distance races, when it will be longer. Unlike the human athlete, running over even shortish distances at a likely racing pace does not seem to be part of the technique of horse-training. The way in which a race is actually run—the initial pace, the running for position—depends upon the jockey and not upon the horse's judgment of pace. Training is an art, declared Mr. Jarvis, and a training routine must be suited to the mental and physical constitution of each particular animal.

Finally, Mr. J. Lynas (Blackpool Football Club) and Mr. J. Egan (Leigh Football Club), two well-known trainers and coaches of professional footballers, Association and Rugby League respectively, gave accounts of their methods of training. They made it clear that a general fitness for endurance and ability to run quickly on occasion makes only a foundation on which the particular skills of the game can be imposed. Mr. Egan analysed the duties of the different players in a team, showing, for example, how the physical and physiological requirements of a wing three-quarter in Rugby football differ from those of a forward and pointing out that, although an all-out run of fifty yards is usually a maximum, very few players are likely to undertake it; frequently, very rapid acceleration over a few yards is more important than first-class sprinting ability. Initial training at the beginning of the season concentrates on distance running to promote endurance, and more specific practice in sprinting, kicking and ball-handling is taken according to individual requirements. While Mr. Lynas seemed less inclined to regard an Association football team as a collection of specialists, his training requirements seemed to be on similar lines, with emphasis on the practice of the skills required for the game. Both trainers regarded speed in running as unimportant in itself. Many great players have been relatively slow runners, but their knowledge of the game and anticipation has often given them actually several yards start of their opponents.

One point which emerged clearly from the papers and from the discussion was that the term 'fitness' should be applied only towards a specific end. A certain degree of muscular development and ability, through the circulation, to transport oxygen is necessary for any sustained muscular activity—this might be termed a 'general fitness'. But beyond this there must be a 'specific fitness' involving the development of particular muscles and the acquirement and use of particular skills, such as pace judgment and economy of effort for the athlete, game technique for the football player and control of the horse by the jockey.

OBITUARIES

Dr. Winifred Brenchley, O.B.E.

DR. WINIFRED BRENCHLEY, the well-known agricultural botanist of the Rothamsted Experimental Station, died at her home at Harpenden, on October 27, after a long and crippling illness which, however, was mercifully without great pain for her. She was born on August 10, 1883; her father was a popular and successful schoolmaster at Camberwell, serving at one time as mayor of the Borough. In early childhood, while recovering from measles, a well-intentioned friend took her out for a drive: she caught a chill which so gravely injured her ears

that she suffered all her life from deafness. But she never allowed this to interfere with her work or her social activities or with her never-failing helpfulness to her younger colleagues.

From James Allen's School, Dulwich, she went first to the Swanley Horticultural College, and then to University College, London, to study under F. W. Oliver, with whom there grew up a life-long friendship. In 1906 she went to Rothamsted, the first of the staff that A. D. Hall was then assembling, and the first woman scientist to be appointed, either there or at any other agricultural institution in the country.

She soon started investigations on plants by the water culture method which she, and afterwards her colleague Katherine Warington, developed into an instrument of remarkable effectiveness. From the outset she included metallic salts known to be toxic at high concentrations, and watched for the stimulus they were supposed to exert at low concentrations: spectrographic methods had not yet arrived, and she narrowly missed discovering the essential role of the trace elements. The earlier results are summarized in "Inorganic Plant Poisons and Stimulants", published in 1914 by the Cambridge University Press; a later revised and enlarged edition came out in 1927. The work continued, however, during all her time at Rothamsted: the last element dealt with was molybdenum.

Through Oliver's influence, Dr. Brenchley began a second group of investigations: ecological studies of the complex floras of farmed land. The effects of fertilizers in altering the competition-equilibrium between the various species in a meadow were described first in "The Manuring of Grassland for Hay" (Longmans) in 1924: but she was still continuing the work when she retired. Her studies of weeds in arable crops and grassland were brought together in "The Weeds of Farmland" (Longmans, 1920), extended later to include studies of the viability of weed seeds in the soil: she was able to show that some had remarkable powers of survival for many years. She also studied the effects on the growing plant of individual factors that make up the natural environment, especially temperature, light and nutrients. These botanical studies did not exhaust her scientific interests; she and Dr. A. D. Imms, then the Rothamsted entomologist, became great friends, and with his help she acquired considerable knowledge of insects.

Dr. Brenchley summarized the first thirty years of her work in the Rothamsted Annual Report for 1935, and the next ten years in the issue for 1939-45. She retired in September 1948, intending to write up her accumulated observations. These had been made with great care and deserved closer study than her busy working life had allowed; but her illness intervened, and it steadily grew worse to the deep regret of a wide circle of friends at Rothamsted and far beyond.

E. JOHN RUSSELL

Dr. Wendell C. Bennett

WENDELL C. BENNETT, a distinguished student of Peruvian archaeology, died on September 6 in his forty-eighth year. His end, while swimming off the shore of Martha's Vineyard in Massachusetts, was a tragic one.

At the time of his death, Bennett occupied a number of important posts at Yale University, where

he was a professor of anthropology, a fellow of Pierson College, a research associate of the Peabody Museum and chairman of the Department of Anthropology. These were a few of the academic evidences of a highly successful career, which had been remarkably steady in its progress and exceptionally fruitful both in scholarship and in personal influence.

