

VII.—*Further Notes on Mineral Growth.*

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WHEN I read my first paper on "Recent Mineral-growth at ordinary temperatures" under (what we, perhaps, rather carelessly call) "ordinary conditions,"* I was met with the reasonable remark that, time enough had not elapsed for me to be *certain* of my facts.

Since then, I have had more than three years of affectionate watching in my "Gold-garden" (as Mr. Ruskin pleasantly calls it); and I am glad to say that the interim has been productive of some new and striking spontaneous changes; which, for convenience of expression, I continue to term "mineral-growth."

I have before me a number of mineralogical facts of much interest, and I propose to notice first, some recent alterations in 47 of the specimens described in the paper referred to; and then to add a few short notes of similar changes in 35 specimens, not therein alluded to.

On page 167 of the *Mineralogical Magazine*, vol. I, I describe some *Iron-growths* out of a specimen of Magnetic Iron-ore; cabinet number Fe 840. With this, I have associated another specimen (Fe 840*a*), a portion of 840. These two bits of minerals are positively amusing as well as suggestive.

It happened on the 13th of May last, I had occasion to show them to the Hon. J. K. Howard, at the office of Woods, Forests, &c., and then for the first time I noticed a broad protrusion about $\frac{1}{4}$ of an inch long, standing straight out, almost level with the bottom of the tray in which it now is.

On examination next morning the protrusion had disappeared. It had, somehow, got underneath the specimen, had flattened and attached itself again to it.

I then discovered that the protrusions (too many to count easily), would attract or repel one another.

I placed the two specimens upon the glass-top of the box, about half-an-inch apart, when, presently the biggest bit drew the other more than half-round in a second of time; the little one snatching sundry protrusions from its big brother in transit. The little thing assumed a rough resemblance to the stuffed black baby-elephant at the

* *Mineralogical Magazine*, Vol. I.

British Museum, with partially hairy body and a proboscis-like protrusion, more than half-an-inch long.

I again put the larger piece about the same distance off, and it behaved in exactly the same way as my magnet.

On moving the big bit, the proboscis of the other invariably turned in its direction, prior to its bulk doing the same.

Some of the protrusions occasionally recede telescope-like; others project somewhat in the same fashion.

It is interesting to note that a stone broken in 1873 or 1874 should behave thus. Common enough, perhaps, though not often noticed. I have a memorandum on the labels 19, V. 78. "Numerous flake-like growths formed after the manner of the artificial Lead-tree. Very interesting."

On page 168, No. 100°. (Native Copper.) "The vertical accumulation" is now more than one-eighth of an inch increased by the growth of the crystallized form, at its apex. The "column" is now separated at both sides from the longitudinal exudations. The "loop" is fast tending downwards, and has a tendency to collapse and unite with the column. The exudations all along the line have increased in bulk; and some minute copper-crystallizations have appeared on the stone, at some distance from the others. Most interesting.

848 (Argentite.) White Silver-growth very considerably multiplied.

On page 169, No. 18 (Argentite) has on it very many recent curly silver-growth.

846 (Argentite) has a few recent silver-growth.

16° (Argentite.) Silver has grown very much in curls.

More than 25 grains weight of silver has grown off the last three specimens in about 12 months, and the bottom of the tray is covered with dirty silver-dust.

On page 170, No. 2 (Moss-copper in small glass-topped box.) One filament has very much grown in length; other filaments have changed in colors, and one of the largest has become silvery-white! *Mem.* 5, v. 80. White appearance has disappeared. *Mem.* 1, VI, 80

On page 171. 86 and 92. (Quartz.) Electrum-growths are much changed.

100°. Interesting electrum-change in a cavity.

100°. Electrum enlarged very much.

217. Globule in indexed cavity in process of changing form.

On page 172. 217, 100° (Au., Bi., Te., &c.,) and No. 7 (Electrum) have enlarged considerably.

15*. The larger gold-growth has perceptibly increased, and another has appeared in a cavity. A growth at a corner of the specimen has considerably increased in bulk, and appears in process of crystallizing. Increase noticeable within the last 16 days.

276 and 276* (Electrum) more generally crystallized.

On page 173, No. 12 (Sponge-gold) changes remarkable.

On page 174, No. 556 and 532 (Quartz-crystals.) Electrum-growth thereon increased.

