in the quantity and quality of the fuel employed. The space saved near the hammer and rolls by doing away with fire-places, separate chimney stacks, and stores of fuel, is also a considerable advantage in favour of the regenerative gas furnace in ironworks. The facility which it affords for either concentrating the heating effect or diffusing it equally over a long chamber, by effecting a more or less rapid mixture of the air and gas, renders the furnace particularly applicable for heating large and irregular forgings, or long strips or tubes which have to be brought to a welding heat throughout. It has already been applied to a considerable extent in Germany for heating iron, having been worked out there under the direction of the writer's eldest brother, Dr. Werner Siemens, who has also contributed essentially to the development of the system. The furnaces at the extensive iron and engine works of M. Borsig, of Berlin, are being remodelled for the adoption of this system of heating, as have also been those at the Imperial factories at Warsaw.

Another important application of the regenerative gas furnace is as a steel melting furnace, in which the highest degree of heat known in the arts is required, presenting consequently the greatest margin for saving of fuel. This application of the regenerative gas furnace is indeed rapidly extending in Germany, but has not yet practically succeeded in Sheffield, where it was also tried. It is, however, in course of application at the Brades Steel Works, near Birmingham. The arrangement of the reversing valves and the air and gas flues is similar to that in the glass furnace previously described.

Other applications of the regenerative gas furnace are being carried out at the present time, among which may be mentioned one to brick and pottery kilns for Mr. Humphrey Chamberlin, near Southampton; for Messrs. Cliff, of Wortley, near Leeds; and for Mr. Cliff, of the Imperial Potteries, Lambeth; also to the heating of gas retorts at the Paris General Gas Works, and at the Chartered Gas Company's Works, London. The description already given, however, is sufficient to show the facility with which this mode of heating may be adapted to the various circumstances under which furnaces are employed. The important application of the regenerative system to hot blast stoves for blast furnaces, by Mr. E. A. Cowper, has already been separately communicated to this Institution (See Proceedings Inst. M.E., 1860, page 54).

The experience hitherto obtained with the regenerative mode of heating shows that it is attended with the greatest proportionate advantage in localities where good coal is scarce, but where an inferior fuel abounds. This applies most forcibly to the South Staffordshire district, where the best coal in lumps is worth 12s. 6d. per ton, whereas good slack can be had at 3s. or 4s. per ton. The question gains, moreover, in importance when it is considered that, according to the best authorities, the thick coal of the district is coming to an end, while millions of tons of coal dust have accumulated, of no present commercial value, which, on being converted into gas in the manner described by means of the gas producers, would acquire a heating value equal at any rate to the same weight of the best coal in the manner in which it is at present used. Considering, also, the proximity of the pits to the ironworks in this district, it may be suggested whether the gas producers, being of very simple construction, might not with advantage be placed near the banks of fuel above or even under ground, the gas being conveyed to the works by a culvert, so as to supersede carting of the fuel. Such an arrangement might notably contribute to perpetuate the high position which South Staffordshire has so long maintained as an iron producing district.

LIST OF MINERALS

GIVEN IN THE "MANUAL OF THE MINERALOGY OF GREAT BRITAIN & IRELAND," BY ROBERT PHILLIPS GREG, F.G.S., AND WILLIAM G. LETTSOM. LONDON (1858), VAN VOORST.

Class I.—Non-Metallic Minerals.

ORDER.—I.—CARBON.

1. Graphite.
2. Coal.
   - *a.* bituminous coal.
   - *b.* non-bituminous coal.
   - *c.* brown coal.

ORDER II.—WATER.

3. Ice.

ORDER III.—RESIN.

4. Amber.
5. Copaline.
6. Middletonite.
7. Retenite.
8. Schleretinite.
9. Burytite.
10. Bitumen.
    - *a.* Naphtha.
    - *b.* Petroleum.
    - *c.* Elaterite.
    - *d.* Asphaltum.
11. Torbanite.
12. Ozocerite.
13. Hatchetine.

ORDER IV.—SULPHUR.

14. Sulphur.

ORDER V.—FLUORINE.

15. Fluor-spar.
16. Fluellite.

ORDER VI.—CHLORINE.

17. Rock-salt.
18. Sal-ammoniac.

ORDER VII.—CARBONATES.

19. Arragonite.
20. Calcite, &c.
21. Strontianite, &c.
22. Witherite.
23. Barytocalcite.
24. Alstonite.
25. Dolomite.
26. Brennerite.
27. Ankerite.
28. Hydrocalcite.
29. Pennite.
30. Hydromagnesite.

ORDER VIII.—OXIDES.

31. Brucite.

ORDER IX.—SULPHATES.

32. Anhydite.
33. Barytes.
34. Celestine.
35. Mascagnine.
36. Epsomite.
37. Alum.
38. Gypsum.
39. Websterite.

ORDER X.—PHOSPHATES.

40. Apatite.
41. Wavellite.
42. Childrenite.

ORDER XI.—SILEX AND SILICATES.

43. Quartz, &c.
44. Opal, &c.
45. Garnet, &c.
46. Idocrase.
47. Epidote, &c.
48. Zoizite?
49. Felspar.
50. Labradorite, &c.
51. Albite.
52. Saussurite?
53. Muscovite.
54. Biotite.
55. Staurolite.
56. Andalusite, &c.
57. Kyanite.
58. Beryl.
59. Spodumene.
60. Killinite.
61. Obsidian, &c.
62. Isopyre.
63. Iolite (Cordierite).
64. Zircon.
65. Olivine.
66. Gadolinite.
67. Allanite.
68. Wollastonite.
69. Augite, &c.
70. Bronzite.
71. Hypersthene.
72. Diallage.
73. Babingtonite.