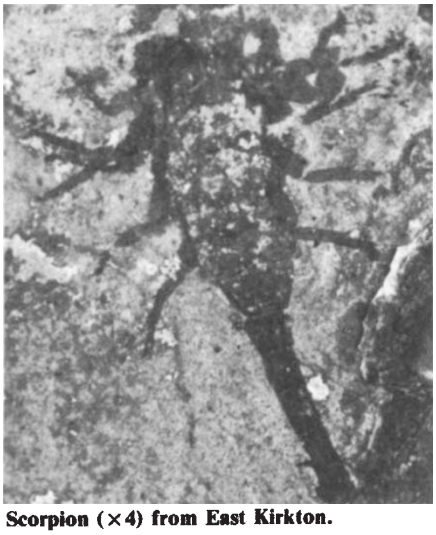
to that at East Kirkton. One is an algal limestone from Hamilton in Kansas, which appears to be a very similar matrix but without the spherulites, and is of late Pennsylvanian or early Permian age. It has produced a similar association of temnospondyls, arthropods and plants[7] but differs in the presence of at least one genus of fish being present in abundance[8]. A Lower Permian freshwater limestone of rather different character from Niederhässlich, near Dresden, also has a large fauna of small amphibians and reptiles without fish[9]. A comparative study of these sites might ultimately permit us to identify common geological factors and so to predict further such localities.

The predominant amphibian in the East Kirkton assemblage bears a close resemblance to *Dendrerpeton*, a temnospondyl amphibian from the early Westphalian of Nova Scotia and Ireland[10,11]. The Nova Scotia material was found in accumulations inside hollow lycopod stumps, suggesting preservation under terrestrial conditions[12], and it is generally believed that *Dendrerpeton* was a terrestrial animal. The East Kirkton amphibian is the earliest certain temnospondyl, showing the definitive large tympanic notch and the huge openings in the palate that characterize the amphibian order Temnospondyli and its descendants — the frogs.

The few months of collecting at East Kirkton have produced intact amphibians, millipedes, eurypterids, scorpions, the earliest harvestman and much plant material, some of it three-dimensionally preserved in chert. If collecting can be extended, the material should establish whether the Euramerican Lower Carboniferous continental fauna was significantly more primitive than its Upper Carboniferous equivalent. If they were similar, the problems of early terrestrial evolution and diversification are pushed back into the Devonian.

As one of the earliest sites to produce most of the components of a terrestrial ecosystem, East Kirkton deserves comprehensive investigation. But there are difficulties in attracting funds for such projects, which makes it increasingly necessary for palaeontologists to adopt a higher public profile. Following the successful dinosaur exhibition put on by York Museum with the cooperation of the British Museum (Natural History), the Hunterian Museum of the University of Glasgow is preparing an exhibition based on Stanley Wood's remarkable collections, to include some of the East Kirkton material and the spectacular Bearsden fishes. It will travel around museums in Scotland and visit the British Museum (Natural History) in London during 1986. □



Scorpion (×4) from East Kirkton.

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Cytoskeleton

Myosin filaments in cytoplasm

from Thomas D. Pollard

EVERY so often a quiet and contented field of research is awakened by a technical advance that at once changes the conventional wisdom and opens up new avenues for experiments. The paper by Yumura and Fukui in the 14 March issue of Nature[1] should have this impact on investigation of myosin filaments in non-muscle cells.

Myosin is best known as a filamentous protein of muscle, in which, together with actin, it plays a major role in the process of contraction by the sliding-filament mechanism. Much less is known of the function of myosin in non-muscle cells and its presence in filamentous form has been in doubt. Yumura and Fukui have shown for the first time, in either the light or electron microscope, both the extent of polymerization of myosin and the distribution of its filaments inside a non-muscle cell. Yumura and Fukui devised a simple method to visualize the filaments. The trick involves flattening live cells with an agar overlay[1] to create a more or less two-dimensional cell, in which fine details are not obscured by superimposition, and individual myosin filaments, stained with a fluorescent antibody, can be resolved in the light microscope[2]. Although only demonstrated for the cellular slime mould *Dictyostelium discoideum*, the technique should be widely applicable.

Previous work with fluorescent antibody staining of vertebrate cells in culture has established that myosin is associated with actin-containing stress fibres[3,4] and the cleavage furrow during cell division[4]. The staining was often reported to be punctate, but it has not been possible to resolve individual filaments. It has also been difficult convincingly to demonstrate myosin filaments in non-muscle cells by electron microscopy, even using antibodies[5-7]. The general view has been that myosin filaments are present, but too small to visualize by light microscopy and so few in number that they are lost to view in electron micrographs among the abundant actin filaments.

The new technique makes it possible to identify individual rod-shaped particles in cells that are stained with a fluorescent antibody to myosin. Although there is no direct proof that these particles are myosin filaments, it is very likely so, because they are the same size and shape as the filaments prepared from purified myosin.

Yumura and Fukui are able to make several important points on the basis of their observations. First, the bulk of the myosin is polymerized into filaments in the cell. Second, they confirm that myosin is concentrated in the cleavage furrow of dividing cells but add that the filaments are oriented parallel to the band of actin filaments that encircles the equator of the cell. This is the alignment expected if the myosin interacts with actin filaments in a sliding-filament mechanism to produce the force required for division. This observation strengthens arguments for such a model[4,9,10]. Third, they show that cyclic AMP, the chemoattractant for *Dictyostelium*, causes a striking transient redistribution of the myosin filaments in the cell. This change may very well be a primary step in the chemotactic response of the cell to cyclic AMP and we can look forward to learning whether it is caused by phosphorylation of the myosin[11] or some other mechanism. Finally, evidence is provided that the myosin filaments are destroyed by treatment with osmium. If this is true for myosin in other cells, it may well explain previous difficulties in demonstrating myosin filaments by electron microscopy □

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