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"Nec aranearum sane textus ideo melior quia ex se fila gignunt, nec noster vilior quia ex alienis libamus ut apes." JUST. LIPS. *Monit. Polit.* lib. i. cap. 1.

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From Ursa Minor	41	D.	In Ursa Major	26	D.						
To Draco			χ to *n*	27	R.						
From Draco			γ to μ	28	D.						
To N.E.....	45	D.	*i* to γ	30	D.						
In Draco			ε past ζ	35	D.						
β α γ to ο	47	R.	*i* to γ	43	D.						
			γ past ε and ζ								
In Bootes			From Ursa Major			From Auriga					
Past *n*	52	D.	To Gemini	1	R.	To Gemini	3	D.			
θ to β...	53	D.	„ „	4	R.	„ Ursa Maj.	6	D.			
			„ Leo	20	D.	„ „ „	9	D.			
			„ „	44	D.	„ „ „	10	D.			
From Canes Venat.			„ Virgo	16	D.	„ „ North	14	R.			
To Bootes.....	42	D.	„ Canes Venatici	29	D.						
„ „	46	D.									
„ „	51	D.	„ Horizon	36	D.						
			„ Draco	38	D.						
			„ Leo Minor	49	D.						
			In Leo Minor	34	D.						
			From Leo Minor			From Gemini			From Orion		
			To Leo	25	R.	To Taurus.....	5	R.	To horizon	2	D.
From Coma Ber.			„ Coma Berenices	48	D.	„ „	13	R.			
To Bootes.....	54	D.	From Leo			„ Orion	7	R.			
			To Canis Minor	31	R.	„ Canis Major	19	D.			
			„ Major	32	R.	„ Horizon.....	8	D.			
						From Canis Minor					
In Virgo			„ Virgo	18	D.	To East	11	D.			
Below Moon	50	D.	„ North	17	D.	„ Cancer	23	D.			
			„ „	15	D.	From Monoceros					
			„ „	37	D.	To Gemini	33	R.			
			From Cancer.						From Lepus.		
			To Caput Hydræ	24	D.	From Canis Major			To West	22	R.
			In Hydra			To South	12	R.			
			θ to Cor.	39	D.	„ „	21	R.			
			Right angles to.....	40	R.						

X. *On the Voltaic Polarization of certain Solid and Fluid Substances.* *By Prof.* Schœnbein.

To the Editors of the Philosophical Magazine and Journal.

Gentlemen,

I READ a paper containing an account of the results of my researches on the voltaic polarization of solid and fluid bodies, before the scientific meetings which took place at Bâle and Fribourg, some months ago.

This memoir, I think, will soon be published in the *Biblioth. Univ.* and in Poggendorff's *Annalen*, and the scientific public thereby enabled to appreciate the facts related in it. The sort of investigations alluded to could not but lead me to make numerous experiments similar to those which were mentioned the other day in the French Academy, as performed by MM. Matteucci * and Peltier, of which I have however, up to this present moment, but a very imperfect knowledge. Having from want of time not yet been able to draw up a regular paper on the results of my most recent voltaic researches, and thinking them not quite void of scientific interest, I beg the favour of your giving in the forthcoming Number of your widely circulated Journal a place to the general statements, the tenor of which is as follows:

1. A platina wire polarized either in the positive or negative way loses its peculiar condition by being heated red-hot. (I call positively polarized a wire which has acted for some time the part of the negative electrode in water slightly acidulated by sulphuric acid; and I term negatively polarized a wire which has in the same liquid performed the function of the positive electrode.)

2. A platina wire positively polarized loses its peculiar condition by being plunged only for a single moment into an atmosphere of chlorine.

3. A platina wire positively polarized loses likewise its electromotive power by being placed in an atmosphere of oxygen; but in order to destroy entirely the polarity of the wire, it is necessary that it should remain for some seconds in the gas mentioned.

4. A platina wire negatively polarized loses its peculiar condition by being put into an atmosphere of hydrogen, but in order to obtain this effect, it is required that the wire in question should remain for some seconds in the gas.

5. A platina wire polarized either negatively or positively is not sensibly affected by being placed in an atmosphere of

* See p. 469 of our last number and volume.—Edit.

carbonic acid or in one of any other gas which does not chemically act either upon hydrogen or oxygen.

