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though the white specks had frequently been observed by others, it was assumed that they were flakes of bone.

Yet it was not until 1859 that the first clinical case of trichinosis was recognized. As *Trichinella* historian William C. Campbell of the Merck Institute for Therapeutic Research in Rahway, New Jersey, tells the story, it was Christmastime in Germany and a young servant girl who was preparing meats for the holiday meals became ill. She was tired, dizzy, had a fever, and—tellingly—suffered from excruciating muscle pain. Early in the new year, she was brought to the hospital in Dresden where the pathologist, Friedrich Albert von Zenker, diagnosed her as having typhoid.

The servant girl did not do well. She lay curled up in such pain that she could barely move. Fifteen days after she entered the hospital, she died. Zenker, who wanted to examine her muscle as part of his postmortem confirmation of her typhoid infection, removed a sliver of muscle from her arm, crushed it, and examined it under a microscope. What he saw amazed him. There were dozens of tiny worms wriggling in the muscle. He went on to examine other muscle tissue from the young woman and, in every case, he saw the worms.

Once trichinosis was recognized as a disease, European investigators began recording dramatic outbreaks, one of which afflicted 8491 persons in Germany alone between the years 1860 and 1880. In response, Germany and most of the countries of western Europe began examining pork before it was sold with "trichinoscopes"—microscopic examination of pork diaphragm muscle.

In time, some countries also began using another method in which samples of pork muscle are digested with acidified pepsin, which releases the *Trichinella* from them. This method is less tedious than the trichinoscope method, but it has the disadvantages of being slow and of using pooled muscle samples so it can be difficult to trace which pig in the group had the trichinosis.

The United States did not at first examine its pork for *Trichinella* and the Europeans argued that they could not accept uninspected U.S. pork. In 1891, the United States began inspecting pork to be exported but not pork to be sold domestically. But the Europeans enacted other protective measures to keep American pork from flooding their markets and, in 1906, the United States ceased its inspection program. One reason was that the process was expensive. In Germany, the inspection system at the turn of the century involved 100,000 inspectors and cost more than the entire budget for the USDA. In this country, inspections added 64¢ to the cost of each pound of pork in 1894. Another reason for stopping the trichinoscopy was that it was not entirely effective.

Nonetheless, trichinosis inspections in Europe, and particularly in Germany, were effective in stemming the disease. According to Campbell, the incidence of trichinosis in swine in the United States in 1970 was higher than the incidence in Germany in 1870.

For the National Pork Producers Council, timing of the use of ELISA could not have been better. Three years ago, the council resolved to make U.S. pork trichinosis-free by 1987. Not only would other countries buy our fresh pork, says Meisinger of the council, but American consumers may at last learn to cook it properly. "When we tell people to cook pork to 170° internal temperature, that has a huge safety factor and still leaves the pork juicy and flavorful," Meisinger says.

The USDA is now in the process of screening 12,000 serum samples from the slaughterhouses to get an idea of how prevalent trichinosis is in this country. And there is no reason why the same test system—with different antigens—could not be used to test for other infectious diseases of animals, says Jack Leighty of the USDA in Beltsville, Maryland. One reason there are no laws requiring that meat be inspected for infectious diseases is that there were no good test systems, according to Leighty. Now, with ELISA that situation could change.

—GINA KOLATA

Zeta Particle in Question

Last July, high-energy physicists were surprised and excited by the news that a completely unexpected elementary particle, tentatively dubbed the zeta, had been uncovered by a group of American and European researchers working at the German Electron Synchrotron (DESY) laboratory in Hamburg (*Science*, 31 August 1984, p. 912). Now it seems the once brash zeta has turned shy.

Although it will take some months to know for sure what happened, the evidence for the zeta was considerably weakened by the particle's failure to show up in a second experimental run. A third run anytime soon is said to be problematical. One disappointed theorist's assessment of the prospects for the zeta's existence: "People don't have high expectations."

The putative zeta turned up in an experiment by the international Crystal Ball collaboration, whose U.S. spokesman is Elliott Bloom of the Stanford Linear Accelerator Center. The Crystal Ball detector looked at gamma rays given off by decaying upsilon particles, which in turn are produced when beams of electrons and positrons collide head on. According to the experimenters, about 5 times in 1000 the decaying upsilons gave off gamma rays having an energy indicating that the decay product was a new particle, the zeta.

Theorists were immediately captivated. The mass of the zeta and the rate at which is was produced were not consistent with the so-called Standard Model of elementary paticles (a melding of two quantum field theories of the forces between particles), which made the zeta just strange enough to be interesting but not too bizarre. And the experimental evidence, a signal 5 standard deviations above the background, was convincing.

Last fall, there was a second experimental run of about twice the total number of electron-positron collisions (integrated luminosity in the jargon) as the first. In the half of the data that has been examined, the Crystal Ball detected no zeta's. There was even a slight dip in the number of gamma rays at the expected energy. A second collaboration experimenting at a Cornell University accelerator, although not working under conditions optimized for zeta searching, has also failed to confirm its existence. With the analysis only partially completed, the Cornell group now estimates that decays to zeta-like states occur less than about 1.5 times in 1000, if at all.

Despite the widespread skepticism, there is a way to save the zeta: its signal could be real but smaller than the first Crystal Ball results suggested and Cornell can presently measure. Until the original data are explained, the zeta is down but not yet out.—ARTHUR L. ROBINSON