CONTENTS

	PAGE
Standard Abbreviations	17
Chemical Symbols	20
Engineering and Scientific Institutions	21
Units	26
Thermodynamics	34
Laws of Fluids	35
Workshop Mathematics	39
English Weights and Measures	51
Metric System	52
Permutations and Combinations	58
Trigonometry	59
Table of Slide-rule Gauge Points	68
Functions of Numbers	69
Natural Sines	79
Logarithmic Sines	81
Natural Cosines	83
Logarithmic Cosines	85
Natural Tangents	87
Logarithmic Tangents	89
Logarithms	91
Antilogarithms	94
Stress Formulæ for Beams	98
Values of I and Z for Various Sections	112
Stress Conversion Table	115, 116
Chords and Radians	116
Moduli of Sections and Moments of Inertia	117
Measuring Tools	118
The Micrometer	118
The Vernier	119
Universal Protractor	122
The Sine Bar	123
The Comparator	124
Drawing Office Practice	125
Patents, Designs, and Trade Marks	153
Heat Treatment	165
Pyrometers and Pyrometry	167
The Principles of Heat Treatment	170
Normalising and Annealing	175
Carburising	177
Heat Treatment of Gears	179
Alloy-steel Castings	182
Permanent-magnet Steels	185

PAGE

Metallurgical Terms 189
Alloys in Steel 193
Methods of Testing Hardness 198
Principles of Making Iron and Steel 201
Steels for Steel Castings 210
Speeds and Feeds for Tungsten-carbide Tools 213
Iron Castings 216
Refractory Materials 219
Pickling and Cleaning Cast Parts 220
Making Foundry Patterns 223
Mechanical Working of Steels 229
Standard Tolerances for Forgings 232
Steels for Cold Pressings 236
Non-ferrous Metals 246
Magnetic Crack Detection 259
Brinell's Hardness Numbers 265
Table of Elements 266
Specific Heats and Melting-points 269
Physical Constants of the Alloy-forming Elements . . . 270
Table of Principal Elements arranged in Order of Valency . . 271
Linear Expansion Coefficients 272
Relative Conversion Table of Hardness Values 273
Steel Tubes 274
Calculations for Tubular Beams and Cantilevers 280
Powder Metallurgy 288
Crack Detection 297
Diecasting 301
Pressure Diecasting 312
Plastics 317
Coolants and Cutting Compounds 353
Impregnating Porous Non-ferrous Castings 359
Reclamation of Worn Parts 363
Factory Lighting 370
Toothed Gearing 376
Loading of Gears 385
Calculating Change Gears 386
Epicyclic Gears 389
Gear-cutting 392
Standard Pitches of Gears 393
Chain Wheels 395
Ball and Roller Bearings 397
Setting Out Cams 437
Cam Design for Automatic Screw Machines 442
Cutting Cams on Milling Machines 444
External and Internal Dovetails 458

PAGE

Keys and Keyways 459
Spline Hobs 480
Capstan and Turret Lathes 481
Capacity of Turret Lathes 496
Cutting Speeds in R.P.M. for Required Surface Speed . . . 500
Turning Speeds for Tungsten-carbide Tipped Tools . . . 502
Capstan Lathe Attachments 506
Form Tools 507
Chucks 516
Screw Thread Terms 531
B.S. Specifications for Bolts, Nuts, and Rivets 532
B.S. Specifications for Screw Threads 534
Screw Thread Forms 534
Bolt and Screw Manufacture 540
Thread Rolling 543
Thread Milling 545
Thread Grinding 547
Screw Cutting 552
Change Wheels for Screw Cutting 557
Optical and Gauge Blocks 560
Machine Taps and Dies 566
Use of Die-heads and Chasers 571
Die-heads and Tappers 576
British Standard Whitworth Screw Threads 581
Whitworth Standard Hexagon Nuts and Bolts 583
Admiralty Fine Thread 583
British Standard Fine Screw Threads. 584
Polishing Spindle Speeds 584
British Association Screw Threads 586
British Standard Castle Nuts 587
Standard Brass Threads 588
British Standard Pipe Threads 590
American National Threads 592
Système Internationale Screw Threads 593
British Standard Cycle Threads 594
Acme Standard Screw Thread 595
Loewenherz Screw Threads 596
Model Screw Threads 596
Royal Microscopical Society Screw Thread 597
Royal Photographic Society Screw Thread 597
Watch Screw Taps 598
Twist Drill Gauge Sizes 600
Swiss Screw Thread 600
American National Fine Thread Series 601
American National Coarse Thread Series 602

