IN LIFE'S DISASTROUS SCENES, TO OTHERS DO, WHAT YOU WOULD WISH BY OTHERS DONE TO YOU.
DARWIN.

CAMDEN GAZETTE.

EDITED BY WILLIAM LANGLEY, M.D. PRINTED BY H. W. JOHNSTON

Number 20. CAMDEN, S. C. THURSDAY, August 15, 1816. Volume I.

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MISCELLANY.

An Analysis of a Paper on the Phosphorescence of different Bodies, by Mr. Dessaignes, read before the National Institute in 1810,

[Translated for the Eclectic Repertory.]

The class of natural philosophy and chemistry offered a prize for the examination of the circumstances and causes of phosphorescence in different bodies, that is to say the luminous appearance exhibited by certain bodies, whether spontaneously or excited by friction, or slight degrees of heat, or any other means distinct from combustion.

This prize was obtained by Mr. Dessaignes, principal of the college at Vendome; and the work to which the prize was adjudged at the public meeting last year, has been followed by similar experiments, which have greatly extended the facts.

This philosopher defines phosphorescence "an appearance of light durable or fugitive, unaccompanied by sensible heat, and not followed by any alteration in unorganized bodies," and he classes the phenomena under four heads, according to the occasional causes. 1st. Phosphorescence from elevation of temperature. 2d. Phosphorescence from insolation. 3d. Phosphorescence from collision. 4th. Spontaneous phosphorescence.

All bodies phosphorescent from elevation of temperature, powdered and thrown on a heated stand, become luminous whatever may be the conducting power of the stand for caloric, and the intensity of the light is in the direct ratio of the degree of heat, but the duration of the posphorescence is always in the inverse ratio of this temperature. The last portions of light are more forcibly retained than the first, and there is in this respect great diversity in different bodies. Vitreous bodies part with their phosphorescence very slowly; while the metals, the phosphorescent oxides, and the metallic salts lose it very quickly. No degree of heat can remove the phosphorescence from lime, barytes, strontian slightly slacked, magnesia, alumine and silex. Under certain circumstances, in a moist atmophere for instance, some of these bodies will resume their phosphorescence, while others will not.

This phosphorescence assumes different aspects, and like the solor light is decomposed by the prism: it escapes in gentle emanations from some bodies, from others in scintillations; the color is blue, but generally dusky from bodies containing iron. Its purity can however be restored by depriving them of the metal which had altered its color.

In general it appeared to Mr. Dessaignes, that the most phosphorescent bodies are those which contain in their composition principles that must have passed from the gaseous or liquid state to that of a solid.

It was of importance to determine if this phosphorescence from elevation of temperature was owing to combustion. With this view Mr. Dessaignes made his experiments in atmospheric air, oxigen, and the torricellian vacuum, without observing any difference in the intensity of light from unorganized bodies; but the light from unorganized bodies was increased in oxigen; whence the author infers that in these bodies the phosphorescence is partly occasioned by combustion.

But an elevation of temperature does not render all bodies luminous, and those which acquire phosphorescence from this cause, lose the property under certain circumstances. On what cause then does in- phosphorescence depend?

Such is the question proposed by Mr. Dessaignes, for the solution of which he repeated his experiments, introducing such circumstances as favored his views. His researches have led to the following results. 1. That the products from fire are not luminous unless the bodies have passed from an earthy state to a state of vitrefaction. 2. Bodies having the water of crystallization in excess afford no light. 3. Bodies capable of being softened by heat likewise afford no light. In this condition are the salts with excess of acid, the boracic salts excepted, they not being melted at the degree of heat employed in these experiments. 4. Bodies and particularly salts which are volatilized, or decomposed at this degree of heat are not phosphorescent. 5. And lastly, bodies mixed with a large quantity of the metallic oxides are likewise completely obscure.

Nevertheless most of these bodies may become luminous on being moistened, provided they possess the property of combining with water, and of rendering it to a certain degree solid. In short, this property may be restored to those bodies that had lost it, on their condition being changed.

Mr. Dessaignes concludes from his experiments, of which we have only been able to indicate the result, that the phosphorescence produced by an elevation of temperature, is owing to a particular fluid driven by the caloric from the bodies between whose particles it exists; and he considers this fluid to be the same as electricity. He entertains this hypothesis, because the circumstances which favour or destroy the accumulation of the electric fluid in like manner favour or absolutely destroy the accumulation of the phosphoric fluid in the same bodies, and that because electricity may be directly accumulated in bodies so as to render them luminous.

