The shale containing the genera mentioned is from an old coal-pit near Edmonstone, forming the roof of one of the coal-seams formerly wrought. It is exceedingly interesting, showing in a thickness of little more than a foot three distinct changes in its organic contents. In its lower portion it is nearly a pure coal, from the abundance of plants which it contains. These, however, gradually begin to disappear, until their place is entirely taken by fish remains, which, in their turn, become so plentiful as to form a layer of themselves, but all in a very fragmentary condition. The fish-bed appears to have come to a sudden termination, as it is abruptly overlaid by shells of the genus *Anthracosia*, apparently all of the same species, and in rather a bad state of preservation.

The only portions of *Strepsodus* and *Rhizodopsis* that I have yet detected are the scales and teeth of the former, and only the scales of the latter. As similar remains have been most minutely described by Professor Young in the "Quarterly Journal" of the Geological Society for 1866, any further remarks are unnecessary, although, when a comparison of the remains of both genera has been made from different quarters, more than one species of each may be found to have existed. This already appears to be the case with *Strepsodus*. Mr Barkas of Newcastle, in his "Guide to the Fish Remains of the Northumberland Coal-field," has, among others, figured and described jaws and teeth of *Strepsodus*. Alluding to a tooth of this genus figured by Professor Young in the paper which I have just cited, he remarks that "it is too delicate and tapering, and not sufficiently reflexed at its apex." The accuracy of Professor Young's figure is thoroughly borne out by the specimens from Edmonstone, and also by a slab from Fifeshire, containing a jaw and numerous teeth, presented lately to our Museum by Mr Lyon. It is scarcely possible, either, that Mr Barkas' illustrations are at fault. Had he drawn from a single example this might have been the case, but, as he observes, he has obtained several jaws and hundreds of teeth. It is, therefore, highly probable that the remains described by Mr Barkas belong to a distinct species, as his figures possess all the characters which he alleges to be absent in Professor Young's.

III. *On the Fossils found in the Rocks underlying the South Side of Edinburgh.* By JOHN HENDERSON, Curator of the Museum.

The rocks underlying the southern portion of Edinburgh have received very little attention from geologists. This is probably owing to the want of good open sections as well as to their unfossiliferous character. In a cutting opened for a drain along

the High Street a number of years ago, a series of sandstones and reddish and greyish shales was exposed, with an easterly dip, showing an ascending series from the Castle Rock to Arthur's Seat. Professor Geikie describes them as belonging to the lowest portion of the Lower Carboniferous group; and in his address to the British Association at Edinburgh in 1871, he gives it as his opinion, "that the lowest plant-bearing beds in this district occur in Arthur's Seat," and evidently considers all the beds between Arthur's Seat and the Castle Rock as unfossiliferous.

In a cutting lately opened for a drain in the Forrest Road, at the south end of George IV. Bridge, a series of black and brown shales was exposed, which upon examination I found to contain numerous plant markings, such as *striated stems* like *Calamites*, along with a smooth *frond* or leaf not unlike a seaweed. On these fronds were a number of small circular dots, which looked like spores, but upon examination they turned out to be that well-known and characteristic little fossil *Spirorbis carbonarius*. I found these to be very abundant in the black shale; and some hard flakes, 2 or 3 inches thick, were nearly made up of the shells of this little annelid. The dip of these beds is to the north-east, which is the general dip of all the beds in the south side of the town, as was clearly shown by a drain through Clerk Street and St Leonard's Street cutting right through the strike of the beds. At Hercules Street the beds consist of a series of brown shales and thin sandstones, dipping in the direction of Salisbury Crags, and at St Leonard's Street a great quantity of a greyish clay, closely resembling the fire-clay of the Coal Measures, was brought up. At Clerk Street, black shale was come upon, containing plant markings, the same as those found at the Forrest Road, which is nearly in the line of strike of the beds, the whole dipping in a north-east direction. It is reasonable to suppose that these beds, from their dip and strike, are one and the same; and that if prolonged farther to the north, they would crop out somewhere about the Castle Esplanade.

A few days ago, while the workmen were making a drain at the back of the new buildings now in the course of erection on the north side of the College, near the Cowgate, one or two beds of rock were cut into, which I found upon inspection to be of a very fossiliferous character. They consisted of hard gritty sandstone, containing numerous fragments of fossil plants. Some of the fragments resembled charred wood. The beds dipped to the north-east at an angle of about 12°, and if prolonged in their line of strike would cross the High Street near the High Church. This evidence, at least, ought to dispel the idea that the beds in this district are unfossiliferous. With regard to their position in the Lower Carboniferous series, Professor Geikie, in the "Memoir of the Geological Survey," sheet 32, is of

opinion that these beds lie 2500 feet below the beds lying immediately to the west of the Castle Rock, and from their lithological character connects them with the strata at Craigmillar Castle, which he considers the lowest beds in the Carboniferous system. He brings them into their present position by a supposed fault running along the east face of the Castle Rock, past Craiglockhart and Colinton, and along the flank of the Pentland Hills. I have always been inclined to doubt the existence of this great fault, from evidence in connection with the rocks that lie on each side of the line of it; and the finding of these fossiliferous beds to the east of the Castle Rock confirms me in my doubt.

Professor Geikie forms his opinions from the lithological character of the beds, assisted by two or three remarkable disturbances in the line of the supposed fault; as, for instance, the broken and disjointed sandstone on the east side of the Castle Rock where the igneous and sedimentary rocks meet, and also by the abrupt and bent sandstone cliff seen in the "course" of the Water of Leith at Colinton. Now the lithological character cannot be depended upon, since a large portion of the beds on the east side closely resemble those lying on the west side of the Castle Rock. The specimens of rock found near the Cowgate, opposite the north side of the College, resemble in every particular the rock composing a great band or beds of strata which I have traced from Colinton northward to West Coates and the Dean Bridge. It consists of two or three beds of reddish and greyish gritty sandstone highly charged with plant remains (mostly large stems). These beds have little resemblance to any other portion of the Carboniferous series that I am familiar with. They re-appear once or twice in the bed of the Water of Leith above Colinton. If these beds were carried over the Castle Rock from the Dean Bridge, as the dip of the rocks on each side of the Castle would imply, this fossiliferous bed would be found very near where these specimens were obtained. Another reason I have for believing there is no fault here, is that in several places along the line the beds of shale and sandstone run through it unbroken, as may be seen by reference to the map, at Craiglockhart and at Colinton, where Professor Geikie specially refers to it. The disturbance is brought about by a flexure in the strata caused by an intrusion of igneous rock, which seemed to have escaped the observation of the officers of the Geological Survey. I should not have taken up so much of your time with this subject, had this *fault* not been made by them to play such an important part in the geology of the neighbourhood of Edinburgh.