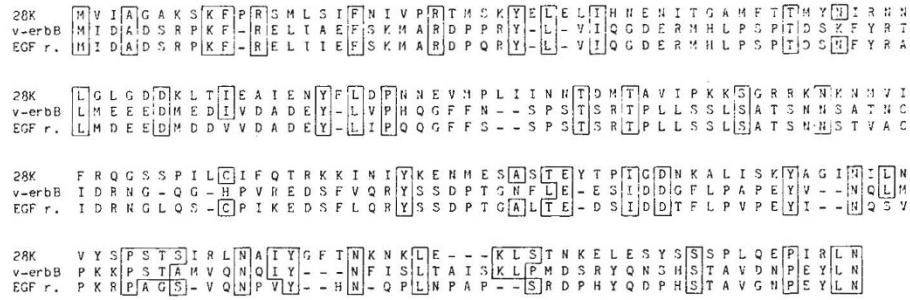

Fig. 2. Alignment of vaccinia 28K protein (28–229), v-*erb-B* protein (372–562), and EGF receptor precursor (952–1,140). Identities between the 28K protein and either of the other two are boxed.

permutations). A score of 7.2 s.d. was obtained if portions of the 28K protein (28-229) and the v-*erb-B* (372–562) were compared. Comparison with a portion (952–1,140) of the cytoplasmic domain of the precursor EGF receptor produced a score of 5.6 s.d. Because of the exhaustive nature of the FASTP search, values in this range indicate a very interesting similarity that is likely but not certain to have biological significance[4].

Such similarity can result from common ancestry or from convergent evolution of proteins with similar structures or functions. For example, it may be advantageous for the virus to mimic certain host proteins. It remains to be seen if more vaccinia proteins have sequences similar to host proteins. Perhaps the relationship between vaccinia virus and its host cell will become clearer when the entire genome of this virus is completely sequenced and more host sequences are available.

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Did Burton synthesize diamonds in 1905?

SIR—In a letter to *Nature* of 24 August 1905[1], C. V. Burton, a prominent physicist, claimed to have synthesized diamond at ambient pressure by an unusual method. It may seem odd that the first response to this communication should appear some 80 years later, but the strange fact is that, for some inexplicable reason, this disclosure was lost to the literature.

Although a brief abstract appeared in *Science Abstracts*, it was not abstracted by any of the three chemical abstracting journals available at that time nor has any chemical treatise concerning carbon referred to it. Despite the voluminous literature relating to synthetic diamonds, not one author has referred to Burton's work. By chance, one of us (F. S.), found a reference to Burton's letter in a book on gem stones by W. Goodchild[2], published in 1908 when the memory of Burton's disclosure was still fresh in the author's mind. Burton gave only a skeleton outline of his procedure and promised a further communication. However, a meticulous search has not disclosed such a communication.

Although Burton claimed to make diamond in the region of temperature and pressure in which graphite was the stable form of carbon, there is no reason why he should not have been successful in obtaining diamond in a metastable state. His method was to dissolve carbon in a lead-calcium alloy in which carbon is more soluble than in lead alone, then supersaturate the lead by oxidizing the calcium with steam at a "dull red heat" thus removing it from the alloy. The carbon precipitated in the form of diamond. Ostwald's law of successive reactions, also now lost from physical chemistry textbooks, provides for a metastable phase to appear before the stable phase, and at 500°C, the conversion of diamond to graphite is exceedingly slow. The data Burton gave on the crystals he obtained, their octahedral form, the refractive index, and the resistance to chemical attack are consistent with his claim to have made microscopic diamonds.

We have attempted to repeat Burton's work. In the absence of any experimental details, it is difficult to be sure that we followed his procedure exactly, and we had some difficulty incorporating the carbon in the alloy but we successfully solved that. We decomposed the alloy with steam at 550°C, our estimate of a dull red heat. The grey crust was treated with acid and washed well to remove all lead and calcium salts. We obtained a black powder in which were embedded many transparent crystals which scintillated with considerable fire in reflected light. They were at most a few micrometres in size. Burton claimed that he made only diamonds and no graphite. We obtained considerable amounts of black powder which may or may not have been graphite which made it impossible to separate the tiny crystals for precise indentification. The crystals had a high refractive index and the powder scratched glass. X-ray powder diffraction showed a strong peak at 0.208 nm which is the strongest peak for diamond, but only weak for graphite. Strangely, the strongest peak for graphite was absent, though two other peaks at 0.161 nm and 0.148 nm were still present. The strongest peak was an unidentified one at 0.251 nm. On the basis of this information, we cannot claim unequivocally that diamond was produced, but combined with the other properties, there is a strong presumption that diamonds were made and, therefore, Burton had synthesized diamonds in 1905, half a century before General Electric had made them in the stable region of high temperature and pressure. He deserves recognition in the Hall of Fame which includes Moissan and Hannay.

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Misapprehension over Alzheimer's disease

SIR—Stanfield *et al.* make the *en passant* observation that degeneration of the neurones of the nucleus basalis of Meynert "are the likely cause of Alzheimer's disease"[1]. This is not so. However, it is a widely held misapprehension. Other nuclei besides the nucleus basalis are similarly afflicted with tangles and show similar cell loss in Alzheimer's disease[2-4]: lesions to the nucleus basalis area in animals produce few of the clinical and none of the pathological symptoms of Alzheimer's disease. The article commonly quoted[5] as support for the cholinergic hypothesis has the beautifully ambiguous title "Alzheimer's disease: a disorder of cortical cholinergic innervation". This title is correct in only one of its senses.

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