Almost from the first, Bennett had devoted himself to the pre-history of South America. With the exception of two early apprentice essays, one on the culture of the Tarahumara of northern Mexico and the other on the archaeology of the Hawaiian Islands, his research was directed almost exclusively to South American archaeology. His first undertakings in this area were begun while on the staff of the American Museum of Natural History, where he remained for seven years. These were rewarding years, during which he laid the groundwork of his own subsequent researches which very largely were responsible in establishing Peruvian archaeology on the sound footing it now occupies.

It was during this period that he made the first stratigraphic excavations in Bolivia, working at the famous site of Tiahuanaco. For this fundamental work he was decorated afterwards by the Bolivian Government. While still at the American Museum of Natural History he carried out significant excavations in the north coastal area of Peru and in Venezuela. The former led to a re-definition of the chronological sequences of Peruvian archaeology and the latter provided the first systematic archaeological data for Venezuela.

On leaving the American Museum of Natural History in 1938, he moved to the University of Wisconsin, attracted there by the opportunity to teach. In 1940 he was invited to Yale, where he remained until his death. During his association with Yale, Bennett was able, despite his teaching and administrative duties, to continue his archaeological research. One of his outstanding achievements in this period of his career was the part he played in organizing the Virú Valley project. Out of this large co-operative venture came his fine study of the Gallinazo culture. The last archaeological enterprise on which Bennett was engaged is not yet published, but it is in the press and is concerned with the problem of the development of coastal Tiahuanaco culture.

The confidence of his fellow anthropologists that Bennett enjoyed and his reputation for sound counsel were reflected in the numerous posts to which he was elected and appointed in professional societies and organizations. He was president of the American Anthropological Association in 1952, and executive secretary of the Joint Committee on Latin American Studies from 1942 to 1944. He was chairman of Yale's Area Studies Executive Committee, and he was active in the Social Science Research Council.

Wendell Bennett was born in the Middle West—in Marion, Indiana—on August 17, 1905, the son of William Rainey Bennett, a minister and lecturer. His schooling was in Chicago and his university career at the University of Chicago, where he was an excellent scholar as well as an exceptional athlete. In 1925 he married Hope Ranslow and from this marriage two daughters, Lucy and Martha, were born. As a person Bennett possessed great charm and warmth. He had a fine gift for friendship to which all varieties of people responded. It was, in fact, this lovable quality which contributed so greatly

to his success in organizing. As an archaeologist he was rigorous and critical, demanding the highest standards of professional competence from himself and from his colleagues. His contributions have been fundamental in advancing our knowledge of South American prehistory.

He will be mourned by a wide circle of friends and colleagues for the feeling of personal loss that the departure of a generous spirit always leaves, and for the sense of loss that the interruption of a full career always implies.

HARRY L. SHAPIRO

Prof. N. D. Zelinskii

NICHOLAS DIMITRIVICH ZELINSKII was born on February 6, 1861, in Tiraspol in the Province of Kherson. He received his school training locally and in Odessa, and afterwards went to the University of Novorossisk. Later he studied in Leipzig and in Göttingen, working there in the laboratory of Victor Meyer. In 1888 he obtained his master's degree and was appointed lecturer at his old University of Novorossisk. There he presented first his master's thesis dealing with thiophene chemistry in 1889, and two years later a thesis for his doctorate on the stereoisomers of saturated carbon compounds.

Zelinskii was appointed adjunct professor in Moscow in 1893 and, except for six years spent at St. Petersburg, remained there until his death on July 31 of this year. The six years interruption occurred during 1911–17, when in company with a hundred other professors and teachers he resigned as a protest against the dismissal of the entire administration staff of the University of Moscow by the Ministry of Education.

Although Zelinskii's contributions to chemical knowledge ranged over a vast field, including heterocyclic derivatives, protein hydrolysis and the synthesis of α -amino-acids, his chief contributions were to hydrocarbon chemistry. In 1891 he prepared the first synthetic naphthene, 1,3-dimethylcyclohexane, and showed its close relationship with the octanaphthene of Caucasian petroleum. This, and later work on the synthesis of saturated cyclic hydrocarbons, ranging from simple to complex polycyclic systems, brought with it an interest in petroleum and the terpenes. As early as the 'nineties he took an active part in the operation of a plant to prepare aromatic hydrocarbons by pyrolysis of petroleum, and thus was among the earliest pioneers of petrochemicals. Later, he showed that aromatics could be more conveniently produced from petroleum by catalytic dehydrogenation of naphthenes than by pyrolysis. This resulted from his discovery in 1911 that cyclohexane derivatives can be converted to aromatic hydrocarbons by passage over a suitable catalyst, an observation which led to the establishment of a school of contact catalysis under his leadership. His contributions in this field were immense; he was the first to use platinum metals as hydrogenation/dehydrogenation catalysts and to differentiate between C_5 - and C_6 -naphthenes by their behaviour on dehydrogenation—a valuable tool in his investigation of the composition of petroleum. Isomerization, desulphurization, cyclization and many other processes of technical interest owe much to his pioneer efforts. His interests included also the origin of petroleum, where no doubt his early association, in 1889, with an expedition to the Black Sea, which proved the bacterial origin of the hydrogen