proof that rifampicin directly inhibits the translation of messenger RNA. Indeed, the result could be explained equally well by saying that the drug has inhibited the synthesis of the messenger RNAs for late proteins. But because, during the first 3 hours after infection, viral messenger RNA is made in the presence of rifampicin, it is tempting to think that early and late messenger synthesis are not equally susceptible to rifampicin. Is that out of the question? The experiments certainly do not rule out the idea that two sorts of polymerase with differing sensitivity to rifampicin are involved in vaccinia multiplication. Or could there be a single polymerase, the sensitivity to rifampicin and template specificity of which is altered by some factor? Subak-Sharpe's mutants may be in the gene which specifies such a factor or species of polymerase normally sensitive to rifampicin.

Until the experiments have been done, dismissing entirely the notion that the antibiotic and antiviral actions of rifampicin are related goes against the grain. On the other hand, the only real reason at present for suggesting that rifampicin blocks viral RNA polymerase is that it is known to function that way in bacteria. That might prove to be nothing more than a red herring; rifampicin's antiviral properties may be completely unrelated to its antibiotic properties.

The problem now is how to reconcile these results with those of Subak-Sharpe's group which, in particular, suggest that rifampicin inhibits RNA synthesis rather than protein synthesis. As things stand, the lack of experimental data leaves the mechanism of the antiviral action of rifampicin quite open. Becker's latest results, for example, can be reconciled with the idea that rifampicin inhibits viral RNA polymerase by making a few not wholly implausible assumptions. For example, vaccinia virus particles are known to contain molecules of RNA polymerase which go into a host cell with the rest of the virus on infection. It might be that these polymerase molecules, bound to the viral DNA, have actually initiated a round of RNA synthesis. Once inside the cell they could make some viral RNA even in the presence of rifampicin because they would have passed the rifampicin sensitive step, initiation, in their previous host while they were being wrapped up into the virus particles. Similarly Becker's failure to detect synthesis of viral protein late in the infectious cycle and Subak-Sharpe's rifampicin resistant mutants may also be the two sides of the same coin.

PALAEONTOLOGY

Forged Fossil with False Teeth

A FORGED fossil has been detected in the British Museum (Natural History). The forgery is no Piltdown skull with false jaw—merely a Cretaceous echinoid with false teeth. Nonetheless, the specimen has played a traitorous part in a century old battle and has deceived palaeontologists for more than 50 years.

The discoverer of the forgery, Porter M. Kier of the US National Museum in Washington, comments that "although echinoid workers generally have not become very aroused in their controversies, two subjects have caused considerable heat: the question whether *Bothriocidaris* was an echinoid (now resolved in the affirmative) and whether or not *Conulus* had teeth" (*Palaeontology*, **12**, 488; 1969). *Conulus* is a Cretaceous echinoid that is found abundantly in the chalk deposits of Europe. Structures considered to be teeth were first described in *Conulus* in 1850, but the tide of battle flowed the other way in 1884 when P. M. Duncan dogmatically declared that *Conulus* teeth were imaginary.

Supporters of the belief that *Conulus* carried an Aristotle's lantern (the enduring structure of which the teeth are a part) meekly retreated until their hour of victory in 1911 when H. L. Hawkins discovered in an old collection at the British Museum (Natural History) a specimen of *Conulus subrotundus* with four fine teeth.

There the matter lay until Dr Kier began a study of echinoid lanterns. Anxious to examine a *Conulus* lantern he dissected hundreds of fossils but found that in none had a lantern or teeth been preserved. Turning to Hawkins's original specimen, he found that the teeth were false. They are attached to the fossil by a chalky substance which appears, suitably enough, to resemble dental cement. The glistening surface of the teeth suggests they are Recent rather than Cretaceous. Kier concludes that *Conulus* never bore a lantern.

How did the British Museum *Conulus* come by its false teeth? The date of acquisition of the specimen is not recorded, other than that it comes from an "old collection" in the Museum's possession. Dr Kier believes the false teeth are the work of a hoaxer. On the other hand, nineteenth century collections of fossils quite often contain forgeries which were made not to deceive but simply to embellish. Fossils in those days were more often than now sold as curios. It may be that whoever discovered the *Conulus* thought it looked incomplete and added the teeth to improve the price of his find.

PROTEINS

Enzymes Synthesized

from a Correspondent

THE chief attractions of the fourth meeting of the Chemical Society Protein Group, held at Liverpool on September 22, were the first total synthesis of enzymatically active material, preliminary accounts of which appeared earlier this year.

R. B. Merrifield (Rockefeller University) reviewed the use of his solid phase method for the synthesis of bovine pancreatic ribonuclease A and discussed the reasons for the low activity of the final material. It was interesting that the crude product contained less total activity than the purified material, suggesting the presence of erroneous sequences with inhibitory activity in the crude synthetic enzyme. Merrifield also mentioned what is perhaps the first experiment using a synthetic protein for the study of structure–activity relationships in enzymes: when ribonuclease S′ lacking residues 21–25 was synthesized by the solid phase method, some enzyme activity was obtained. This seems to be a case where the entire primary sequence is not essential for some activity.