reducing the magnification a sharp image is obtained, which is more of the diffraction pattern of the comparator objective than an image of the actual line itself. The result in a great measure will then depend on the conditions of illumination of the line comparator.

It seems certain that minor systematic errors, in the optical portion, chiefly connected with the conditions of illumination of the étalons, still remain uncorrected. Their effects are, however, negligible compared with the real uncertainties of line standard measurements. Even at the present time, there would be a considerable gain in accuracy if a wave-length were accepted as the fundamental standard, but before a change is decided upon, it seems very desirable that the whole position should be reconsidered in the light of recent knowledge. The discovery of the hollow cathode discharge by Paschen and its further development by Schüler have given us a light source that is much more monochromatic than the Geissler tube of Michelson or the argon-filled cadmium lamp as used by Sears and Barrell. The further possibility now exists of finding a more suitable line from a heavier, non-isotopic element of zero nuclear spin, since we are no longer limited to the more volatile elements.

Tilton[21] has recently carried out a statistical analysis of the data on the refractive index of carbon dioxide – free air, from which he deduces a correlation between the refractivity $(\mu - 1)$ and the twenty-three year magnetic cycle of sunspots. Some of the data are admittedly uncertain, but there seems to be evidence of a real variation that makes it essential to adopt a vacuum wave-length as the ultimate standard, if and when a change is made.

For the moment, we cannot do better than accept the mean value given in the above table as the wave-length of the red cadmium line in

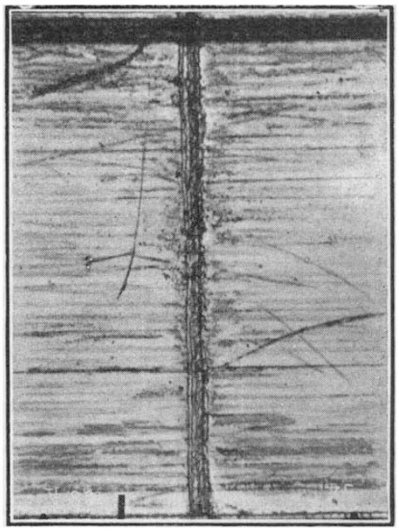

FIG. 1. One of the fiduciary lines of the International sub-standard. No. 26. (×300.)

'normal' air, and to adopt Sears and Barrell's value, 1·000,276,49, as its refractive index. The vacuum wave-length then becomes 6440·2493 A. and the Imperial yard, defined as a length at 62° F., contains 1,419,818·31 vacuum wave-lengths.

[19] Meggers and Peters, *Bull. Bur. Stand.*, **14**, 697; 1918.
[20] Pérard, *Proc.-verb. Com. int. Poids Mes.*, p. 27; 1927.
[21] Tilton, *Bur. Stand. J. Res.*, **13**, 111; 1934.

Obituary

PROF. BOHUSLAV BRAUNER

PROF. BOHUSLAV BRAUNER, one of the best-known representatives of Czech chemistry of the last half century, died in Prague on February 15, after a short illness. He was born on May 8, 1855, in Prague, the son of Dr. Francis Brauner, who was a noted Prague lawyer and Czech political leader. His mother Augusta, a very talented and spirited lady, was the daughter of Prof. K. A. Neumann, the first professor of chemistry at the Polytechnic Institute of Prague, and the grand-niece of the well-known German pharmacist, Prof. Caspar Neumann (1683–1737), one of the founders of pharmaceutical chemistry.

Thus Brauner seems to have inherited his liking and ability for chemistry from his mother's side. Great attention was paid in the Brauner family to languages, amongst which besides the Czech mother-tongue, Russian, English, German and French were equally cultivated. There the foundation was laid of Brauner's astonishing practical linguistic knowledge. He showed a refined taste for fine arts like the other members of his family; his sister Zdenka Braunerová being a well-known Czech painter.

In 1873, Brauner went to the University and to the Technical School in Prague, where one of his teachers was the physicist Ernst Mach, at that time professor in the University of Prague. Before attaining the doctor's degree, young Brauner went abroad for training in research; contrary to the fashion at that time, when "every chemist had to embark on organic chemistry", he preferred inorganic training under Bunsen in Heidelberg in 1878. Two years later, Brauner went to Manchester, attracted by the work of Sir Henry Roscoe on rare elements.

The school of chemistry in Owens College, Manchester, had a profound influence upon Brauner, who learned there to love the original Anglo-Saxon spirit of experimental investigation in natural philosophy. During his years in Manchester, Brauner was eagerly investigating the rare earths, and he succeeded in preparing a double fluoride of tetravalent cerium and potassium which on gentle heating gave off free fluorine, thus for the first time obtained

by purely chemical means. Fourteen years later, he found a similar reaction with lead tetrafluoride.

