

On peat and its products / Professor Brande.

Contributors

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2. By the various products derivable from what is called its destructive distillation.

When it is desired to convert peat into charcoal, the plan adopted by the Irish Amelioration Society is to carbonize blocks of peat, partially dried on trays of wicker work, in moveable pyramidal furnaces. The charcoal so obtained varies in character with that of the peat which produces it; and when the peat is compressed previous to its carbonization, (which may be well effected by means of a machine invented by Mr. Rogers, and which was explained by reference to a diagram,) the resulting charcoal exceeds the density of common wood charcoal. In stove-drying, dense peat loses about one-third, and the light and porous, half of its weight: 4 tons of dried peat will give about one ton of charcoal. The efficacy of this charcoal in the manufacture of iron, in consequence of the small quantity of sulphur it contains, was mentioned; and its deodorizing and purifying qualities experimentally exhibited.

2. *The products of the destructive distillation of peat* were then described. The elements of peat are essentially those of wood and coal; viz. Carbon, Nitrogen, Hydrogen, and Oxygen. If therefore peat were distilled in close vessels, the products obtained, would, as might be expected, resemble the products of a similar operation on coal or wood. Hitherto, however, the expense of such a process in the case of peat has precluded its general adoption. Mr. Reece however has invented for this purpose a blast-furnace, which differs in principle from that in which iron is melted, by having an arrangement to collect the products of combustion; and he has thus succeeded in obtaining ammonia, acetic acid, pyroxylic spirit, tar, naphtha, oils, and paraffine, together with large quantities of inflammable gases, from the peat. It has been found convenient to place two of these furnaces close to each other, so that one may be at work when the blast is turned off the other in order to allow of its being charged.

In two furnaces of this kind, 10 feet in diameter and 35 feet high, 100 tons of peat may be decomposed every 24 hours,

and produce 10,000 gallons liquor (A.)

1,000 . . . tar (B.)

6,270,000 cubic feet of inflammable gases (C.)

A. The liquor holds in solution sufficient ammonia to yield when saturated by sulphuric acid 1 ton of sulphate of ammonia; enough acetic acid to give, when saturated by lime, 14 cwt. of grey acetate of lime; and, lastly, it contains 52 gallons of pyroxylic spirit. This process was described in detail, and a diagram of the furnaces, and of the apparatus employed for distilling the spirit was exhibited.

B. The tar is quite different from what is obtained from coal or from wood. It is a peculiar greasy-feeling substance. This substance is heated to about 100° at which temperature it melts; and being then treated first with about 3 per cent. of sulphuric acid, and afterwards with hot water, it separates after a time, into two

layers; the lower consisting of acid, water, and impurities; the upper, of paraffine and oils.

This mixture of paraffine and oily hydrocarbons is then submitted to distillation: the first half of the distilled products consists chiefly of hydrocarbons of the naphtha family; the other half contains the denser oils and paraffine; when cold, the paraffine crystallises, and is separated from the oil by straining and pressure; it is subsequently bleached and deodorized by chlorine, or chlorochromic acid; then redistilled, pressed, and steamed, until brought to a state of purity. The heavy oils, from which the paraffine is deposited, are then mixed with the lighter oils, which were separated in the first instance by distillation, and with caustic lime. After a time sulphuric acid is added, which combines with impurities. The oils are then distilled, bleached by chlorochromic acid, and deodorized. In this part of the process the substance called *capnomor*, the properties of which have not been investigated, presents itself.

C. *The gases.* — The greater part of the oxygen of the air which is blown through the furnace, naturally combines in the first instance with the burning carbon and is converted into carbonic acid. This gas, however, on rising through the intensely heated mass, takes up an additional proportion of carbon to form *carbonic oxide*, which passes off with the hydrogen and gaseous hydrocarbons, also generated by the combustion, and which, notwithstanding the large proportion of nitrogen blended with them, remain in the form of an inflammable mixture, which is ultimately used as fuel to work the steam-engine, and to heat the stills and boilers.

In conclusion Professor Brande reviewed the various products of peat and their uses.

They appear to be.

1. *Sulphate of Ammonia.* This substance is employed in the preparation of carbonate and muriate of ammonia, of caustic ammonia, and in the manufacture of manures and fertilizing composts.

2. *Acetate of Lime*, which is in constant demand as a source of acetic acid, and of various acetates largely consumed by the calico printers.

3. *Pyroxylic spirit (or wood-alcohol)* used in vapour lamps, (two of which were exhibited and attention called to the brilliancy of the light afforded,) and in the preparation of varnishes.

4. *Naphtha*, used for making varnishes, and for dissolving caoutchouc.

5. *Heavy and more fixed oils*, applicable for lubricating machinery, especially when blended with other unctuous substances; or as a cheap lamp oil, and as a source of lamp black.

6. *Paraffine.* This when mixed with fatty matter forms a material for candles, samples of which were shown, consisting of mixtures of paraffine, sperm, and stearine.

GENERAL MONTHLY MEETING,

February 3, 1851.

SIR CHARLES FELLOWS, Vice-President, in the Chair.

Capt. H. J. Codrington, R.N., and W. T. Dry, Esq., were admitted Members of the Royal Institution.

William Bevan, Esq.

Allen Davis, Esq.

The Earl of Ducie,

The Countess of Ducie,

J. P. Gassiot, Esq., F.R.S.

The Viscount Mandeville,

Adam Murray, Jun. Esq.

James Scott, Esq.

were duly *elected* Members of the Royal Institution.