It had long been known that the exposure of certain bodies to light rendered them phosphorescent. Dufay and Beccaria had made experiments on the phenomena of this kind, and from the experiments of the latter it was inferred that the phosphorescence of bodies exposed to light arose from the disengagement of the light which had been introduced by a species of absorption. But the experiment on which this hypothesis is framed has been ascertained by Mr. Dessaignes not to be correct: the phosphorus which he subjected to the different prismatic rays always afforded the same kind of light. Moreover the phosphorescence produced by insolation, far from being an emanation of rays, is only an oscillation; for however frequent the insolations, the phosphorescence is not increased, and the covering the phosphorescent body with smoke will render it obscure. Light as well as heat does not render all bodies phosphorescent, and those which are, are not so in the same degree. The Canton phosphorus becomes phosphorescent by the light of the moon, while the hyalin quartz shines only by the immediate light of the sun. In general fluid bodies are insensible by this kind of excitation, which is the case with charcoal, the carburet of iron and other metals, most of the sulphurets the metallic ozides in the dry way, and in general all bodies which like the foregoing are conductors of electricity; but the edio-electric may become phosphorescent by means of a strong light. It ought to be observed that in respect to the phosphorescence all bodies exhibited the same effects with electricity as with light.

The light produced by insolation and by heat have the same color, and both are equally effected by the metallic oxides.

Bodies the most luminous by insolation cannot be rendered so when heated; but they become phosphorescent in proportion as they cool, and some bodies which have lost the power of shining by an elevation of temperature become luminous by insolation, which Mr. Dessaignes attributes to the water retained in these bodies; for water has unquestionably great influence in these phenomena, as Mr. Dessaignes has in several places remarked.

The light produced by many bodies known by the name of phosphorus has been ascribed generally to combustion. Mr. Dessaignes being desirous of examining this hypothesis, subjected these bodies to experiments which according to him evidently prove that they owe their light to the same cause, to wit, a species of electricity; for Mr. Dessaignes considers the light produced by irradiation and electrising the same as that afforded by an elevation of temperature; only that in the two first instances the light experiences a kind of vibration, while in the last it is really expelled.

Mr. Dessaignes made the phosphorescence by collision the subject of several memoirs. From his experiments the following general and very remarkable law is established; that all bodies whether solid, or naseous affords light by compression. But this light is not so abundant when the body has been rendered phosphorescent by heat; and how frequent and strong the compression, they cannot be entirely deprived of their phosphorescent property. Mr. Dessaignes thinks that this light depends on a different cause from that produced by heat. "It appears to depend," says he, "upon a very elastic fluid closely "united to all the elements of gravitating "matter. This fluid, the primary source "of expansion, is pressed out in proportion as the constituent particles of matter approach each other, so that it is farther from the limits of compression in "gases than in vitreous bodies; and in "the latter a less effort is required to excite the oscillations, &c."

Mr. Dessaignes distinguishes two kinds of spontaneous phosphorescence, the one fugitive,—the other permanent. Among the former may be classed those produced by the union of a certain portion of water and quicklime, and among the latter rotten wood, and other bodies in a state of putrefaction. The latter particularly engaged the attention of Mr. Dessaignes. His observations were made on animal substances, fresh water and sea-fish, on vegetable matter, and the different kinds of wood. These substances individually presented distinctive characters, but from their united phenomena it appears that their phosporescence is a species of combustion in which water and carbonic acid are formed; all the parts constituting muscle or wood do not contribute to the production of light in these bodies; the woody and muscular fibre undergo no essential change, and the phosphorescence of these bodies is owing in wood to the glutinous principle and in muscle to the gelatinous principle uniting their respective fibres.

From the numerous facts collected respecting spontaneous phosphorescence, Mr. Dessaignes endeavours to explain the phosphorescence of the sea, which he thinks may be owing to two causes, 1. The presence of animalculæ, phosphorescent by the emanation of luminous matter secreted by the animalculæ. 2. By the mere presence of matter dissolved or mixed in water and proceeding from these animals, or fish and the mollusci, &c.

Since the publication of this first work, Mr. Dessaignes has extended his enquires; and has attempted by numerous experiments to determine the influence of points on the phosphorescence, whether from elevation of temperature, or from insolation; and he not only ascertained that the points have the same effect on the phosphoric fluid as on the electric; but moreover that natural bodies differing only in the aggregation of their particles, may admit of infinite variety as regards their phosphorescent property, &c.

