3. "On the Axis of a Dinosaur from the Wealden of Brook, in the Isle of Wight; probably referable to *Iguanodon*." By Prof. H. G. Seeley, F.L.S., F.G.S.

This perfect specimen, preserved in the Woodwardian Museum of the University of Cambridge, is $3\frac{1}{2}$ inches long and $3\frac{1}{4}$ inches high. The odontoid process is anchylosed to the axis, and projects forward as in the axis of birds, so as to articulate with the occipital condyle of the skull. The pre- and postzygapophyses are situated much as in birds; as are the two ovate pedicles, on the anterior part of the side of the vertebra to which the cervical rib was articulated. But posteriorly the articular surface for the third cervical vertebra is transversely ovate and slightly concave. The neural spine is compressed from side to side, more so in front than behind. Among mammals, the nearest resemblance to this kind of axis is seen similarly in the whale; and among reptiles the crocodile has a two-headed rib; but the other characters are more like those of *Hatteria*, which the author regarded as a near ally of the Crocodilia and Chelonia, and as wrongly united with the Lacertilia.

4. "On an Ornithosaurian from the Purbeck Limestone of Langton, near Swanage (*Doratorhynchus validus*)." By Prof. H. G. Seeley, F.L.S., F.G.S.

The author obtained these specimens (a lower jaw and a vertebra) in 1868, and described them in the "Index to the Secondary Reptilia, etc. in the Woodwardian Museum," in 1869, as *Pterodactylus macrurus*. He now believed that the Ornithosaurian vertebræ from the Cambridge Greensand, which have been regarded as caudal, are really cervical, and therefore that the analogy on which this vertebra was determined to be caudal cannot be sustained; he proposed to adopt for his species Prof. Owen's specific name *validus*, given in 1870 to a phalange of the wing finger from the same deposit. The vertebra is 5 inches long, relatively less expanded at the ends than similar vertebræ from the Cambridge Greensand, has strong zygapophysial processes, and a minute pneumatic foramen.

The lower jaw, as preserved, is $12\frac{1}{4}$ inches long. The symphysis extends for 5 inches, and is about $\frac{1}{8}$ of an inch deep, and divided into two parts by a deep median groove. The teeth extended for 8 inches along the jaw, and about 7 or 8 occurred in the space of an inch. They were directed outward in front, and became vertical behind. Where the rami are fractured behind, they measure $2\frac{1}{4}$ inches from side to side.

OBITUARY.

SIR WILLIAM EDMOND LOGAN.

LL.D., F.R.S., F.G S., V.P. Nat. Hist. Soc. Montreal.

Yet another leading man has passed away—one whose name has become familiar to geologists during fifty years of the most vigorous growth of our science, and one whose labours and researches have contributed in no small degree towards that development and progress of ideas by which geology at the present day is characterized.

William Edmond Logan (who was of Scottish parentage) was born in Montreal in 1798. His education, commenced in Canada, was continued at the High School and in the University of Edinburgh. He soon displayed a love for geological pursuits, and commenced in South Wales carefully to study the structure of the Coal-field of that region, and to map the outcrop of its numerous Coal-seams, depicting their faults and most minute details on the One-inch Sheet of the Ordnance Survey. This admirable work he generously handed over to Sir Henry de la Beche when he began the Survey of that district, and on the early Sheets of the Government Geological Maps for South Wales the name of W. E. Logan appears with those of De la Beche, Ramsay, Phillips, and Aveline.

During this time Logan worked on the staff of the Survey as a volunteer, and among other valuable services rendered he introduced the practice of drawing horizontal sections on a true scale of six inches to a mile, which afterwards served as models for the large sections of the Survey.

