

of Biniodide of Mercury. Heat the scarlet crystals in the teaspoon over the lamp; they become pale yellow. Place them on the paper, and rub them with the thumb-nail, and they become scarlet again. They are now reduced to a red powder colouring the paper. Pass the paper to and fro over the lamp, the scarlet instantly turns yellow. Attempt to rub the powder off by passing the paper over the carpet, the paper instantly turns red again.

Miller explains the change from yellow to red as follows:—“Warrington has shown that this change of colour depends upon a change in the molecular constitution of the salt, in consequence of which the rhomboidal crystals are converted into octahedra with a square base.” This alone would be sufficiently perplexing, but the changes seem capable of being produced over and over again, and we have simply to alternate thermal and dynamic metamorphic processes to produce the yellow biniodide and the scarlet biniodide of mercury at pleasure. If these things may be done in the drawing-room, what may not thermal and dynamic metamorphism, alone or combined, effect in the laboratory of nature?

One more possible case. In using the soldering iron (which iron, is always copper) a very moderate temperature is essential to keep the solder on the face of the clean copper, a temperature far below that requisite to melt copper with tin to produce one of the copper-tin alloys; yet occasionally the soldering iron will show streaks of yellow gun-metal. An amateur in his attempts at soldering is apt to press the soldering iron heavily on his work, and it seems possible that the alloy indicated on the iron may arise from insufficient heat being reinforced by equally insufficient pressure; the two combined being, however, sufficient to produce an alloy of copper and tin. If this be so we have in the soldering iron a case of thermal and dynamic metamorphism in combination, just as in the biniodide of mercury we have thermal and dynamic metamorphism in alternation.

A friend employed on the Manchester Ship Canal once sent me a specimen of red sandstone from a slickenside. At the plane of contact and pressure the red colour is entirely discharged, and the stone apparently porcellanized. The depth to which the metamorphic action extends is so very slight, sometimes less than $\frac{1}{8}$ th of an inch, that the metamorphosis would seem due to pressure rather than heat, as it is difficult to understand how pure thermal action could be restricted to such a mere film.

TORQUAY, 16th June, 1894.

A. R. HUNT.

SHELLS FROM PORTLAND RUBBLE DRIFT.

SIR,—I had the pleasure of several hours work in June last at the Rubble Drift at Portland, both at Chesilton and at the Bill.

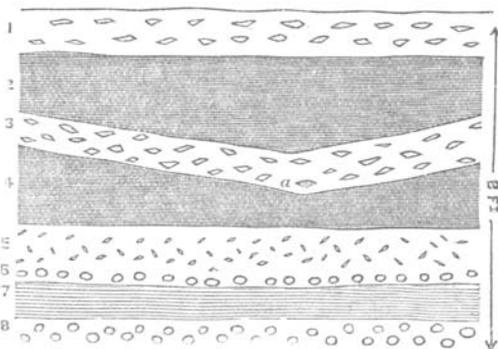
I was not able to obtain any recent shells from the Chesilton Rubble; but I would remark on the enormous angular and sub-angular blocks of Portland oolite that occur in this section at various horizons, the whole of the material being unsorted, and therefore having been accumulated by more or less rapid aggregation of material in a comparatively brief space of time.

At Portland Bill, in the loam or loess between strata of angular *débris* from the Middle Purbecks, I found an interesting collection of land and fresh-water shells. Mr. Edgar A. Smith, of the British Museum (Natural History), has kindly determined the species for me. They are:—

<i>Succinea oblonga</i> (Drap.)	41 specimens.	<i>Pupa muscorum</i> (Linn.)	56 specimens.
<i>Limnaea peregra</i> (Linn.)	4 „	<i>Cyclostoma elegans</i> ...	1 „
<i>Helix hispida</i> (Linn.) ...	1 „	<i>Pisidium</i> , sp. ...	1 „
<i>Helix pulchella</i> ...	5 „		

These shells are entire, but very brittle. A great many broke to pieces in the process of washing out, and reduced my spoils. The *Cyclostoma* was dug out of a large block of fallen loam by my wife, but in such a position as left no doubt of its genuineness. Fifteen of the *P. muscorum* are immature specimens; two of them have only two whorls. Professor Prestwich has hitherto only found the operculum of *Cyclostoma* at the Battery, Folkstone, and *H. hispida* and *H. pulchella* at the same place. *Pisidium* does not occur in his lists of Rubble Drift Shells as given in the Raised Beach paper (Quart. Journ. Geol. Soc. 1892, vol. xlviii.), and of the above list only *S. oblonga*, *L. peregra*, and *P. muscorum* are named from Portland Bill. I also found four specimens of *Littorina litorea* in the Rubble

1. Angular Drift.
2. Loam with *Pupa*, etc.
3. Angular Drift.
4. Loam with *Pupa*, etc.
5. Small Angular Drift.
6. Raised Beach.
7. Sand, etc.
8. Raised Beach.



Section of the Rubble-Drift, Portland.

Drift, one at a height of $4\frac{1}{2}$ feet above the raised beach, from which they have probably been derived. A large piece of mammalian bone also occurred at the bottom of the second seam of angular Rubble Drift, at (a), and which is only slightly adherent to the tongue. I give a rough sketch of the section.

SHOREHAM VICARAGE, KENT.

R. ASHINGTON BULLEN.

GEOLOGICAL SURVEY OF INDIA.—We are glad to announce that MAJOR C. L. GRIESBACH, C.I.E., F.G.S., has been appointed (July 17th) Director of the Geological Survey of India, after about twenty years service, *vice* Dr. Wm. King, F.G.S., retired.

ERRATA:

GEOL. MAG. August Number, pp. 337 and 339, for *Nanopus* read *Nasopus*.—O. C. Marsh.

Ibid. p. 364, line 19 from bottom, for *Trias* read Permian.—A. Irving.