Fascinated with Mendeléeff's system, Brauner entered into scientific correspondence with the genial Russian chemist in 1881 and was greatly impressed by meeting him in St. Petersburg. There a cordial friendship between the two enthusiastic Slavonic chemists began, to last for twenty-five years, until the death of Mendeléeff.

A problem which occupied Brauner's mind for a long time was the position of the rare earth elements in the Periodic System. As a strong adherent of the tabular form of the system, he expected that these elements would somehow fit in so as to show their chemical analogies. By determining carefully their atomic weights, he was already able to predict the gap between neodymium and samarium. In his investigations at Manchester, Brauner succeeded in showing the complexity of didymium, denoting by Diα and Diβ what Auer von Welsbach three years later called praseodymium and neodymium. This brilliant work was submitted by Brauner to the Charles University of Prague for his 'habilitation' thesis. He was appointed assistant professor there in 1890 and full professor in 1897.

During his whole academic career, Prof. Brauner worked intensively at the chemistry of the rare earths and on the determination of atomic weights. As a specialist in the first branch, he was asked by Mendeléeff to write the account on rare earths in his famous textbook "Principles of Chemistry", whilst in the other branch he immortalised himself in Abegg's well-known "Handbuch der anorganischen Chemie", to which he contributed his masterly critical discussion on atomic weights. As an authority on these determinations, he fought, together with Venable, for the new base O = 16·000, right down to its general adoption at the Paris Congress in 1900.

Prof. Brauner retired in 1925, after forty-three years of teaching, during which time he lectured to generations of chemists and pharmacists. The highest scientific distinctions came to him not only from his own people, but still more so from abroad. Those he treasured most were the honorary memberships of the Chemical Society of London, the American Chemical Society and the Société Chimique de France, and the honorary D.Sc. of the University of Manchester. His seventieth birthday was celebrated by a jubilee number of the *Recueil des Travaux Chimiques des Pays-Bas* in 1925, and his seventy-fifth birthday by the jubilee number of the *Collection of Czechoslovak Chemical Communications* in 1930.

The personality of Prof. Brauner was one of imposing and original individuality. His Herculean figure, quick penetrating eyes, high and broad forehead, and strong features harmonised well with his commanding voice, dry remarks and sarcastic wit. Yet his sanguine enthusiasm often also brought tears into his eyes, revealing his gentleness of heart and love for mankind and the whole of Nature. One of his great hobbies was astronomy, the progress of which he followed as eagerly as that of chemistry. No wonder that with such naturalistic bent he soon became a passionate and ardent reader of NATURE, of which he had read carefully every number, starting from his Manchester days in 1882. Often he contributed to it thoughtful and conscientious reports. His recreation was sport, which he introduced and promoted enthusiastically in Bohemia, having become attached to it during his studies in England. His Spartan mode of life most probably preserved his health in spite of the noxious atmosphere of the chemical laboratory and his somewhat delicate lungs. Yet pneumonia, which attacked him several times in his stronger days, succeeded at last in overcoming him in his eightieth year, to the sincere regret of his two sons and daughter and his many devoted friends and pupils. J. H.

SIR LESLIE MACKENZIE

WE regret to record the death of Sir William Leslie Mackenzie, which occurred in Edinburgh on February 28.

Sir Leslie Mackenzie was a native of Ross-shire and graduated M.A., with double honours, at the University of Aberdeen in 1882. He studied medicine in Aberdeen and Edinburgh and, at the latter University, took the degree of M.B., C.M., with honours, in 1888, and M.D., with highest honours, in 1895. He held the D.P.H. and was a fellow of the Royal College of Physicians of Edinburgh. In addition to achieving a brilliant career in medicine, Sir Leslie was a recognised authority on psychology and mental philosophy. He had gained the Fullerton and Ferguson scholarships in mental philosophy, and was at one time examiner in mental philosophy as well as in medical jurisprudence and public health at the University of Aberdeen. His later work was recognised in the award of the Medal of Honour of the University of Brussels in 1920. In Aberdeen also he was a resident medical officer in the Royal Infirmary and afterwards was assistant professor of physiology and Arnott lecturer in physiology at Gordons Colleges. In his earlier work he had thus a wide knowledge and interest, as well as considerable and diverse experience.

For Sir Leslie's later work, which was more of a public nature and had its outcome in the development of the various modern branches of public health service during his term of office on the Local Government Board and Scottish Board of Health, he had his first insight while, for a time, assistant to that eminent and widely-known hygienist, Prof. Matthew Hay, medical officer of health for the City of Aberdeen. From this assistantship he became the first medical officer of health for the combined counties of Wigtown and Kirkcudbright, under the Local Government (Scotland) Act, 1889, where he had to organise the public health work of a very large area. He and Prof. Hay were selected to give evidence before the Royal Commission (for Scotland) on physical training. He had carried out for the Commission and reported on the examination of six hundred school children, and the Commission's report resulted in the establishment of the School Medical Service.

In 1894, Sir Leslie was appointed medical officer