

traits lies in the practicality of incorporating them into the parental lines used in potato breeding programmes. Gibson recognized this, and noted that *S. tarijense* may be crossed with the cultivated potato. Your correspondent, however, gives the impression that the problems in utilizing these species are completely unknown. This is far from the case.

S. berthaultii and *S. tarijense* are diploid species and both can be crossed easily with the cultivated potato, the tetraploid *S. tuberosum*. The progeny from such crosses are sterile triploids which would still carry many undesirable traits from the wild species. However, both these species can also be crossed with haploids (dihaploids) of *S. tuberosum*, and with haploid derivatives, to give progeny which are diploid and, when the wild species is used as the seed parent, are also generally fertile. Undesirable traits may be eliminated by further crossing and selection. *S. polyadenium*, on the other

hand, can at best only be crossed with *S. tuberosum* with very great difficulty.

It is clear that of the species studied by Gibson two, *S. berthaultii* and *S. tarijense*, can be used in a breeding programme fairly readily. Working at the diploid level, as I have suggested, has numerous advantages, and there are several methods of combining diploid parental lines and tetraploid cultivars at the final stage before variety selection.

Yours faithfully,

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Unambiguous Billion

STR.—For a long time we have had to live with the annoying fact that Americans and Europeans cannot use the word billion without a risk of confusion. Perhaps it would be possible to persuade people on both sides of the Atlantic to

add just two extra letters to indicate how big the billion is meant to be. To be specific, I suggest that 1 ambillion = 10^9 and 1 eubillion = 10^{12} . Thus ambillion becomes the name of the American billion—a cause of ambiguity.

Yours faithfully,

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Retino-rectal Connexions

STR.—Dr Robertson (*Nature*, 233, 435; 1971) refers to an annoying visual condition which he calls tunnel vision. Surely he means hindsight?

Yours faithfully,

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Obituary

Professor Arne Tiselius

PROFESSOR ARNE TISELIUS, who won the Nobel Prize for chemistry in 1948, died in Stockholm on October 29, aged sixty-nine.

Born in Stockholm in 1902, Tiselius moved early to Gothenburg and thence, after matriculation, to take up academic studies in Uppsala, the city which he was rarely to leave. Tiselius's interest in chemistry was first awakened at school, and his ability was noticed by The Svedberg, who quickly made him his valued and trusted research assistant. The master soon gave his protégé the freedom to plan and carry out his research. Tiselius chose to investigate electrophoresis and studied in particular the so-called boundary anomalies which occur in connexion with the electrophoretic migration of proteins. In his doctoral dissertation in 1930, Tiselius presented significant discoveries on the heterogeneity of serum proteins. After an important year of research at Princeton, he continued his development of moving boundary electrophoresis and designed the apparatus which made his name internationally known, the chief improvement being the elimination of convection. Tiselius showed by means of this apparatus that the electrophoresis of serum gave five distinctly migrating boundaries. These are albumin, and α , β and γ globulin as Tiselius designated them, and also a boundary dependent on the protein concentration. This work brought the world's leading immunochemists to Uppsala and the international

contacts in many fields of physical chemistry and biochemistry were intensified. In 1938 Tiselius became the first to hold a newly created research chair in biochemistry at Uppsala.

Tiselius took an active part in the development of electrophoresis and especially preparative zone electrophoresis, but he extended his interest to chromatography which he realized was to provide biochemists with the necessary methods for further investigating the chemistry of proteins. He introduced a standard nomenclature for chromatography and contributed especially to the development of general principles for analytical and preparative chromatography.

For example, displacement chromatography and gradient chromatography originate from Tiselius's pioneer work. Gas chromatography can also be traced from the Uppsala school. These methods have extended far beyond the field of protein chemistry. Tiselius's last work as an active researcher was to investigate suitable conditions for the chromatography of proteins. His contribution was the introduction of calcium phosphate as an adsorbent, which method is still being used. When ion-exchangers and molecular-sieving gels were introduced he retired from experimental work but followed developments with never ending interest and gave generously of his knowledge to others.

After receiving the Nobel Prize in 1948 Arne Tiselius increasingly began to devote himself to research policy. He was President of the International Union of Chemistry IUPAC from 1951–1955.

Swedish science is greatly indebted to Arne Tiselius. He was, for example, one of the initiators for the founding of the Swedish Natural Science Research Council.

He became the presiding chairman of the Royal Academy of Science in 1956 and was very active in the Nobel Foundation, and held, among other posts, the chair between 1960–64. He took a keen interest in the Foundation's symposium committee and took the initiative for several of the international symposia. He was also a member of the Wallenberg Foundation.

Tiselius's contributions to the international coordination of research in chemistry have been of utmost importance and the appreciation resulted in eleven honorary degrees. He belonged to a great number of academies and learned bodies and was on the editorial committees of a number of scientific journals. His capacity for work was almost unbelievable and he was always in great demand.

Tiselius was deeply and personally involved in the problems arising from the effects of scientific research on society and man, and he expressed his anxieties for the negative effects in the Pugwash movement.

Arne Tiselius was not only a brilliant scientist, but also an unusual personality. He possessed a rare ability for listening to others' opinions, drawing conclusions, seeing the essentials, summarizing and then presenting the judgment and advice of a good friend and wise leader. He will be sorely missed.