a course in science or agriculture at a university or college of agriculture, and should have had special training in the science and practice of dairying. Forms of application and copies of the regulations governing the appointment may be had from the Secretary of the Ministry, 10 Whitehall Place, S.W.1. Application forms must be returned by March 26.

WE have received intimation of the opening at Lake Trasimeno of a laboratory for the study of the biology of the lake, including researches on the fresh-water fishes. The lake, which is about thirty miles in circumference, offers many opportunities for limnological work. It is to be hoped that this new station will receive the support which will justify its continuance. The premises have been provided by the University of Perugia, and Dr. Osvaldo Polimanti, professor of physiology in the University, has been appointed director, and intending workers should communicate with him.

MR. G. M. B. DOBSON will deliver a lecture to the Royal Meteorological Society on March 21 on "The Characteristics of the Atmosphere up to 200 km., as obtained from Observations of Meteors." Meteorological observations in the free atmosphere by means of *ballons-sondes* have not been carried to heights much greater than 30 kilometres, but Prof Lindemann and Mr. Dobson have recently put forward a method of determining the temperature at much greater elevations by means of observations of meteors (see NATURE, December 9, 1922, p. 794). Those interested are invited to attend the meeting which will be held in the Society's rooms at 49 Cromwell Road, South Kensington, London, S.W.7.

AT the annual general meeting of the Institute of Metals held on Wednesday, March 7, the following officers for the year 1923–24 were elected:—*President*: Mr. Leonard Sumner. *Past-Presidents*: Sir Gerard A. Muntz, Bart., Engineer Vice-Admiral Sir Henry J. Oram, Sir George Beilby, Prof. H. C. H. Carpenter, and Engineer Vice-Admiral Sir George Goodwin. *Vice-Presidents*: Sir John Dewrance, Mr. W. Murray Morrison, Sir Thomas Rose, Dr. W. Rosenhain, Sir William E. Smith, and Prof. T. Turner. *Honorary Treasurer*: Mr. A. E. Seaton. *Members of Council*: Mr. W. H. Allen, Mr. L. Archbutt, Mr. G. A. Boeddicker, Mr. T. Bolton, Dr. H. W. Brownsdon, Engineer Vice-Admiral R. B. Dixon, Prof. C. A. Edwards, Mr. S. Evered, Dr. R. S. Hutton, Mr. F. C. A. H. Lantsberry, Sir Charles A. Parsons, Mr. H. A. Ruck-Keene, Dr. R. Seligman, Mr. James Steven, Mr. F. Tomlinson, and Mr. H. B. Weeks.

Our Astronomical Column.

GREAT FIREBALL IN NORTHERN INDIA ON DECEMBER 28, 1922.—Mr. W. F. Denning writes that "letters have been received reporting a splendid fireball which appeared over the Punjab at about the time of sunset on December 28. It was observed by a great number of people, and accounts published in the *Civil and Military Gazette* (Lahore) include descriptions from Simla, Peshawar, Balloki, Moghalpura, Sargodha, Jhelum, Rawalpindi, Bakloh, Dharamsala, Lahore, Sharaqpur, Murpur, and other stations.

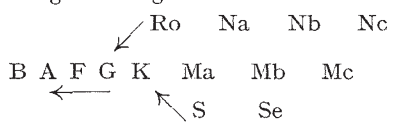
Many of the accounts are of little service, but Col. W. E. Pye and Lieut. Stephenson at Shagai, Khyber Pass, North-West Frontier, give an excellent description of the phenomenon. The observed path at the latter place was from 6°-43° to 20°-48°, and the fireball exhibited moderately slow motion. It left a long white streak which endured about fifteen minutes. A large number of the observers allude to the streak as perfectly straight at first, but it soon assumed a zig-zag shape, and drifted away from the place of its early projection. At one station the streak, which appeared to be vertical when formed, became horizontal in twelve minutes, the lower end having moved the required distance. At Sargodha, six minutes after the great illumination due to the meteor, loud rumbling sounds were heard, caused by the disruption of the object. These would indicate a distance of 75 miles.

From a comparison of the observations the fireball seems to have been an early Quadrantid with a radiant at 234° +55°. The height was about 54 to 29 miles, and velocity about 25 miles per second. The luminous course was directed from N.N.W. to S.S.E. It crossed the river Chenab, and ended about 100 miles N.E. of Mooltan.

These results are only approximate. The object was one of great splendour, and it is hoped that further observations will be forthcoming.

STELLAR SPECTRA OF CLASS S.—In the current number of the *Astrophysical Journal* (December 1922) Mr. Paul W. Merrill directs attention to a number of red stars having spectra similar to that of R Geminorum, which differ from any of the well-known types of spectra which form the Harvard classification. In this classification the red stars are known as M and N types and each of these is subdivided, but no stars are known which have a spectra intermediate between them; M stars have characteristic titanium flutings and N stars carbon flutings. This peculiarity has led to the adoption of a break in the main series of stellar evolution types of spectra.

Thus an M star of increasing temperature becomes consecutively in the evolutionary series a K, G, F, etc., type star, while an N star, also a giant, becomes an Ro, G, F, etc., type star in its progressive stages. Mr. Merrill shows in this paper that the stars he has discussed should properly form a third division of the giant series joining on to the main sequence of evolutionary stages between the types Ma and K. This progression may be likened to three sets of railway lines joining up at two positions near each other and continuing as a single line. Thus:



It is interesting to note that the Harvard classification is based to a great extent on the replacement of metallic lines by ionised lines, and eventually by gaseous lines, the higher the temperature; but Mr. Merrill points out that while some M stars show ionised lines, so also do the S stars; this presents, as he says, "an anomalous circumstance which invites investigation."