Ideal for lab or field use.

Gives fast, precise answers to your computations. Stops errors.

Why Not Solve Your Calculating Problems Today?

AMAZING OTIS KING SLIDE RULE
Only \$18.95 ppd.
Typical user comments:

- "For what I'm doing (Biochemistry) the Otis King beats the . . . (electric calculator), as well as all the other slide rules I've used."
Pasadena, California
- "Invaluable after just a week's use."
Lincoln, Nebraska
- "Very pleased with its method of operation. It indeed performs as advertised."
Belmont, Massachusetts

Satisfaction Unconditionally Guaranteed
Calculator Co. • Box 593 • Lakewood, Calif.

CALCULATOR COMPANY—Dept. 3
Box 593, Lakewood, Calif. 90714

Please send me Otis King slide rule(s) at \$18.95 each on a satisfaction guaranteed basis.

Name

Address

City/State

(In California, add 5% sales tax.)

CLASSIFIED

Classified advertisements are accepted for the following classifications: Books, Business Opportunities, Camps, Colleges, Micro Ads, Personals, Positions Wanted, Schools, Services, Travel. All advertisements must be consonant with the character of Science News.

Rates . . . single insertion 30c a word. Minimum charge is \$6.00. For multiple insertions, write for rate card. Classified advertising is payable in advance. Closing date 4 weeks prior to publication (Saturday).

Employment opportunities are accepted at regular display rates, subject to agency commission. Minimum size 1 inch. Minimum charge \$23.80 per inch. Rate cards available upon request.

To speed up insertion, address classified advertising . . . Classified Ads, Science News, 1719 N Street, N.W., Washington, D. C. 20036.

BOOKS

MUSHROOMS AND FUNGI. Comprehensive lists. LEW's, 2510 Van Ness Avenue, San Francisco, Calif. 94109.

PUBLISH your book! Join our successful authors: publicity, advertising, promotion, beautiful books. All subjects invited. Send for free manuscript report and detailed booklet. Carlton Press, (Dept. XNM), 84 Fifth Avenue, New York 10011.

THE SILENT WEAPONS: The Realities of Chemical and Biological Warfare. By Robin Clarke. The editor of Britain's Science Journal has assembled the first complete record of the biological and chemical weapons developed in secret by the military, and their potential effects. \$4.95 from David McKay Company, Inc., 750 Third Avenue, New York 10017.

CAMPS

HIGH/SCOPE—Co-ed, 11-16. Arts, science program providing freedom to grow in understanding and generosity, in friendships and responsibilities. David Weikart, Ph.D., 1305 Sherman, Ypsilanti, Mich. 48197.

SCIENCE EXPLORING FOR BOYS ages 11-15 at SPRUCE MOUNTAIN CAMP, Bryant Pond, Maine. Field and mountain trips, ham radio, photography, plants, animals, astronomy, weather, geology, ecology. Exciting concept of science recreation. Staff inquiries invited. Catalog: William T. Harty, 12 Highland St., West Medway, Mass. 02053.

MICRO ADS

GOVERNMENT SURPLUS 80-page electronic-optical catalog showing hundreds of bargains galore. Pennies on the dollar. Meshna, Nahant, Mass. 01908.

LIVE SEAHORSES, marine specimens, aquarium supplies. Illustrated catalog 15c. Marine Box 248-206 Dania, Florida 33004.

CUSTOM MADE FISHEYE lens attachment for most 35mm cameras. Send \$15 and exact inside dimension of your lens cover. Write Box 33, Holbrook, N.Y., 11741.

MAGNETS. ALL TYPES. Specials—20 disc magnets, or 2 stick magnets, or 10 small bar magnets, or 8 assorted magnets, \$1.00. Maryland Magnet Company, 5412-K Gist, Baltimore, Maryland 21215.

PERSONALS

CAN'T SLEEP? NOISY? Get comfortable Mack's Pillow Soft Earplugs, \$1.00. Black sateen Shut Eye Sleep Shade, \$2.98. Guaranteed! McKeon Products Company, Dept. N, 23220 Ithaca St., Oak Park, Michigan 48237.

SERVICES

OVER 2,000,000 BACK DATE magazines! Low prices. Fast service. Send needs. No catalog. Midtown Magazines, Box 917-SR, Maywood, N. J. 07607.

