

## INDEX

- 'Abnormal places,' 59  
 Accidents, 33, 144-146  
 Adits, 7-9, 13, 14, 21, 119  
 Administration, 141, 142  
 After-damp, 110  
 Air, compressed, 36, 83, 121  
   — distribution of, 115-118  
 Anthracite, 37-39, 51  
 Anticlines, 62, 63  
 Arber, Dr E. A. N., 49, 51  
 Arsenic in coal, 41  
 Ashburnham, 32  
 Ashton Moss Colliery, 86  
 Atmospheric or fire-engine, 17-20, 22-24  
 Average-clause, 139  
  
 Backs, 69  
 Bacteria in coal, 51  
 Balance-tub, 21  
 Balls (fuel), 36  
 Barnsley Seam, 56  
 Barren ground, 66, 67  
 Basins or coalfields, 61-63  
 Bat, 56, 134  
 Bearers, 8  
 Beaudesert Park, 38  
 Beaumaris Castle, 6  
 Beaumont, Master, 12  
 Beehive pits, 7  
 Bell-pits, 7  
 Bewdley, 4  
 Binds, 53, 56  
 Black damp, 111  
 Blasting, 17, 33, 83, 84, 93  
  
 Blenkinsop, John, 28  
 Blowers, 30, 32, 110, 145  
 Bloxwich, 61  
 Blue bricks, 54  
 Blyth, 5  
 Bolt-holes, 106  
 Bord-and-Pillar, 15, 95-103, 106;  
   ventilation of, 117, 118  
 Bord-and-Wall, 95  
 Bords, 96-99, 115  
 Boring, 12, 43-46, 64, 73-77, 148,  
   149  
 Boulton, Matthew, 27  
 Bovey Tracey, 41, 42  
 Brasses, 40  
 Brattices, 33, 101, 115, 116, 118  
 Breaks in seam, 58-61  
 Brejcha's method of boring, 76  
 Brereton, 119  
 Brewers, 5, 8  
 Bricks, 54, 57  
 Bridgnorth, 45  
 Broken working, 96, 98, 102, 103  
 Bronze-smelting, 3  
 Brora, 41  
 Brown Coal, 37, 38  
 Buddle, John, junr., 30  
 Bulman, H. F., and Redmayne,  
   R. A. S., Messrs, 143  
  
 Cage, 32, 128, 129  
 Caius, Dr John, 5, 10  
 Caking coals, 39  
 Camhous, Adam de, 5  
 Cannel Coal, 37, 38, 51

## INDEX

153

- Carbon dioxide, 111; monoxide, 111, 112  
 Carboniferous Limestone, 43, 63  
   — System, table of, 47  
 Carmarthenshire, 44, 78  
 Carnarvon Castle, 6  
 Cawley, John, 18  
 Chabauner, —, 36  
 Chain-pumps, 13, 19  
 Chains, winding-, 35  
 Charcoal, 3, 4, 11, 12, 16, 20, 32  
 Cheadle, 16  
 Cheshire, 76  
 Choke-damp, 111  
 Clanny, Dr W. R., 31  
 Claverley, 45  
 Cleat, 69, 88, 97, 98  
 Cleavage, 69  
 Clee Hills, 61  
 Clod, 53  
 Clunch, 53, 56  
 Coal, arsenic in, 41; iron-pyrite in, 40, 41; sulphur in, 40, 41  
   — conditions of deposition, 50  
   — duration of supply, 144; formation of, 51  
   — origin of, 50, 51; origin of name, 4  
   — output of, 11, 27, 142-144  
   — varieties of, 37-39, 51  
 Coals, combustion of, 39, 40  
   — geological age of, 41-44  
   — suitability of, 40, 41  
 Coalbrookdale, 19, 20, 22, 23, 45, 53, 59  
 Coal-cutting machines, 108, 109  
 Coal-dust, 112, 113  
 Coalfields or basins, origin of, 61-63  
   — Kent, 64; Northern, 84; Yorkshire, Derbyshire and Nottinghamshire, 64, 84, 96, 138  
 Coal Measures, characters of, 41-43, 52-58; organic remains of, 41, 47-49, 54, 57  
 Coal-seam, Barnsley, 56; Coleford High Delf, 59; Shallow, 119; Smithy, 55, 56; Thick or Ten-yard, 25, 57, 58, 105, 106  
 Coal-seat, 57  
 Coal-washing, 135  
 Coke, 11, 20, 40, 57, 135  
 Coking Coal, 37, 57  
 Coleford High Delf Seam, 59  
 Coleorton, 11  
 Collier, origin of name, 4  
 Collieries, Ashton Moss, 86; Florence, 85; Griff, 19, 22; Landshipping, 145; Nether-ton, 26, 29; Oaks, 144; Seng-henydd, 144  
 Combustion of coals, 39, 40  
*Compleat Collier, The*, 14  
 Compressed air, 36, 83, 121  
 Conditions of deposition of coal, 50  
 Cores, care of, 76, 77  
 Corf, 10, 14, 22, 24, 32  
 Cornish pumping-engine, 121  
 Costeaning, 73  
 Coursing the air, 21, 117  
 Cradley, 58  
 Crank, 23  
 Creep, 29, 30, 102  
 Crop, *see* Outcrop  
 Crush, 30, 101  
 Culm, 36  
 Cumberland, 27, 42  
 Curr, John, 24  
 Cutters, 69  
 Dams, 94  
 Darby, Abraham, 20  
 Dartmouth, 18