On page 175, 583. "Mitre-shaped" electrum-growth increased.

501. The interesting electrum-growth is now five-sixteenths of an inch long; being rather more than one-sixteenth longer than when I measured it at the beginning of this year. It has also increased sensibly in bulk. The longitudinal groove is deeper. Another groove has appeared all along an opposite edge. This remarkable growth appears separating at its base, and I fear will, some day, *grow off*, as other electrum-growths have frequently done. At present, however, it is very firmly fixed in the quartz.

On page 176, No. 832. Large quartz specimen loaned in June, 1878, to the Liverpool Museum, examined by me Dec. 16, 1879. Found that one of the largest electrum-growths, and several smaller ones had grown off. There appeared, also, several recent growths.

No 834 show electrum-specks recently *grown off*

On page 177, No 594, at index *a*, Electrum palpably developed in length. At *b*, Electrum, apparently, crystallizing into cubic form.

815. The "antler-like" electrum-growth in the gossan-lined cavity has sensibly increased; and, at the edge of the cavity, the electrum has burst through its gossany-coating, and is beautifully bright.

581 has most interesting bright recent electrum-growths in two cavities of the quartz.

525 has electrum considerably increased.

On page 178, No. 511 (quartz.) Electrum has grown and become very interesting. Is probably changing shape to isometric-shape.

566 (quartz) shows recent electrum-growth.

535. Some threads of Moss-gold have fallen off; and others have perceptibly grown. Electrum in cavities, much grown. Here are, also, some new growths.

587. Electrum has increased in bulk in several places, and here are three new growths.

520. Copper-looking growth of electrum.

123. Grooves in electrum deeper, and a division likely to take place shortly.

On page 179, No. 196. Electrum increased in length.

No. 10 At index *a*, a gold-crystal forming in cubical system.

At index *b*, electrum has grown off, and in its place have appeared four tiny bright forked branches of electrum.

At index *c* is electrum crystallizing; and also in a cavity behind it are several recent branch electrum-growths.

At *d*, electrum has grown 1-18th of an inch, and has become corkscrew-like in shape.

At *e*, electrum has become much more branched and rather loose. Near it are two recent electrum-growths.

At *f*, electrum crystallizing into cubic form.

Page 180, No. 220 (Brown Blende). Recent electrum-growth at one end of specimen.

215 (Galena, &c.) Electrum-growths, palpably increased. Specimen has become very interesting as to spontaneous movements.

97 and 98. Electrum growths increased in bulk.

502 The scoop-like electrum-growth is now $\frac{1}{4}$ -inch in length; has curved further into the cavity by nearly 1-16th of an inch, has become stouter, and more rugged. The trefoil-like growth in the gossany-cavity has changed its shape by the elongation of its centre-portion.

On page 181, No. 22^a. Electrum-growths increased, and recent ones have appeared in the *undecomposed* marcasite.

207. Electrum-growths palpably increased. The "broad-growth" at the thinnest edge of the specimen in May, 1877, was barely 1-16th of an inch high; it is now more than $\frac{1}{8}$ th of an inch.

117^a (Mispickel.) The electrum in this specimen has grown fully $\frac{1}{8}$ th of an inch since I measured it in December last, it thinned out in its process of elongation, and electrum $\frac{1}{4} \times 3$ -16ths inch grew off. Since then, the grown-off portion has curled a little at the edges, and has a tendency to isometric crystallization.

The remainder of the electrum-shape attached to the quartz and unassociated with the auro-pyritous mineral, has sensibly increased in bulk; exhibits a tendency to cubical-crystallization, and is now beautifully bright.

The growth originating in the quartz-cavity has protruded still further, and the cavity appears as if likely to get rid of its tenant at no distant period.

The Mispickel has not in the least decomposed, and no electrum is at present to be seen at its surface.

On page 182, No. 49. The electrum looks more like Native Copper than it did. It would pass for native copper in an ore-heap.

236. The beautiful gold-crystals on this specimen had upon them what appeared to be "parasitic black crystals." Most of them have pushed off their *black coating* and revealed bright faces of octahedra crystals.

The black crystals are now much less numerous. Some are to be seen apart from the principal cluster of gold-crystals. These I have not before noticed; but cannot say positively that they are recent.

