

Succinct Observations on a New Genus of Fossil Coniferae,

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Among a number of vegetable fossils, discovered not long ago in the clays of the *leads* at Haddon (as shown in the accompanying plan and sections), and submitted to me for phytographic examination, the fruits of a coniferous genus, allied to Cupressinites of Bowerbank, seemed the most remarkable; hence this particular fossil has been selected as the first for elucidation on the present occasion. Some preliminary remarks on the discovery of these and some other fossil fruits were, by R. Brough Smyth, Esq., the Secretary of the Victorian Mining Department, and the writer, communicated to the Geological Society of London (see *Geo. Mag.*, page 390, 1870), and through those remarks the genus *Spondylostrobos* became established. The additional gain of more material from the place of discovery has not materially altered or enlarged the views, which I entertained of the relationship of this genus, and I therefore now proceed to offer its full diagnosis.

Spondylostrobos.

Ferd. von Mueller.

Strobilus woody, globose-ovate or almost spherical, with five, rarely four or six, thick longitudinal ribs, forming as many blunt prominent dissepiments, consolidated in the axis of the fruit; these costæ at the vertex furrowed by single grooves. Base of the strobilus naked. Valves five, rarely four or six, interjacent to the costæ, and by them widely separated from each other, erect, long appressed, fixed at the base, compressed-trigonal, the exterior face in outline oblong or lanceolar-oval, all nearly equal in size, and extending from the base of the fruit to about three-fourths its height, irregularly rough at the back, not keeled nor appendiculate. Cells five, rarely four or six, each bearing a single seed towards the centre of the fruit. Seed ovate, nearly half as long as the valves, very convex at the inner side, winged around the whole margin, pendent from near the apex of the cavity, to which it is affixed, not always all developed.

I derived the generic name from *σπόνδυλος* (verticillus, whorl) and *στροβος* (strobos, pine-cone).

Spondylostrobos Smythii.

The only species hitherto discovered I have dedicated to the gentleman who, as Secretary of our Mining Department for many years, has so widely augmented our knowledge of the mineral resources of our adopted country, and to whose consideration I owe the opportunity of glancing over the vegetable remnants referred to in these pages.

All the specimens, well illustrated by Captain Shepherd on the accompanying page, seem to belong to one single species, variable in size and shape, but connected by intermediate forms. The leaves and amenta of the tree or shrub, which furnished these fruits, remained as yet completely unknown. The smallest fruits before me measure about two-thirds of an inch, the largest one inch and two-thirds. The ridges more attenuated and convex towards the base, wider and confluent at the summit. The wings of the seeds appear slightly outward directed, not exactly peripheral. The seed is perfectly free from the valve.

The validity of the genus rests chiefly on the extraordinary development of the columella, if so it may be called; this columellar portion forming indeed the main body of the fruit. In this respect *Spondylostrobos* differs from all other cupressineous genera, living as well as bygone. It shares the normally five-valved structure of the fruit only with *Solenostrobos* (Endlicher, synopsis *Coniferarum*, page 272, *Cupressinites*, Bowerbank London Clay partly), but, as explained already in the diagnosis, this character of the number of valves is not absolute, though predominant, and thus vindicating the generic value of *Solenostrobos*. The species of the latter genus are, however, very distinct from *Spondylostrobos*, should even the augmentation of material from new sources induce us to unite hereafter generically the new fossil now reviewed with *Solenostrobos*. Access to Bowerbank's illustrated work (*History of the Fossil Fruits and Seeds of the London Clay*, 1840), obligingly afforded me by my venerable friend, the Rev. W. B. Clarke,