FROM THE PORTICO.

View of the present state of Polite Learning.

CHAPTER III.

Of Ancient Learning, and the Literature of the Middle Ages.

In an enquiry into the present state of Letters, it is in some sort necessary, to take a retrospect of ancient learning, and the erudition of the middle ages, in order to compare their attendant circumstances, contrast their different beauties and defects; and thence infer the causes of their intellectual excellence, or declension.

Experience can evince with certainty, what qualities, conditions, and circumstances, impair the radiance of scientific perfection, as well as advance literature to renown. And so far only, is the testimony of antiquity, worthy of recital, or a general view of of their acquirements, necessary to a correct estimate of our own possessions.

Whether we consider the republican grandeur of Grecian genius, or the regal splendour of Roman learning, the same conviction will result as to the symptoms and causes of intellectual degeneracy. Conditions similar in their form and symmetry, between those and the present age, and particular incidents precisely conformable, cannot indeed, be either discovered or applied, but all that reason can require, or ingenuity suggest, may be adduced. A general similitude will be found to exist, in the characters of the different ages; and the same consequences, flowing from a common principle in both, may be regularly traced, and indubitably attested.

Greece, from the death of Socrates, surceased to advance far in the road to perfection. Before this flagicious event, so sadly prophetic of her future degradation, and but a short time after, her constellations of genius shone with the most vivid lustre, and shed the happiest influence on her character and fame. From the time of Alexander, till the Romans brought the nations of Greece to the humility of provinces, her excellence was stationary and unprogressive. Little that was new was produced; and of that little, still less was eminently excellent. Long before the Gothic Alaric invaded her dominions, she had commenced the process of depravement, which had been gradually maturing, since the moment of her enslavement to ambitious Rome; Rome her first foreign conqueror; the foe to all liberty and science, save her own. Ambition and envy, pride and selfishness, being at once both the means of her glory, and the cause of her disgrace!

The great celebrity of the Athenian Schools of Philosophy and Rhetorick, even up to the reign of Justinian, may seem to invalidate the correctness of this era of her literary declension. But it is to be remembered, that no fresh learning, or superior genius, had elevated this latter period, higher than the age, in which Plato, Socrates, and Aristotle, flourished. On the contrary, many circumstances contributed to sink it to inferiority. The banks of the Ilissus, indeed, resounded with the voice of learning; but it was the wisdom of her former philosophers, that gave animation to the scene. It derived renown, not from the lessons of the Professors, or the eloquence of their Sophists; but from the sublime genius, and imperishable works of their forefathers. Even the performances of the latter, were not exhibited in their original purity. The remarks of the Commentator, surpassed the original in magnitude, and nothing else; while they bespoke the tumid vanity, instead of the genuine taste of the times. No greater proof of the degeneracy of letters could be produced, than that which emanated from this circumstance: their genuine and primitive learning, was heavily encumbered with a dead mass of criticism, commentaries, and annotations, for the most part useless, and often pernicious. Learning thus swelled by criticism to an unnatural bulk, must ever be considered as an infallible symptom, of the age being feeble in intellect, and perverted in taste; and proves beyond suspicion of mistake, that where they abound, the seeds of corruption are big with life, and bursting into birth.

The general character of this period, so remarkable for Arts, and Literature, being at the pinnacle of excellence and splendour, was unexampled affluence, and literary leisure; eager emulation and rational curiosity. The time of Socrates is here alluded to. It was then that freedom in politicks invited genius to the control of government; and inspired the voice of a Divine Oratory, to suggest the wisest projects, and enforce the most salutary measures, for the national happiness and glory. Comfort and opulence, allowed of pleasures and amusements. Poets for their histrionick productions, were rewarded, honoured, and adored; and caressed and envied for the variety of their powers, and the splendour of their distinction. From its vigour, the state panted to be at war; and when wearied with toil, reposed with serenity in the bowers of philosophy. The flashes of her genius, and the perfection of her intellect, produced every variety of placid beauty, and tumultuous action; and stamped the character of the age, as great and peculiar. Colloquial discourse shone in the ebullitions of sprightly wit; and all the noble arts of elegant refinement, as rhetorick, eloquence, musick, sculpture and painting, flourished in beauty and in vigour.

It is in viewing this period, that our eyes blench in the torrid sun of Grecian excellence, whose brilliant rays dazzle our understanding, while they upbraid our indolence. The models which we now esteem as infallible, in poetry, history, eloquence, and the arts, and which we