

he continued in business until about 1910, with such success that he was able to retire.

From 1887 until about 1900, when a Mr. Orme joined him as partner, I was on intimate terms with him in the conduct of his business. When Dewar in 1892 asked Muller to make for him the first double-walled vacuum vessels, they were all made of clear glass, which is sufficient proof, I think, that they were the earliest made. It was then suggested that the internal surface should be silvered, to reduce radiation influx; as Muller had no experience in this, I instructed him in the technique, and actually silvered the first two or three vessels myself.

The fact that Lord Rayleigh was unaware that Muller was in London at this time suggests to me that it must have been a considerable time after 1892 when Lennox demonstrated to him how double-wall vacuum vessels were made. By this time Lennox may have learned the technique of making them from Muller, as these vessels are very difficult to make, and no ordinary glassblower, at that time, would be capable of doing so.

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Economy in Education

THERE is one way in which a great many of our public schools might well economize, and that is in the building and equipment of science laboratories such as are in use at the present time. My teaching experience is confined to public schools only; but I give it as my opinion that the money spent on costly apparatus and equipment is in many cases sheer waste and out of all proportion with the science which can and should be taught in schools.

I do not stand alone in this matter, for Mr. O. H. Latter, probably the pioneer of the teaching of biology in schools, writes in the preface of "Readable School Biology" (Bell, 1926): "I hold that with classes taking Biology as a part of their *general education*, personal practical work by the pupils themselves is sheer waste of time and money".

Much of the responsibility for this waste lies at the door of the science teachers themselves, but I think that still more lies at the door of the Board of Education.

A. G. LOWNDES.

Plymouth.
May 12.

Points from Foregoing Letters

P. J. G. Mann and J. H. Quastel show that the addition of vitamin B₁ to isolated polyneuritic pigeon brain increases the rate of synthesis of acetylcholine when the brain is incubated aerobically in a bicarbonate-pyruvate medium containing a relatively high concentration of potassium ions. No such increase occurs when the vitamin is added to normal pigeon brain examined under similar conditions.

By successive digestion with pepsin and trypsin, an enzyme-resistant phosphopeptide of constant composition has been isolated by M. Damodaran and B. V. Ramachandran from casein in the form of its barium salt. In contrast to a similar phosphopeptide obtained by Rimington, which was claimed to contain hydroxyglutamic acid, hydroxyaminobutyric acid and serine, the substance isolated consists of glutamic acid, isoleucine and serine.

Normal adult and embryonic tissues explanted *in vitro* begin to proliferate after a certain latent period which varies with the age of the organism. L. Doljanski and R. S. Hoffman have investigated the latent period of neoplastic tissue (rat sarcoma and Rous chicken sarcoma) and found that tumour explants commence proliferating *in vitro* after a latent period which is very much shorter than that of normal adult tissue. In about half the experiments tumour tissue started to grow practically without any latent period.

H. Loewenthal and F. L. Hopwood find that fully capsulated young cultures of hemolytic streptococci, when exposed to ultrasonic vibrations, provide a better antigen than overnight cultures. They point out, however, that since the disintegration of streptococci by ultrasonic vibrations liberates serologically active material from cocci possessing no demonstrable capsule as well as from the fully capsulated cocci, the observations cannot be taken as conclusive proof

that the type-specific antigen of streptococci is situated only in the capsule.

Three skulls of very young individuals of the Indian antelope (*Antelope cervicapra*) showed the presence of rudimentary upper canine teeth, which in one case had not reached the surface of the maxilla. J. Ritchie suggests that this evidence supports Forsyth Major's belief that rudimentary canine teeth may be present in all foetal and most very young antelopes, notwithstanding the evidence recently adduced by Lönnberg.

R. S. Krishnan and T. E. Banks have separated chemically the recoil fragments produced from uranium fission under deuteron bombardment and have shown that some of the activities agree with those produced by neutron fission of uranium. They have also obtained evidence of deuteron-induced fission in thorium. Excitation function measurements and chemical separation of the recoil fragments have been carried out for this case also.

The effect of temperature in the ultra-violet transparency of various glasses has been examined in detail by W. J. Arrol for two wave-lengths close to the limits of transparency in this region. A strictly linear relation holds between absorption coefficient and temperature over the range 10°-50° C.

Measurements of phase boundary potential during the melting of certain solids by C. Ockrent and W. H. Banks show that the transformation is accompanied by abrupt changes in potential.

D. P. Mellor and W. H. Lockwood have measured the magnetic susceptibility of a nickel compound in which the normal planar distribution of the bonds about the nickel atom is prevented by steric interference. They claim that the distortion changes the character of the bonds from being essentially covalent to bonds essentially ionic in character.