the senior of Australian philosophers, proved beyond doubt that the enormous columellar receptacle of *Spondylostrobos*, on which the valves are sunk, is totally wanting in any of the four species of *Solenostrobos* figured. (Plate IX., figs. 22 and 23; also, plate X., figs. 24 and 25; also, figs. 28 and 29.) These illustrations indeed show sufficiently, that the margins of the fruit valves are contiguous, precisely as in the existing genus *Callitris*, and its sub-genera *Frenela*, *Actinostrobos* and *Octoclinis*; whereas in *Spondylostrobos* the fruit valves are rendered discontinuous by the intervening and protruding ridges of the receptacle. Excellent as Sowerby's drawings are, as furnished by Bowerbank's work, they give us no insight into the real inner structure of *Solenostrobos*, owing indeed to the scanty or imperfectly preserved material, not sufficient for examination, or too precious to be sacrificed in dissection. Another allied genus, *Passalostrobos* (Endl. syn. Conif. 278; *Cupressinites tessellatus*, Bowerb. Lond. Clay, page 53, plate X., figs. 26, 27, 30, 31), may perhaps indicate in its structure an approach to a columnar development beyond the summit, but not beyond the margins of the valves, should the central portion of the fruit be receptacular and not valvular. This the re-inspection of the original specimens can only explain. The doubts entertained by the learned Schimper in reference to the systematic position of *Solenostrobos* (Conf. Schimper traité de paléontologie végétale, tome seconde, 1870, page 358), are, by the discovery of our pentamerous conifer in Australia, now completely cleared away. Neither in his work, nor in Heer's still more recent elucidation of some fossil coniferæ (Philos. Transactions of the Royal Society of London, 1870, page 463, plate XLI., figs. 10 and 11; also, plate XLIII., figs. 4 and 5), any additional plants are recorded, to shed light on the pentamerous coniferæ from Sheppey, as regards their foliage and seeds.

In reference to the affinity of *Spondylostrobos* to existing coniferous plants, a comparison is possible only with *Callitris* and its sub-genera, because they alone exhibit likewise a simple verticillus of fruit valves. In all the species of that genus, the columella is comparatively small or obliterated, and therefore no obstacle offered to the contiguity of their fruit valves. The seeds, moreover, are never in number less than two located at each valve, often more in number, sometimes numerous, while the valves are four, six, or rarely eight in normal number, never five. Absence of flowers, leaves, and perfect seeds of *Spondylostrobos* disenable us to carry the comparison further. There is no other genus, recorded in the recent elaborate essay on existing coniferæ of the whole globe, as furnished by my illustrious friend, Professor Parlatore, for De Candolle's prodromus (pars XVI., 361-521), that could be regarded closely related to the fossil plant here under consideration.

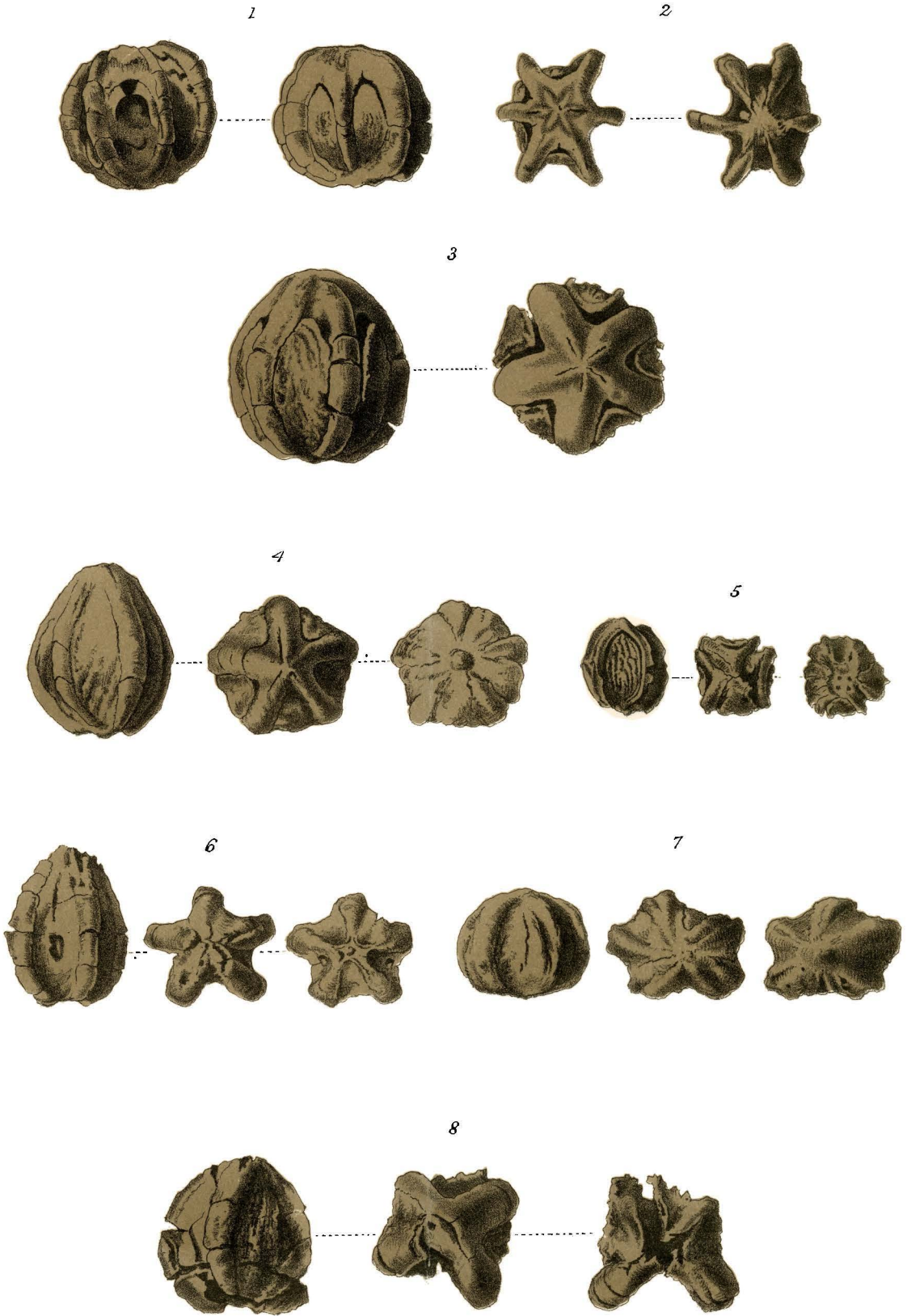
EXPLANATION OF THE LITHOGRAM.