- Davy, Sir Humphry, 31, 122, 123  
 Davy-lamp, 31, 33, 111, 122, 123  
 Day-holes or Day-levels, 7, 9, 78, 79, 119  
 Dead rent, 137–140  
 Deep shafts, 85, 86  
 Dene, Forest of, 32, 52, 59, 78, 120  
 Derbyshire, 64, 96  
 Dhustone, 61  
 Dip, 67, 68, 72; 'to the dip,' 80  
 Dip-workings, 120, 125  
 Domesday Book, 3, 4  
 Dorset, 41  
 Double-road Stall, 95  
 Drainage, 12, 13, 17, 20, 118–121; free or natural, 8, 13, 32, 119, 120  
 Drifts, 72, 78, 79, 93; stone-, 91, 92, 116  
 Dry coals, 40  
 Dudley, 29  
 Dudley, Dud, 16, 20; Lord —, 25  
 Duff, 133  
 Dunstanborough Castle, 6  
 Durham County, 5, 6, 10, 33, 40, 96, 138  
 Dust, coal-, 112, 113  
 Dyers, 5  
 Dykes, 60  
 Edge-coals, 63  
 Edge-rails, 25, 35  
 Electric fans, 117; light, 123; power, 36, 83, 117, 121; shot-firing, 84; signals, 130  
 Elis, 2  
 Endless-rope haulage, 127, 128  
 Ends, 69, 97, 98  
 Engine, atmospheric or fire-, 17–20, 22–24; Cornish pumping-, 121; steam, early, 23, 27, 28; winding, modern, 35, 132  
 Engine-plane, 87, 89, 126  
 Etruria Maris, 47, 54  
 Explosions, 12, 16, 17, 21, 29, 32, 34, 112, 113  
 Explosives, 33, 100, 101  
 Face, 69, 97, 104  
 Face-airing, 15, 21, 117  
 Fans, ventilating, 33, 34, 114, 115  
 Fault rock, 90  
 Faults, normal, 66, 67; overthrust, 65, 66; driving through, 90–93; leader of, 90; step-, 66; 'throw' of, 66, 67; 'want' of, 66, 67  
 Fault-trough, 66  
 Ferruginous springs, 72  
 Finchale, 7, 8  
 Fireclay, 57  
 Fire-damp, 10, 16, 25, 30, 110, 112, 122, 123, 145; detectors, 123  
 Fire-engine, 17–20, 22–24  
 Fire-lamp, 16, 29, 33  
 Firemen, 25, 26  
 Fire-rib, 106, 107  
 Fires, underground, 10, 11, 15, 16; gob-fires, 105, 106, 111  
 Fire-setting, 16, 17  
 Firing the gas, 25, 26  
 Flat (putters'), 124  
 Flat ropes, 25, 34, 35  
 Floor, 57  
 Florence Colliery, 85  
 Fly-wheel, 23  
 Folds, 59, 60, 62–65  
 Foot-acre, 138  
 Forest of Dene, 32, 52, 59, 78, 120  
 Forest of Wyre, 4  
 Formation of coal, mode of, 51  
 Forth, Firth of, 4  
 Fossils of Coal Measures, 41, 47–49, 54, 57

