placed these pairs in the trichloride of gold, while a similar wire I wrapped in filter-paper and immersed in the same solution of gold, when in four hours I observed that the wires that were attached to the porcelain and glass were feebly gilded, whilst that attached to the quartz was thickly gilded, but the wire unattached did not exhibit any trace of gold thereon. Gold in place of platina in these experiments also accretes gold to itself, which is clearly revealed by the altered appearance that in a few hours it presented.

As the quartz was of the pure white variety I was led at first to suppose that it at least possessed the same property in relation to the electro-deposition of gold above noted as the noble metals do, but I soon ascertained that this was simply owing to the presence in the quartz of a minute proportion of some proto-compound of iron, for on igniting the quartz, or digesting it with hydrochloric acid before placing it (as wired with platina) in the solution of gold, the gold was deposited upon the wire. The same negative results occurred in the case of the glass when similarly treated prior to the immersion.

These results, as I think, clearly show that any gold that had deposited upon the normal gold in the case that Mr. Daintree gives us had in greater part, if not wholly, been electro-deposited there by means of a chemical combination set up by the oxidation of the protoxide of iron of the glass vessel upon which that normal or original piece of gold lay.

The fact that the whitest and purest quartz at my disposal did, when thus coupled with platina or gold, become solidly gilded when placed in an auric-chloride solution is, I think, rather a remarkable one, for the quartz thus appears to act as the positive pole of an electric circuit. Had it not thus acted we should have had the gold liberated from the auriferous salt by the oxidation of iron deposited in minute disconnected granules on and partly in the body of the quartz, in place of the reguline deposit on the metal attached thereto, as in my results.

In regard to this, some here may contend that the general idea is that all bodies are electric conductors in the same sense that the metals are, but it seems to me that if this were really the case we should be able to electro-deposit gold on quartz, which, as I said above, I have been unable to do. The whole matter, however, requires further research. Meanwhile we have the knowledge that particles and nuggets of gold in auric chloride do increase their size when they have full contact with quartz, glass, and siliceous substances generally that contain ferrous oxide, and this circumstance fully explains how any small increase which obtained in the size of Mr. Daintree's residual gold was brought about.

Addenda.

The following facts may prove interesting, and also useful, for enabling one to understand some of the phenomena above described :—

If a piece of pure bituminous coal is immersed in a weak solution of auric chloride, and rested clear of the containing vessel—say, on filter-paper—no deposit of gold occurs on the coal; but if this coal is allowed to have contact with quartz, earthenware, or glass, in a short time it will be tinged brown near the junction of the two solids, and in a few hours the whole of the coal is well gilded. Here it is shown that the coal is a pretty fair conductor of weak electric currents.

If pure platina be coupled with pure gold in equal-sized plates in an auric-chloride solution no deposit of gold occurs—at least, I found none; a fact which goes towards proving that these metals in all the experiments I describe here only act as inert poles—as mere "ways and means" for the passage of electric currents.

The electric current is stronger when the gold in the potash is paired with gold in auric chloride than with gold in hydrochloric acid, a circumstance no doubt due to the easier decomposition of the gold salts than the acid.

When the platina of a zinc-platina couple is connected with a platina pole in the alkali solution, and the zinc of this couple is connected with the other platina pole (that which is in the gold solution), the deposition of gold on the platina is not stopped, but only retarded. Using a copper-zinc couple instead of the zinc-platina one, the rate of the deposition of gold is but little, if at all, affected.

A copper-zinc couple in sulphuric acid connected with two gold plates in the auric-chloride solution deposits gold only at a very slow rate, and this even when the copper and zinc plates are much larger than the gold plates.

From the results above stated it appears that the electro-motive power yielded by potash and auric chloride with gold or platina plates is of considerable strength—at any rate, is stronger than that given by the copper-zinc couple in sulphuric acid.

NOTE.—Since the above paper was read I have ascertained that the statements in chemical works as to "gelatine not being appreciably soluble in water" are not absolutely correct. It therefore follows that in some of the experiments I have described gold has been reduced from my solutions by this substance—gelatine, as used in making the necessary electrical connections. The first question, then, is to determine the proportion of gold that was liberated by the gelatine so used. A few tentative experiments showed that when using filter-paper, Swedish or asbestos, both well washed, for the electrical connections, and common spring water to make up the solutions, gold deposits were obtained about as rapidly as before, but by using distilled water to make up my solutions only very slight deposits of gold were obtained, so slight, indeed, that they might well have formed by the aid of organic matter derived from the dust or living organisms derived from the air. This requires further investigation. Anyway, the results of this paper clearly show that whenever the metal gold is in natural waters, containing gold in solution, it will become coated with reguline gold if only there are the conditions present that can insure the electrical polarisation of that metal, such as its contact with solutions of different strength of a somewhat dissimilar nature.—WILLIAM SKEY.