- Fig. 1.—A spherical fruit, of ordinary size, the valves removed to bring the seeds in view.
 Fig. 2.—A fruit with dissepimental ridges, more than usually protruding, and with six valves and six septa; the summit and base in view.
 Fig. 3.—Side view and front view of a fruit of the larger variety, the commencing expansion of the valves discernible.
 Fig. 4.—A more ovate fruit, presenting the side, vertex and base.
 Fig. 5.—A small form of the fruit, moreover only four-valved, the edges of the dissepimental protrusions accidentally channelled by corrosion.
 Fig. 6.—A fruit of almost oval shape, the side, top and base in view.
 Fig. 7.—A fruit of depressed spherical outline.
 Fig. 8.—Fruits in a less perfect state of preservation.

All the figures of natural size.

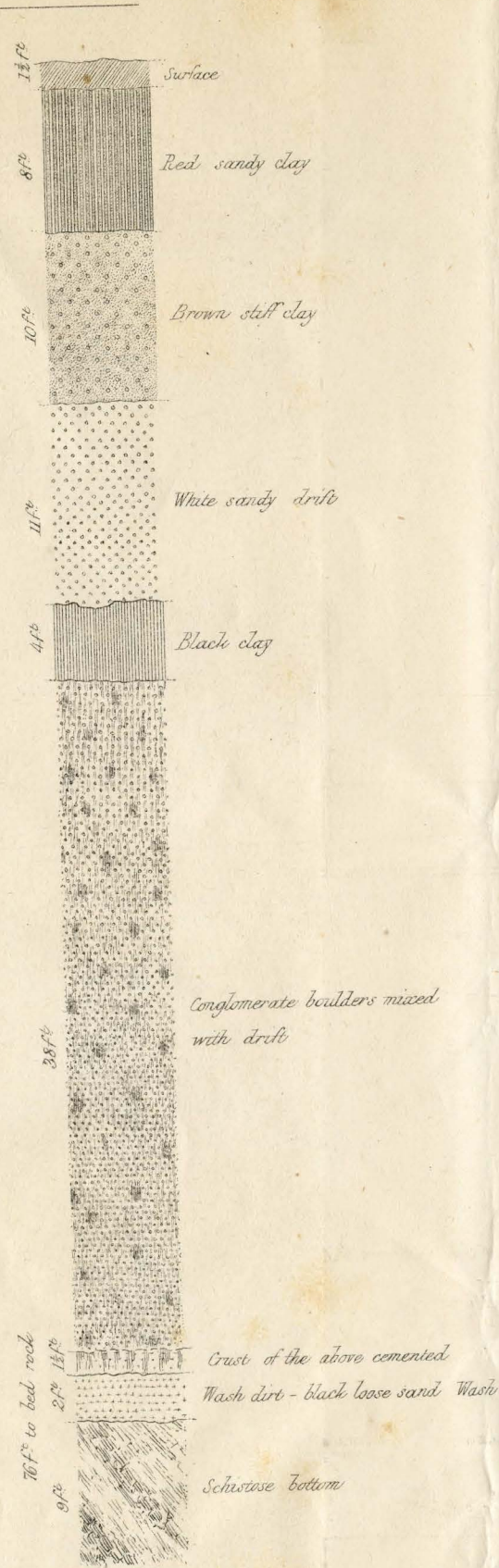
SPONDYLOSTROBUS SMYTHII

F von MUELLER



SECTION OF STRATA
in the
CRUCIBLE CO'S SHAFT
HADDON

Scale 10F^t to 1 Inch, Vertical and Horizontal.



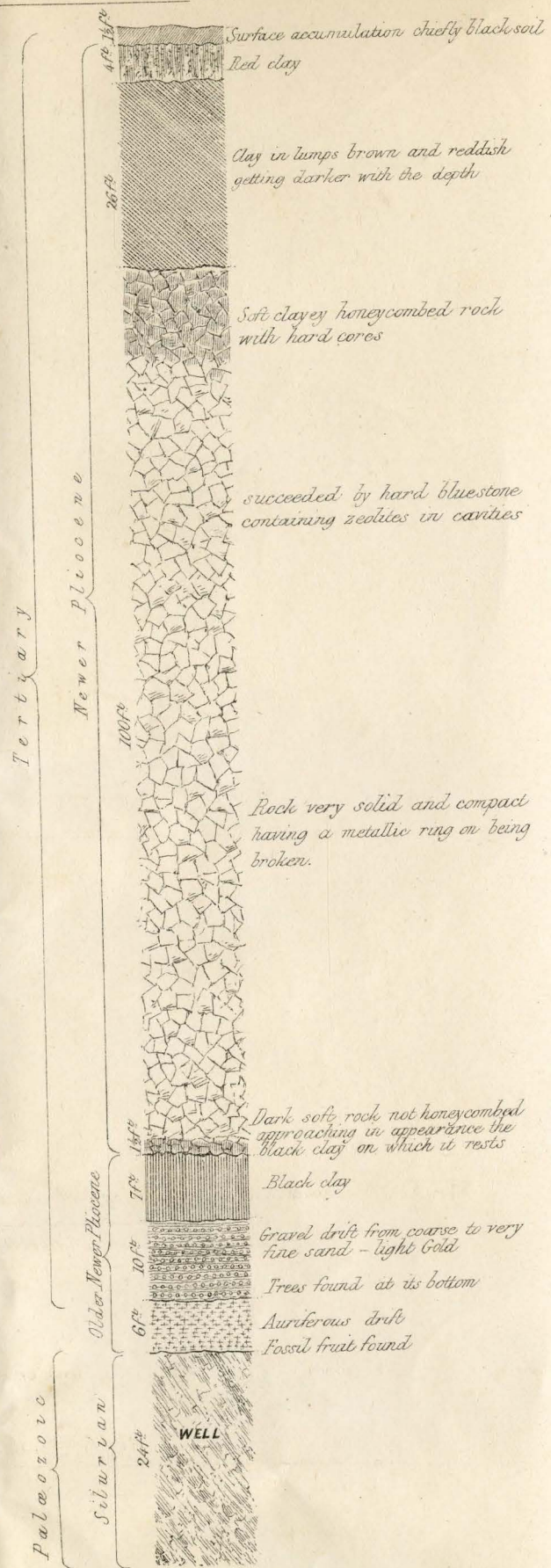
CROSS SECTION

at bottom of Lead at the point marked A on plan.



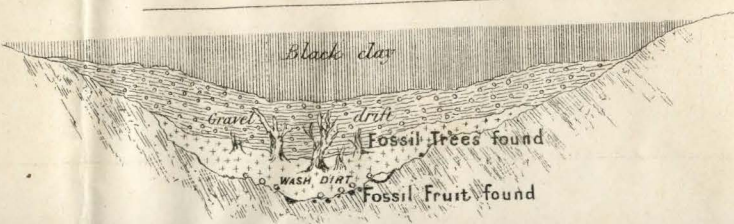
SECTION OF STRATA
in the
REFORM CO'S SHAFT
HADDON

Scale 20F^t to 1 Inch, Horizontal and Vertical.