6. A platina wire (in its natural state) assumes in every respect the condition and voltaic bearings of a positively polarized wire by being plunged only for a few seconds into an atmosphere of hydrogen.

7. Gold and silver are not sensibly affected under the same circumstances.

8. A platina wire does not acquire any degree of electromotive power by being put into oxygen gas: the metal remains in its natural state. Neither is any degree of such power acquired by gold or silver under the same circumstances.

9. Platina, gold, and silver, by being placed only for a few seconds in an atmosphere of chlorine, assume the voltaic state of a negatively polarized wire.

10. Water slightly acidulated with sulphuric acid and holding some hydrogen dissolved, bears to acidulated water containing no hydrogen the same voltaic relation that zinc does to copper; provided, however, both fluids be separated from each other by a membrane, and connected with the galvanometer by means of platina wires. If for the latter purpose (that is to say, for connecting the fluids with the galvanometer) gold or silver wires are made use of, the said fluids do not excite the least current.

11. Two fluids, one being acidulated water containing some oxygen dissolved, the other being likewise acidulated water containing no oxygen, appear to be in a voltaic point of view perfectly indifferent to each other, whether they are connected with the galvanometer by platina, silver, or gold wires.

12. Water slightly acidulated with sulphuric acid and holding some chlorine dissolved, bears to acidulated water not containing any chlorine the same voltaic relation that copper bears to zinc. In other terms, the former fluid acts under certain circumstances the electromotive part of the peroxides of silver, lead, &c.

13. The aqueous solution of hydrogen mentioned in § 10, loses its property to excite a current by being mixed with a certain quantity of an aqueous solution of chlorine; and, *vice versâ*, the latter fluid loses its electromotive power mentioned in the § 12 by being mixed with a sufficient quantity of hydrogen dissolved in water.

14. Muriatic acid positively polarized loses its peculiar voltaic condition by being mixed with some chlorine, and the same acid being negatively polarized loses its polarity by being treated with some hydrogen. From the facts stated, and

others which are mentioned in the memoir above alluded to, a great number of rather important inferences might be drawn; but having for the present no leisure time to do so, I am obliged to confine myself to stating those which follow:

a. The secondary currents produced both by polar wires, electrolytic fluids, and secondary piles, are due to chemical action, i. e. (in the cases mentioned) to the union of oxygen with hydrogen, or to that of chlorine with hydrogen; and not, as M. Peltier seems to think, to the mere act of the solution in water of the gases mentioned.

b. The chemical combination of oxygen and hydrogen in acidulated (or common) water is brought about by the presence of platina in the same manner as that metal determines the chemical union of gaseous oxygen and hydrogen.

c. The current produced by a platina wire being surrounded by a film of chlorine, or by water holding chlorine in solution, is not dependent on the action of the latter body upon platina, but on the action of chlorine upon the hydrogen of water.

d. Electrolytic bodies do not suffer even the weakest current to pass through them without undergoing decomposition. (This inference is drawn from the fact ascertained by me some time ago, that platina wires acting as electrodes in muriatic acid are polarized by a current so weak as not to be able to electrolyze even iodide of potassium).

e. The most delicate test to ascertain that electrolyzation has taken place, is the polarized state of the electrodes.

I cannot close my letter, Gentlemen, without taking the liberty to point out to you the beautiful, and, as it seems to me, most conclusive evidence in favour of the correctness of the chemical theory of galvanism, now so much contested, which is afforded by the fact stated in § 10. If the mere contact of the two different fluids mentioned there were the real cause of the current obtained, it is obvious that the same current ought to be produced whether the fluid be connected with the galvanometer by means of gold, or if they be connected with the instrument by that of platina wires; but the result being determined by the nature of the connecting wires, and platina being known to favour the union of hydrogen and oxygen, whilst gold and silver do not possess in any sensible degree that property, we are entitled to assert that the current in question is caused by the combination of hydrogen with (the) oxygen (contained dissolved in water) and not by contact.

I am, Gentlemen, yours, &c.

Bâle, Dec. 1838. C. F. Schœnbein.