The twin-crystals, of which there are, perhaps 200, are very interesting.

20. Some electrum crystallizing into isometric form.

818. The twin electrum-crystal, decidedly increased in bulk, and has become beautifully bright. The other growths have also progressed.

On page 183, 841. Apex of the crystal much brighter.

At index *a*, the electrum-growth in the quartz has increased, and become more pointed. About half-an-inch off it, another growth has appeared. Gold has come to sight in some adjacent blende.

500^f. Red index *a* points to gold-pseudomorphs in a cavity. Two of these have become brighter at their extremities. In another cavity are some recent dirty-looking electrum-growths; and in a cavity adjacent to this, are some recent bright growths.

On page 229 of the same volume I described some Norwegian (Kongsberg) minerals.

13 Ag. exhibits several recent argentite-growths.

On page 230. 10 Ag. Some new argentite-growths have appeared in a cavity.

11 Ag. shows further development of silver in curly growths.

14 Ag. has elongated a tarnished silver-thread.

On page 231. 6 Ag. shows a bright recent silver-growth out of a slender silver-thread. The growth is out of pistacite.

2 Ag. shows several recent silver-growths.

On page 232. 123 Ag. shows recent silver-growths.

18 Ag. The silver-growth has split open its enclosing calcite, released itself, and both silver and argentite have curled in places!

Some recent Mineral and Metal-growths not before reported of.

Specimen 100^a shows recent Millerite-growth, with electrum-growth out of Mispickel.

699 shows recent electrum-growths at indices *a*, *b*, *c*, *e*, and *f*.

822. Electrum very much increased and recent gold-threads *beautifully bright*.

52. Fifteen electrum-growths sensibly increased, and the specimen during this progress in a most novel and interesting state.

26 y. Lower Silurian schist containing copper pyrites and black blende, shows numerous electrum-growths and crystallization since 12, vii, '77.

771 shows recent electrum-crystallization.

93^a and 819. Electrum-growths increased.

517. Some interesting electrum-growths.

No. 752. A remarkable change has taken place in the electrum-growths: some of them have become laminated.

58^a and 564. Electrum-growths much increased, and have become very bright and beautiful.

401. Electrum-leaf grown off and surface crystallizing into form.

99. Electrum crystallizing isometrically.

837. Electrum shape much changed. Shape indescribable.

679, 115, 41, 153, 21, 117, 93, 566. All exhibit recent electrum-growths.

757, 822, and 101. Electrum-growths increased.

82. Electrum-growths much brighter.

99. Electrum grown off *in gold-dust!*

32^b. Several bright recent electrum-growths in cavities.

115. Electrum-crystallization in cavities.

205^a. Electrum cubic-crystallization more perfect.

500^a. Pyrites decomposing after being boiled in Nitric-acid, disclosing long flaky-electrum, some portions of which exhibit recent bright growths. Mem. 6, vii, '80. These growths have all since tarnished.

500^b. (In round glass-topped box.) These gold-growths much changed in shape since 16th Dec., 1879. Appear to be changing like 501 before referred to. All these have been detached from matrix.

500^c. Gossany-quartz (like 535 referred to) calcined in 1874, and had then some of the electrum in *globules*. Found by me in a heap,

June, 1878. Has much changed since. Globules have all changed to undefined shapes.

C. 1. Curved changes in a natural Cape diamond since Dec., 1877.

25. Coil of metallic Cadmium has elongated nearly 1-16th of an inch since January 1st last.

Mem. 6, vii, '80. I have been reading lately Lord Bacon's *Sylva Sylvarum*, published by Dr. Wm. Rawley (1658), and I am tempted to add an extract therefrom in favor of the somewhat objectionable term *growth*.

"EXPERIMENT SOLITARY TOUCHING THE GROWTH OR MULTIPLYING
OF METALS."

"It is reported by some of the ancients, that, in Cyprus, there is a kind of iron that, being cut into little pieces and put into the ground, and well watered will increase into greater pieces. This is certain, and known of old, that *Lead* will multiply and increase as has been seen in old statuas (*sic.*) of stone, which have been put into cellars; the fact of them having been bound with *leaden-bands*; where (after a time) there appeared, that the *lead* did swell; inasmuch as it hanged upon the *stone* like *warts*." (p. 168.)