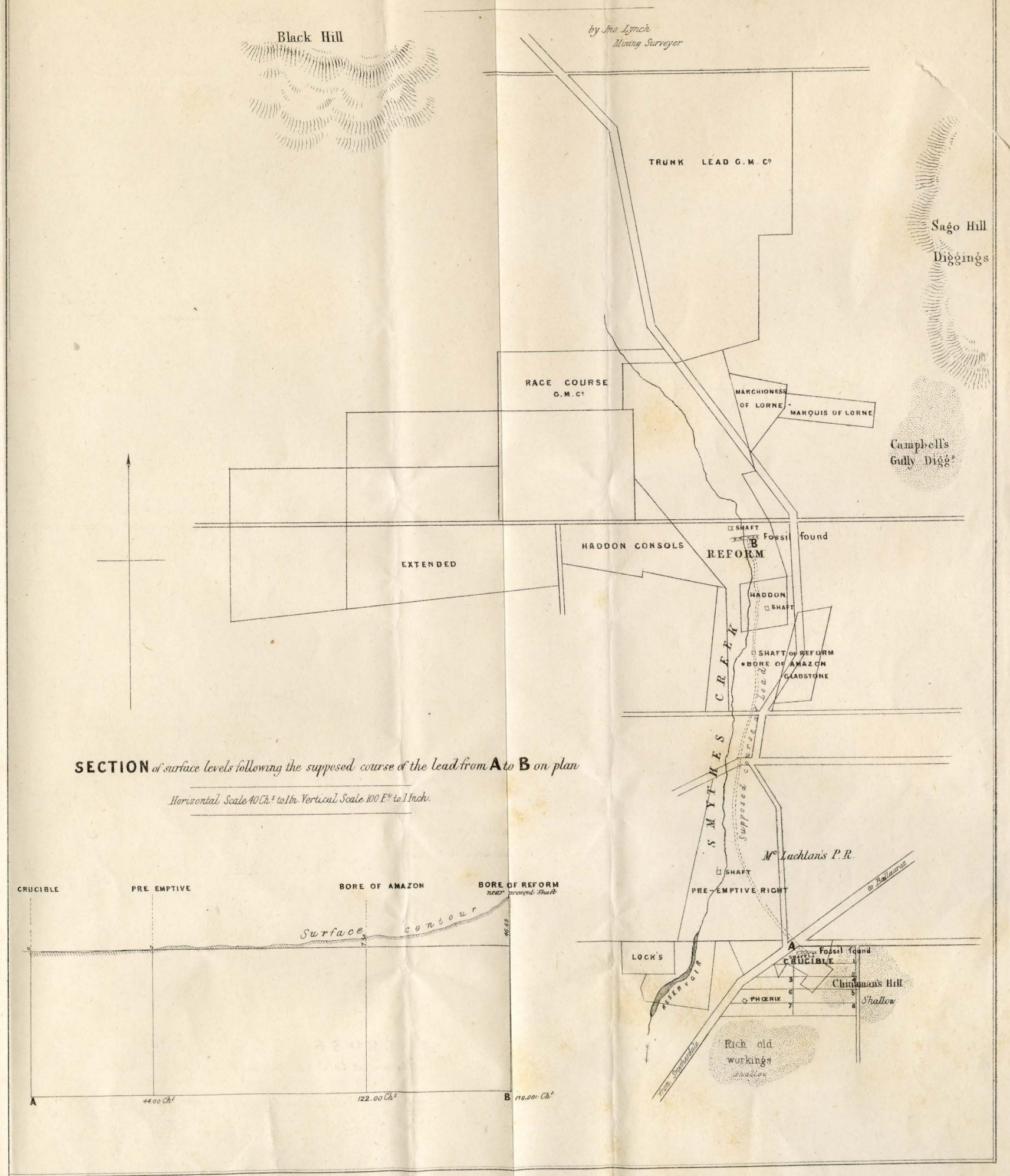
CROSS SECTION

at bottom of Lead at the point marked B on plan.



PLAN
OF PORTION OF HADDON GOLD FIELD

Scale 16 Chains to One Inch.



SECTION of surface levels following the supposed course of the lead from A to B on plan

Horizontal Scale 40 Ch. to 1 In. Vertical Scale 100 F^t to 1 In.