. . . Derby battle

rosette-like crystals formed from the Dancer's Image sample.

His science, however, is under heavy attack by the defense.

Dr. Umbreit says photographs of the crystals Smith submitted with his evidence "don't even bear a faint resemblance" to the crystals formed with phenylbutazone. Smith maintains that if the photographs don't show characteristic crystals, then the photographs are at fault, because he saw these crystals when he made the test.

Of the color tests used, another expert witness, Dr. C. Henry Jarboe of the University of Louisville, says they are "19th century methods" that are so non-specific as to be useful only for screening purposes.

"Using these methods (the series of six tests)," Dr. Jarboe says, "no man could say that a drug specified by name is present. It is incredible to me that scientists should not apply easily and economically available techniques to be sure in such analyses, especially when there is a great deal at stake."

The most important step to add to the procedure, Dr. Jarboe says, is preparative thin layer chromatography (TLC). He says this procedure allows the extract to be separated into each of its constituents, with great accuracy.

Another necessary step, Dr. Jarboe says, is infrared spectroscopy. Phenylbutazone also absorbs light in the infrared spectrum. A peak there combined with a peak in the ultraviolet would provide a spectroscopic cross reference that could pinpoint phenylbutazone.

Dr. Jarboe agrees with scientists working with phenylbutazone at the National Institutes of Health in Bethesda, Md. They say that heptane, another organic solvent, is a better extractive agent than chloroform because it dissolves from the urine fewer substances that interfere with the test.

Two expert witnesses in Smith's behalf were Dr. Francis Ozog of Denver, Colo., and Dr. George Jaggard of Philadelphia. Both are members of the International Association of Racing Chemists, as is Smith. Both say Smith's techniques are adequate to the task of finding phenylbutazone and that if the state chemist says he saw characteristic crystals, he should be believed.

Dr. Jaggard, however, says his laboratory does use preparative TLC and infrared spectroscopy in such analyses.

Despite the challenges, Smith is sticking by his guns. He says there is "no doubt in my mind" that phenylbutazone was present, and adds that as far as procedural error goes he performed the various tests two, three or four times. "If I had to hang a man on this evidence, he'd be hanging now, he says. ◇

Share the Thrills of Exploring Outer Space



All DYNASCOPES, including this superb RV-6, 6-inch available on easy terms!

Now it's easy to join the thousands of serious amateurs who have discovered the excitement of exploring our mysterious universe. Your enjoyment begins right from the start, yet the challenges and rewards go on for years! And it's a hobby that can be shared at modest cost.

Choose from a Full Range Of DYNASCOPES® 4" Starting at \$49.95

Picking a telescope to fit your needs and your pocketbook is simple when you select a DYNASCOPE — the same instruments used by more than 150 schools, colleges and observatories. Prices begin as low as \$49.95, and your satisfaction is guaranteed by a full-refund warranty.

FASCINATING GUIDE YOURS FREE!

Read these valuable facts before buying any telescope. Mail coupon or postcard for your complimentary copy of this helpful guide.



Criterion Manufacturing Co., 331 Church St., Hartford, Conn. 06101
© TM Registered U.S. Pat. Office

CRITERION MANUFACTURING CO., Dept. NL-32
331 Church St., Hartford, Conn. 06101

Please send your free Telescope Guide.

Name _____
Address _____
City _____ State _____

How Fast Can You Read?

A noted publisher in Chicago reports there is a simple technique of rapid reading which should enable you to increase your reading speed and yet retain much more. Most people do not realize how much they could increase their pleasure, success and income by reading faster and more accurately.

According to this publisher, most people, regardless of their present reading skill, can use this simple technique to improve their reading ability to a remarkable degree. Whether reading stories, books, technical matter, it becomes possible to read sentences at a glance and entire pages in seconds with this method.

To acquaint the readers of this publication with the easy-to-follow rules for developing rapid reading skill, the company has printed full details of its interesting self-training method in a new booklet, "How to Read Faster and Retain More" mailed free to anyone who requests it. No obligation. Send your name, address, and zip code to: Reading, 835 Diversey Parkway, Dept. 540-011, Chicago, Ill. 60614. A postcard will do. (ADV)