## INDEX

155

- Fossils, use of, 46, 49, 50  
 Fourness, William, 34  
 Freezing, sinking shafts by, 82, 83  
 Fuels, patent, 35, 36, 133  
 Furnaces, iron-, 19, 23, 24, 32, 57; ventilating, 29, 33, 34, 114  
 Galeage, 137  
 Gannister, 57  
 Gas, *see* Fire-damp  
 Gas Coal, 37, 38, 41, 56  
 Gas-lighting, 27  
 Gateroads, 103, 104  
 Gateshead, 12, 17  
 Gebhardt's method of sinking, 83  
 Genoa, 2  
 Geological Survey, State, 15, 46, 70  
 Geological surveying, 69-71  
 Geological Systems, table of, 42  
 Geology of coal, 41-73  
 Gibson, Dr Walcot, 46, 49  
 Gig-brow, 125  
 Glamorgan, 54, 144  
 Glass-making, 12  
 Goaf or gob, 89, 96, 99, 102-105, 135  
 Gob-fires, 105, 106, 111  
 Graphite, 38  
 Graptolites, 44  
 Greece, 2  
 Green rock, 61  
 Griff Colliery, 19, 22  
 Guides, 24, 32, 128, 129  
 Gunpowder, 17, 33  
 Hade, 66  
 Hadrian's Wall, 3  
 Halesowen, 58  
 Hall, T. Y., 32  
 Hamstead, 105  
 Hand-picking, 134  
 Harraton, 33  
 Haulage, underground, 124-128  
 Heading, 72; cross-, 88  
 Headway, 96-99, 115  
 Hendre-forgan, 34  
 Heswall, 76  
 Hewing, 98, 100  
 Hill system of working, 95  
 Historical review, 1-37  
 Hodgson, Rev. John, 31  
 Holing, 98, 100  
 Holy Island, 8  
 Holyrood Abbey, 4  
 Hop-drying, 39, 41  
 Horse-gins, 13-15, 20, 22, 128  
 Horse-power, 13-15, 21, 27, 124, 125  
 House Coal, 37-39, 51, 56  
 Hydrogen sulphide, 112  
 Igneous intrusions, 60, 61  
 Inbye, term explained, 87  
 Inclined planes, 21, 24, 28, 87, 89  
 Intakes (air), 115-117  
 Introduction, 1, 2  
 Ireland, 39, 42  
 Iron, output of, 24, 32; furnaces, 19, 23, 24, 32, 57; ropes, 34, 130, 131; smelting, 3, 9-11, 16, 20, 23, 24, 27  
 Ironstone, 53, 54, 72  
 Jarrow, 31  
 Joints, 68, 69  
 Jurassic rocks, 41, 63, 64  
 Keeps, 130  
 Kent Coalfield, 64  
 Kidston, Dr Robert, 49  
 Kimeridge, 41  
 Kind-Chaudron method of sinking, 85  
 Kirving, 98

- Koenig's method of sinking, 83
- Labour, 9, 141-145
- Laccolite, 61
- Lamps, safety, 31, 33, 111, 122, 123; fire-, 16, 29, 33
- Lancashire, 57
- Land-sale, 78
- Landshipping Colliery, 145
- Laws regulating Coal Mining, 6, 146-148
- Leases, 136, 137
- Leeds, 28, 34
- Leicestershire, 11
- Leland, John, 5
- Level-course, 67, 93, 99
- Levels, day-, 7, 9, 78, 79, 119; winning-, 87-90, 99, 115
- Lichfield Cathedral, 38
- Lighting the mine, 121-123
- Lignite, 2, 37, 38, 41
- Liguria, 2
- Lime-burning, 3-6, 8, 10, 57
- Limit of working, 65
- Lithology of Coal Measures, 52-61
- Locomotive engine, 2, 28
- Longton, 85
- Longwall, 27, 89, 95-97, 103-106, 118; ventilation of, 118
- Ludgate Circus, 5
- Machines, coal-cutting, 108, 109
- Main-and-tail-rope haulage, 126, 127
- Main roads (underground), 87, 88
- Main-rope haulage, 126
- Malting, 39, 41
- Mansell, Robert, 12
- Marsh gas, 110
- Martin, John, 33
- Meinzies, Michael, 21
- Merthyr Tydfil, 28
- Methane, 110
- Millstone Grit, 43, 63
- Monkwearmouth, 31, 32, 35, 84
- Mostyn, 16
- Murdoch, William, 27, 28
- Necks, 60
- Netherton Colliery, 26, 29
- Newbattle Abbey, 4
- Newcomen, Thomas, 18
- Newminster Abbey, 4, 5
- Nicking, 97, 98, 100
- Nip-out, 59
- Norman period, 4
- Northumberland, 4, 5, 10, 42, 96
- Norway, 90
- Nottinghamshire, 64, 138
- Nuneaton, 19, 22
- Oaks Colliery, 144
- Officials, colliery-, 25, 26, 141, 142
- Old workings, 93, 94, 148
- Oligocene rocks, 41
- Open-work, 6
- Ordovician rocks, 43, 44
- Organic remains, 47-49
- Outbursts, 110
- Outbye, term explained, 87
- Outcrop, 6, 63-66, 68, 71, 72, 79
- Output of coal, 11, 27, 142-144; of iron, 24, 32
- Overlap, 58, 62
- Over-winding, 35, 131, 146
- Owen, George, 69
- Packwalls, 103, 105
- Panel-work, 30
- Papin, Denis, 18
- Parliament, Acts of, 146-8
- Patent fuels, 35, 36, 133
- Peat, 38
- Pembrokeshire, 66, 145