At this early part of his career Logan made a most important observation on the origin of coal, then but little understood. He pointed out that each coal-seam rests on an "underclay" or "fireclay," in which rootlets of *Stigmaria* branch freely in all directions. This association of coal and *Stigmaria*-clay he found to be so constant that he was led to the conclusion that the clay represented the ancient soil or mud in which the *Stigmaria* grew, and that the coal was the result of the accumulated growth and decay of the matted vegetation which had once lived upon that soil. Looking back, after a lapse of forty years, we are astonished at the brilliance of Logan's early deduction, which served to throw so clear a light upon the nature and origin of coal, and entitles its author to our highest esteem as a most careful and accurate observer.

In 1841 Mr. Logan went to America, and examined the coal-fields of Pennsylvania and Nova-Scotia, where he also made some original observations. In the winter of 1841-42 he devoted himself to watching the behaviour of ice as a geological agent on the great Canadian rivers. The result of his studies was communicated by Logan in person to the Geological Society of London in the spring of 1842.

About this time (1842) there arose in Canada a strong desire to know something more about the mineral resources of the Colony, and the Legislature having voted £1,500 for a Geological Survey, the Canadian Government consulted the Home Office as to a suitable person to undertake the task, mentioning the name of Mr. Logan, and inquiring in what estimation he was held in England by scientific men. Murchison was at that time President of the Geological Society, and, being appealed to, he warmly recommended Logan, as did also his old friend De la Beche. From his appointment in 1843 Logan's whole energies were given to the task assigned to him, and to his devotion and untiring energy must be attributed the fact that he never allowed the difficulties of his task to overpower him, although beset on all sides with obstacles sufficient to have disheartened men of less determination and ability. The country over which his Survey extended was frequently obscured by dense vegetation. There was no Ordnance Map to use. The

Government, moreover, only acted on impulse, and soon were ready to abandon a Survey which had only been sanctioned by them in a fit of patriotic fervour. Through all these obstacles Logan's tact and perseverance enabled him to steer his bark, and finally to gain the haven of popularity, while success crowned his efforts in the field. Year by year his annual reports were presented to the Canadian Parliament, accompanied by admirable Geological Maps, and it is in these official reports that the chief work of his life is embodied.

He was fortunate in securing excellent assistants in his field work; men whose names are well known to geologists: Alexander Murray (now Director of the Survey of Newfoundland), James Richardson, and in later years Robert Bell, and others. For mineralogical and chemical examination of rocks he secured the services of Dr. T. Sterry Hunt; while for the palæontological determination of the fossils he obtained the aid of Mr. E. Billings. Perhaps the best proof of the benefits conferred by the Survey upon Canada is furnished by the firm footing and liberal support which it now obtains from the Provincial Legislature. The Survey has its Museum and a Laboratory, where the minerals, rocks and fossils of the country are examined and illustrated with especial reference to the industrial resources of the country. By such methods alone can scientific men hope to succeed in securing the hearty co-operation of Colonial Governments. All young States require to be shown some commercial advantage to be derived from geological and other investigations; and in proportion to the success with which this aspect of the subject is put before them, so will be the support given to such scientific undertakings.

After the Paris Exhibition of 1855, at which the mineral productions of Canada had been so successfully exhibited by him, the honour of knighthood was conferred upon Sir William Logan in recognition of his long and unwearied exertions in carrying out this important task. He devoted himself with equal energy to the interests of the Colony at the International Exhibition of 1862. The generalized summary of the labours of the Survey of Canada, during the first twenty years of its existence, published in 1863, contains the gist of his work as well as a luminous account of all that was then known of the geology and mineral wealth of the Province.

Finding his duties too heavy for his advancing years and failing health, Sir William resigned his appointment in 1869, and was succeeded by Mr. A. R. C. Selwyn, formerly of the Geological Survey of Great Britain, and afterwards Director of the Survey of Victoria.

Sir William Logan gave 20,000 dollars towards the endowment of a Chair of Geology in M'Gill's College, Montreal, and up to the last his interest in his favourite science was unabated.

Well has Prof. Geikie observed: "He has done a great work in his time, and has left a name and an example to be cherished among the honoured possessions of Geology." [1]

[1] *Nature*, July 1st, 1875, to which we are indebted for the main facts and most of the statements contained in this notice.