

$$\begin{array}{r}
 * \dots\dots\dots \dots\dots\dots \\
 Y x \dots\dots\dots m n^{m-1} \\
 Z \dots\dots\dots n^m
 \end{array}$$

therefore the sum of the numeral co-efficients in the expansion  $x^m + A x^{m-1} + B x^{m-2} + C x^{m-3} + \dots\dots\dots Y x + z$  is

$$1 + m n + \frac{m(m-1)}{1.2} n^2 + \frac{m(m-1)(m-2)}{1.2.3} \dots\dots m n^{m-1} + n^m.$$

But this series is evidently the expansion of  $(1 + n)^m =$  (number of terms in each factor)<sup>m</sup>: therefore the sum of the numeral co-efficients of any power of a polynomial is equal to the number of terms in the polynomial raised to the same power.

*IV.—Geological Sketch of Masúri and Landour in the Himalaya; together with an Abstract of the Thermometrical Register kept at Landour during the year 1831. By F. H. Fisher, Assistant Surgeon.*

The characteristic features of the primitive clayslate formation at Landour correspond so completely with those of similar districts in Europe, and tend so decidedly to favour the received geognostical arrangement of mountain rocks, that no one can survey them without strong feelings of interest and surprise; recognising at such remote distances the objects of early research and attention, and confirming as it were the result of former inquiry.

Viewing this mountain from the Dún, its general aspect at once determines its internal composition; the gentle acclivity, round-packed summit, and plentiful vegetation, indicating clayslate; its height, calculating above the level of the sea, is supposed to be about 7000 feet, and its length ranging from east to west may perhaps average a mile; seldom affording a breadth on cleared sites of more than 100 feet.

Throughout this range, instances of some of the accidental rocks, peculiar to the primitive clayslate formation generally, occur.

Before describing these intruders, which appear to have thrust themselves perversely across the regularly disposed strata of the clayslate, it may not be foreign to note, as briefly as opportunity has afforded, the rocks which appear in the hilly route from Rajpúr to the Landour bazar†, assuming the site of the latter to be somewhat above the acclivity of the mountain.

† The convenience of geologists having been considered as little as others in the plan and construction of this route, any attempt at systematic arrangement must

Ascending from Rajpúr the road is cut through a bed of bituminous slate, passing through alum slate of a bluish green colour, both of which are much decayed, and then traverses clayslate of a faded red colour; black limestone next appears, frequently intersected by flinty slate and Lydian stone: about a quarter of a mile below Jeripani large beds of primitive gypsum\* with earthy sulphate of lime occur, and this may be considered the commencement of the Masúri limestone formation. The road continues with slight variations in a westerly direction, and displays huge beds of grey limestone with one remarkable tract of calcareous tufa; after which clayslate re-appears, generally much indurated, iron-shot, and containing beds of flinty slate, with irregular nodules and schistose veins of brown clay iron ore. The colour of the clayslate now passes into faded red, and running in a northerly direction the road leads to Landour, leaving the Masúri range to the westward.

The whole of this Masúri range is composed of huge masses of stratified limestone, inclining at a gentle angle to the east, presenting occasionally considerable breadth of summit, but never approaching the height of Landour. In colour it is of a bluish grey, passing into black and white, highly crystallized, and well suited for ornamental purposes; it yields excellent lime, but the natives are careless in the preparation of it.

The aspect of Masúri may still assert its claim to the picturesque, notwithstanding the merciless ravages of the woodman's axe amongst its withering beauties; precipices abrupt and imposing, moss-grown cliffs luxuriating in foliage, or nourishing creepers of the most lovely hue, must ever arrest attention, and steal admiration from the idlest observer. The simple minerals discoverable in this formation, are calcareous tufa, frequently iron-shot; calcareous sinter, white, brown, and yellow; calcareous spar in the primitive form; and sulphate of barytes; nodules of noble serpentine associated with hornblende slate, glassy actynolite, and earthy gypsum.

Leaving Masúri and passing through the Landour bazar by the road

necessarily be abandoned; mention therefore can be merely made of the various rocks as they occur in succession, without reference to strict geognostical situation. The distance included in the route is about five miles.

\* I consider this to be primitive from the considerable masses which occur; it varies in colour from brown to the purest white, the latter variety being highly crystalline; emits a strong smell of sulphuretted hydrogen when fractured; the same odour is perceptible in the water drawn from the stalactitic cave near Rajpúr. In large doses this water is but slightly cathartic.

above alluded to, we ascend by a small patch of grey limestone, and set foot on the clay slate of Landour\*.

It is of a faded red colour, frequently passing into black, bluish black, greenish grey, and light brown, disposed in large slates, inclining at a considerable angle in an easterly direction; it is occasionally waved in its structure, and in the red varieties cleaves easily in the parallel of the stratum, presenting a glittering surface, owing to small particles of imbedded mica. The black and bluish black varieties do not yield so readily to the hammer; they are tough, afford irregular fragments, and cannot be adapted to the purposes of roofing. The accidental rocks which occur in this formation may be thus enumerated: granular quartz rock†; felspar ‡; flinty slate and limestone §.

They are all unconformable, crossing the clay slate at right angles, and dipping to the north.

*Abstract of a Thermometrical Register kept at Landour from the 1st of January to the 31st Dec. 1831. Thermometer kept in an open verandah facing the N.*

	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Max.	47°	48°	64°	76°	85°	86°	70°	72°	69°	70°	62°	50°
Min.	31	31	40	44	60	60	61	59	54	51	42	30

### V.—*On Modes of obtaining Important Results by Simple Means.* By Capt. G. Twemlow, *Bombay Artillery.*

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#### 2.—*Easy mode of casting masses of simple metals without the aid of furnaces.*

The native mode is to surround the mould (sunk in the earth) by a fire capable of keeping it hot, then to employ as many assistants with their small earthen pans, and hand-bellows, as may be necessary to fuse the requisite quantity of metal; in this way it would not be difficult to cast a pillar of large dimensions, taking the precaution to have the mould strong, well bound and supported, the fire around it sufficiently intense, although properly covered in, and the assistants in sufficient numbers to melt the metal, and pour it into the mould, kept hot as long as requir-

\* Landour is separated from the snowy range by intermediate zones; they all run parallel.

† Concretions not exceeding the size of a pigeon's egg, and of a milky hue, as seen on the site of the new Hospital.

‡ Compact felspar of a greyish colour, distinctly stratified, slaty in the small, and by the aid of a glass small acicular crystals of hornblende may be sometimes discerned;—cleared site near Mr. J. Lloyd's grass hut.

§ But sparingly found of a pink colour, coarse in structure, and rather tough;—site of the tennis court.