## INDEX

157

- Pennant Sandstone, 52, 120  
 Pensnett Chase, 16  
 Pen-y-daren, 28  
 Permian rocks, 43, 45, 63, 64, 84  
 Pickard, James, 23  
 Pillar-and-Stall, 95  
 Pillars, 15, 96, 97, 99, 115; removal of, 96, 99, 102, 103; size of, 101, 102  
 'Pit-and-adit' stage of mining, 7, 9  
 Pitmen, serfs, 9  
 Pit-mounds, 135  
 'Pit' stage of mining, 9  
 Plans of mines, 33, 147  
 Plate-rails, 25  
 Plessey, William of, 5  
 Plot, Dr Robert, 16  
 Poetsch's method of sinking, 82  
 Polesworth, 55  
 Pontoise, 6  
 Post-and-Stall, 95  
 Power, compressed air, 36, 83, 121; electric, 36, 83, 117, 121; horse, 13-15, 21, 27, 124, 125  
 Prospecting, 69-73  
 Pulley-frame, 130  
 Pumping, 18, 20, 22, 27, 120, 121  
 Pumps, chain-, 13, 19  
 Putters, 14, 124  
 Pyrite, iron-, 40, 41, 57, 72, 105, 112, 134, 135
- Quicksands, 82, 84, 85
- Radnorshire, 43  
 Radstock, 66  
 Rails, early forms of, 12, 19, 25, 35  
 Railways, 12, 19, 21, 22, 24, 25, 27, 35, 124  
 Rearers, 63  
 Records, mining, 147, 148
- Redmayne, R. A. S., and Bulman, H. F., Messrs, 143  
 Regulations, State, 33, 146-148  
 Rent, 'dead,' 'fixed,' 'minimum' or 'sleeping,' 137-140  
 Returns (air), 115-117  
 Rhodes, John, junr., 15  
 'Rise, to the,' 80  
 Roads, main (underground), 87, 88  
 Roadstone, 61  
 Rocket, The, locomotive, 28  
 Rolley-way, 124  
 Roman period, 3  
 Roof, 57  
 Ropes, flat, 25, 34, 35; hempen, 34, 35; wire, 34, 130, 131  
 Round coal, 133  
 Row Pit, Harraton, 33  
 Rowley Hills, 61  
 Royalties, 137-140  
 Ryan, James, 29  
 Ryton-on-Tyne, 32  
 Rugeley, 38
- Safety-lamps, 31, 33, 111, 122, 123  
 Salt-making, 8-11  
 Sands, quick-, 82, 84, 85  
 Savery, Thomas, 18  
 Saxon period, 3  
 Scotland, 42  
 Screens, 133, 134  
 Sea-coal, origin of term, 4, 5  
 Sea-coal Lane (London), 5  
 Seam, breaks in the, 58-61  
 Seam, Barnsley, 56; Coleford High Delf, 59; Shallow, 119; Smithy, 55, 56; Thick or Tenyard, 25, 57, 58, 105-107  
 Senghenydd Colliery, 144  
 Serfs, 9  
 Shaft-pillar, 86, 104  
 — section, 55