PAGE

American 8-Pitch, 12-Pitch, and 16-Pitch Thread Series . . 603
29-Degree Worm Thread 604
Gas Threads 604
International Metric Fine Thread 605
Metric Thread (Trapezoidal) 606
Progress Threads 606
S.F. French Thread 607
French Standard Thread 607
French Metric Threads 607
German Metric Thread 608
German Metric Fine Thread 609
Screw Thread Gauge Tolerances 610
Cordeaux Screw Thread 612
British Standard Heads for British Association Screws . . 614
Sparking-plug Threads 616
Tolerances on Plated Screw Threads 617
Edison Type Electric-lamp Caps 618
Whitworth and B.S.F. Screw Heads 621
British Standard Black Nuts, Lock Nuts, and Bolt Heads . . 622
Dimensions of Wing Nuts. 623
American Standard Pipe Thread (Briggs) 624
Whitworth Standard Screws for Instrument and Watch Makers . 625
A.S.M.E. Standard Threads 626
Letter Sizes of Drills 627
United States Standard Form Thread 628
Wood-screw Proportions 630
Holtzapffel's Screw Threads 632
Speeds and Feeds 633
Shaping Machine Surface Speeds 635
Shapes for Lathe Shaper and Planer Tools 636
Cutting Speeds for Planer and Shaper Tools 639
Speeds for Tapping 639
Cutting Speeds for Twist Drills 640
Speeds and Feeds for Hacksaws 642
Speeds and Feeds for Flexible Back Bandsaws 643
Surface Speeds for Milling Cutters 646
Rake Angles for Milling Cutters 647
Metal Removal Rates 647
Speed and Feed Calculating Graph 648
Weights of Woods 651
Calculating Bending Allowances 652
Tube and Section Bending 657
Screw Threads for Water, Gas, and Steam Pipes. 664
Weights of Sheet Metal 669
Bending Bars 672

PAGE

Copper, Brass, and Steel Tube Bending 674
Rivet Spacing 675
Tube Bending Allowances 698
Wire Gauge Standards 699
Wire Abbreviations 699
Stub's Steel Wire Gauge 700
Lancashire Pinion Gauge Sizes 701
Mains Transformer Data 702
Birmingham or Stub's Iron Wire Gauge 703
Birmingham Gauge for Sheets and Hoops 703
Birmingham Wire Gauge for Silver and Gold 703
British Standard Wire Gauge 704
Warrington Wire Gauge 704
Instrument-wire Gauge 704
Millimetric Equivalents of S.W.G., B.G., and B. & S. 705
English Music Wire Gauge 706
Brunton Cast-steel Music Wire 707
American or B. & S. Wire Gauge 707
U.S. Standard for Steel and Iron Sheets and Plates 708
Alhoff & Muller Music Wire Gauge 708
Felten & Guilleaume Music Wire Gauge 708
W. N. Brunton Music Wire Gauge 709
Washburn & Moen, American Steel & Wire Co., and Roebling Wire Gauges 709
Poehlmann Music Wire Gauge 709
Roebling & Trenton Iron Co. Music Wire Gauges 710
American Steel & Wire Co. Music Wire Gauge 710
American Screw & Wire Co. Music Wire Gauge 710
Wright Wire Co. Music Wire Gauge 711
Enamelled Copper Wire 711
Decimal Equivalents of Wire and Drill Gauge 712
Eureka Resistance Wire 715
Fuse Wire Tables 716
Sheet Zinc Trade Gauge 717
Nickel Chrome Resistance Wire 717
Wire Rope 718
Copper Wire Data 719
Splicing Wire Rope 725
Bowden Cables 728
Wire Drawing 730
Gauge and Screw Thread Measurement 734
Optical Flats 764
Contour Measurement 769
Plug Gauges 789
Presswork 796