The following PRESENTS were announced ; and the thanks of the Members ordered to be returned for the same :—

FROM

The Royal Institute of British Architects — Proceedings for November, December, 1850 ; January, 1851. 4to.

The Royal Geographical Society — Journal, Vol. XX. Part 1. 8vo. 1850.

The Institution of Civil Engineers — Proceedings for November, December, 1850 ; January, 1851. 8vo.

The Statistical Society of London — Journal, Vol. XIII. Part 4. 8vo. 1850.

John Webster, M.D., F.R.S., M.R.I. (the Author) — An Essay on the Epidemic Cholera. 12mo. 1832.

Observations on the Admission of Medical Pupils to the Wards of Bethlem Hospital. 8vo. 1842.

On the Health of London during the six months terminating Sept. 28, 1850. 8vo. 1850.

Notes of a Recent Visit to several Provincial Asylums for the Insane in France. 8vo. 1850.

Thos. Twining, Esq., Jun., M. R. I. — Geschichte des Vereins für Naturkunde im Herzogthum Nassau, und des Naturhistorischen Museums in Wiesbaden ; von Dr. C. Thomä. 8vo. 1842.

Jahrbücher des Vereins für Naturkunde im Herzogthum Nassau, 1844-50. 6 Hefte, 8vo.

Athenæum Club — List of Members, &c. 18mo. 1850.

Supplement to the Catalogue of the Library of the Athenæum. 8vo. 1851.

A. V. Holtzapffel, Esq. — Turning and Mechanical Manipulation, &c. by the late Charles Holtzapffel. Vol. III. 8vo. 1850.

C. T. Jackson, Esq. (the Author) — Report on the Geological and Mineral Survey of the Mineral Lands of the United States in the State of Michigan. 8vo. 1849.

John Forbes, M.D., F.R.S., M.R.I. (the Author) — Of Happiness in its relations to Work and Knowledge. 12mo. 1850.

The Dowager Lady Stanley of Alderley — An Account of the Hot Springs in Iceland, (accompanied by one large and four smaller Engravings,) by John

- Thos. Stanley, Esq., F.R.S., with an Analysis of their Waters, by Joseph Black, M.D. 8vo. 1791.
- The Agricultural Society of England* — Journal, Vol. XI. Part 2. 8vo. 1850.
- W. Parker, Esq., M.R.C.S. (the Author) — The Physiological and Scientific Treatment of Cholera. 12mo. 1849.
- A Treatise on the Cause and Nature of Vital Heat. 12mo. 1850.
- W. Roxburgh, M.D., M.R.I. — Medico-Chirurgical Transactions published by the Royal Medical and Chirurgical Society of London; Vol. XXIII—XXVI. 8vo. 1840-3.
- Professor Faraday — Bulletins des Séances de la Classe des Sciences, de l'Académie Royale de Belgique, Année 1849. 8vo. 1850.
- Structure and Classification of Zoophytes: by J. D. Dana, A.M. 4to. 1846.
- Ausführliches Handbuch der Analytischen Chemie; von H. Rose; 2 vol. 8vo. 1851.
- Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften, Wien; Juni und Juli, 1850.—Notizenblatt, No. 1. 8vo. 1851.
- Archiv für Kunde Oesterreichischer Geschichts-Quellen; 1850, II Band, 1 und 2 Hefte. 8vo.
- The Editor — The Athenæum Journal for December, 1850, and Jan. 1851. 4to.
- Jacob Bell, Esq., M.R.I. (the Editor).—The Pharmaceutical Journal for Jan. and Feb. 1851. 8vo.
- The Chemical Society — Quarterly Journal, No. 12. 8vo. 1851.
- The Asiatic Society of Bengal — Journal, No. 213. 8vo. 1850.
- The Editor — The Art-Journal for Jan. 1851. 4to.
- N. Bland, Esq., M.R.I. (the Author) — Persian Chess. 8vo. 1850.
- W. Salt, Esq., M.R.I. — Portrait of John Buckler, Esq., F.S.A. in 1847.—1850.
- W. Johnston, Esq., M.R.I. (the Author) — England as it is, Political, Social, and Industrial, in the middle of the Nineteenth Century; 2 vols. 12mo. 1851.
- The Syndicate of the Cambridge Observatory — Astronomical Observations made at Cambridge by the Rev. J. Challis; Vol. XVI. (1844-5). 4to. 1850.
- C. L. Prince, Esq., (the Author) — Results of a Meteorological Journal, kept at Uckfield, Sussex, in 1850. fol. 1851.
- The Horticultural Society of London — Journal, Vol. V. Part 4, and Vol. VI. Part 1. 8vo. 1850.
- B. C. Brodie, Esq., F.R.S., M.R.I., (the Author) — On the Condition of certain Elements at the Moment of Chemical Change, 4to. 1850.
- G. B. Airy, Esq. (Astronomer-Royal), Greenwich Astronomical, Magnetical, and Meteorological Observations for 1849. 4to. 1850.
- The Cambridge Philosophical Society — Transactions, Vol. IX. Part 1. 4to. 1851.
- Professor Piazzzi Smyth (the Author) — On a Method of Cooling the Air of Rooms in Tropical Climates. 4to. 1850.
- T. Turner, Esq., (the Author) — Remarks on the Amendment of the Law of Patents. 8vo. 1851.
- The Senate of the University of London — London University Calendar for 1851. 12mo.
- The Royal Medical and Chirurgical Society — Medico-Chirurgical Transactions, Vol. XXXIII. 8vo. 1850.