- Shaft-sidings, 88, 89  
 — sinking, 78–86  
 Shafts, deep, 85, 86; downcast, 16, 86, 87; pumping, 80, 120; upcast, 16, 86, 87; ventilating, 80; winding, 80, 86, 128  
 Shallow Seam, 119  
 Sheffield, 24  
 Shropshire, 3, 20, 24, 27, 32, 35, 45, 61, 64  
 Side of work, 106, 107  
 Signals, 130  
 Silurian rocks, 43, 45, 46  
 Single-road Stall, 95  
 Sinking of shafts, 78–86  
 Slants, 78, 79  
 Slide-fault, 66  
 Slips, 78  
 Slopes, 78  
 Slyne, 69  
 Smeaton, John, 22  
 Smelting of bronze, 3; of iron, 3, 9–11, 16, 20, 23, 24, 27  
 Smith, Andrew, 34  
 Smith-work, 3–6, 10  
 Smithy Seam, 55, 56  
 Smut, 56, 71  
 Soughs, 8, 119  
 Spedding, Carlisle, 21, 26  
 Splitting the air, 30, 117  
 Springs, ferruginous, 72; surface-, 85  
 Square-work, 96, 106–108  
 Staffordshire, 32 North, 46, 85, 86; South, 7, 15, 16, 19, 25, 35, 40, 45, 53, 54, 58, 61, 64, 80, 96, 105–108, 119, 121, 128, 135, 140  
 Staple-pit, 91, 93  
 State Geological Survey, 46, 70  
 State regulations, 33, 146–148  
 Statistics, 6, 11, 27, 143–145  
 Steam Coal, 37, 39, 57  
 Steam-engine, early, 23, 27, 28; modern, 35, 132  
 Steam-jet, 34  
 Steel-mill, 21, 29  
 Stentons, 88, 115, 116  
 Stephenson, George, 33, Robert, 28  
 Stewart, —, 34  
 Stife, 111  
*Stigmaria*, 48, 57  
 Stink-damp, 112  
 Stone Coal, 39  
 Stone drifts, 91, 92, 116  
 Stone-head, 81  
 Stoop-and-Room, 95  
 Stourbridge, 45, 57  
 Strike, 67, 68  
 Sulphur in coal, 40, 41  
 Sump, 86, 120  
 Sun-and-planet mechanism, 23  
 Sunderland, 14, 31  
 Surface-arrangements, 133–135  
 Survey, State Geological, 46, 70  
 Surveying, geological, 69–71  
 Sussex, 12, 32  
 Sutherland, 41  
 Sweat-damp, 111  
 Sweden, 90  
 Swelly, 59  
 Symon Fault, 59, 60  
 Synclines, 62, 63  
 Ten-yard or Thick Seam, 25, 57, 58, 105, 106  
 Theophrastus, 2  
 Thick or Ten-yard Seam, 25, 57, 58, 105, 106  
 Thill, 57  
 Thornborough, John, 11  
 Timbering, 89, 90, 100, 101, 103, 107  
 Tippler, 133  
 Trammers, 124

## INDEX

159

- Trams, 124  
 Trevithick, Richard, 28  
 Trias rocks, 43, 45, 63, 64, 84  
 Tubbing, 14, 24, 84, 85  
 Tubs, 124  
 Tynemouth, 5
- Underclay, 48, 50, 57, 65, 100  
 Underground fires, 10, 11, 15, 16;  
   gob-fires, 105, 106, 111  
 Underground haulage, 124–128  
   — water, 11, 12, 17, 118  
 Uronium, 3
- Varieties of coal, 37–39, 51  
 Ventilation, natural, 8, 13–15,  
   113; by fire-lamp, 16, 33; by  
   furnace, 29, 33, 34, 114; mod-  
   ern, 33, 34, 101, 109–118  
 Vivian, Andrew, 28
- Wages, 142–144  
 Wales, 32; North, 95; South,  
   32, 36, 39, 52–54, 72, 78, 95,  
   120, 137, 138  
 Wall, 96, 103  
 Wallsend, 30  
 Walsall, 19, 135  
 Warwickshire, 19, 55, 64, 95  
 Wasbrough, Matthew, 23  
 Washing of coal, 135  
 Wash-out, 59  
 Water, underground, 11, 12, 17,  
   118; winding of, 120
- Water-gates, 8  
 Water-wheels, 13, 19, 22, 23  
 Watt, James, 22, 23, 27, 28,  
   121  
 Way-leave, 140  
 Weathering of rocks, 53, 54  
 Wednesbury, 16, 19, 135  
 Wednesfield, 61  
 Westminster, 36; Palace, 5  
 White damp, 111  
 Whitehaven, 21, 26  
 Whole-working, 96–99  
 Wicket system of working, 95  
 Wigan, 38, frontispiece  
 Wilkinson, J. J., 31  
 Willenhall, 61  
 Winding of coal 32, 34, 128–132  
   of water, 120  
 Winding-chains, 35  
 Winding-engine, 35, 132  
 Windsor Castle, 6  
 Winlaton, 6  
 Winning the coal, 77–94  
   — levels, 87–90  
 Winsor, F. A., 27  
 Worcestershire, 16, 57  
 Working the coal, 95–109  
 Wroxeter, 3  
 Wyre Forest, 4
- Yorkshire, 56, 57, 64, 84, 96, 138,  
   143, 144  
 Yorkshire coast, coals of, 41