PAGE

Bending and Forming Dies 800
Press Selection 802
Standard Die Sets 815
Newall Limits 833
Soft and Hard Soldering 837
Melting-points and Strengths of Solders 838
Table of Decimal Equivalents 841
Taper Pins 842
Tapers and Angles 843
Standard Tapers 843
Weight of Steel Bars 844
Horse-power Required to Drive Machinery 845
Standard Wood Screws 847
Flooring Brads, Panel Pins, and Nails 848
Twist Drills for Wood Screws 848
Hob Terms and Proportions 850
Rivets and Riveting 852
Grinding 862
Grinding-wheel Speeds 875
Surface Grinding 881
Centreless Grinding 882
Metal Polishing 883
Barrelling 887
Automatic Polishing 889
Electrolytic Polishing 889
Metal Degreasing 890
Electroplating 895
Nickel-plating 897
Chromium-plating 900
Chemical Colouring of Metals 906
Milling and Milling Machines 909
Indexing 913
Cutting Speeds for Milling Cutters 933
Selecting Cutter for Milling Spiral Gears 935
Negative Rake Milling 936
Index Table for Milling Machines 941
Belts and Pulleys 942
Surface Broaching 950
Spanner Proportions 956
Power Required to Blank Pressings 958
Relation of Load to Stress on Rivets 959
Production Control 960
Time and Motion Study 982
Rate-fixing 982
Setting Times 986

PAGE

Calculation of Machining Times 995
Nomogram for Ascertaining Cutting Speeds 997
Bearings 998
Design of the Work-place 1001
Quality Control 1002
Works Cost Accounts 1030
Wage Incentive Plans 1060
Springs 1064
Spring Ends 1068
Machine Knobs and Handles 1073
Parallelogram of Forces 1078
Centrifugal Force and Tension 1079
Moments of Inertia 1080
Pulleys 1081
Levers 1082
The Screw and the Pendulum 1083
Compressed Air 1085
Planing and Shaping 1091
Drills and Drilling 1094
Drilling Speed Table 1096
Drill Grinding 1097
Drill Angles for Soft Materials 1099
Decimal Equivalents of Standard Drill Sizes 1100
Bit Stock Twist Drills 1105
Tapping Sizes for Whitworth, B.S.F., and B.A. Threads . . 1105
Weights of Various Substances 1106
Countersinking 1107
Couplings 1111
Portable Tools—Electric 1119
Portable Tools—Pneumatic 1124
Cutting Tools 1125
Reamers. 1135
Saws and Sawing 1138
Bandsaw Speeds 1139
Jigs, Tools, and Fixtures 1141
Lathe Work 1160
Lathe Terms 1171
Foundry Practice 1173
Hydraulics 1185
Heating and Ventilation 1192
Boilers 1197
Conveyors 1205
Cranes 1207
Welding 1208
Silbronze Welding 1224

PAGE

Lubricants 1225
Internal-combustion Engines 1229
Table showing Relation between Engine Revolutions per Minute and Speed in Miles 1231
Equivalent Miles and Kilometres per Hour 1233
Brooklands Track Data 1233
Panel Beating. 1234
Pipe Unions, Joints, and Glands 1235
Aeronautical Engineering. 1241
Materials for Aircraft Construction 1268
Aluminium Alloys—Classification and Heat Treatment . . 1269
Strength Values of Timbers 1274
Stampings and Forgings 1276
Aero Castings 1277
Mensuration 1278
Radio Formulæ 1286
Index 1291
Index to Advertisers 1325