

## INDEX OF SUBJECTS

*The numbers refer to the pages*

- $\alpha$  Aquilae** (Altair), 7, 53  
 **$\alpha$  Aurigae** (Capella), 41, Plate VI (p. 49), 57, 59  
 **$\alpha$  Bootis** (Arcturus), 41, Plate VI (p. 49), 56, 59  
 **$\alpha$  Canis Maj.** (Sirius), 5, 7, 31, 33, 41, Plate VI (p. 49), 58, 59, 129, 130, 182  
 **$\alpha$  Canis Min.** (Procyon), 7, 33, 41, Plate VI (p. 49), 63, 182  
 **$\alpha$  Centauri**, 5, 7, 8, 23, 24, 31, 33, 59, 129, 130, 298  
 **$\alpha$  Cygni** (Deneb), 41, 53  
 **$\alpha$  Lyrae** (Vega), 8, 31, 41  
 **$\alpha$  Orionis** (Betelgeux), 41, Plate VI (p. 49), 56, 59, 129  
 **$\alpha$  Scorpii** (Antares), 56, 59  
 **$\alpha$  Tauri** (Aldebaran), 41, 53  
 **$\alpha$  Ursae Min.** (Polaris), 41, 53, 313, 382  
**Absorption-lines** in stellar spectra, 48, 49  
**Absorption of radiation**, 83  
**Adiabatic equilibrium**, 61, 92, 258  
**Age of the earth**, 396, 409  
   " universe, 139, 381, 421  
**Ages of the stars**, 129, 130, 139, 185, 316 ff., 376, 380, 381, 417  
**Albert** (asteroid), 4  
**Aldebaran**, 41, 53  
**Altair**, 7, 53  
**Andromeda**, nebula *M* 31 in, Plates I (p. 15), VII (p. 331), VIII (p. 332), 15, 18, 19, 333, 352  
**Angstrom unit** ( $\text{\AA}$ ), 39  
**Annihilation of matter**, 113, 127, 135, 139, 418  
**Antares**, 56, 59  
**Arcturus**, 41, Plate VI (p. 49), 56, 59  
**Asteroids**, 3  
**Atomic diameters**, 48, 412  
   " numbers and atomic weight of stellar matter, 102, 103, 108, 112, 134, 161, 167, 380, 419  
   " structure, 412  
 **$\beta$  Cephei**, 382, 390  
 **$\beta$  Lyrae**, 288, 289  
 **$\beta$  Orionis** (Rigel), 41, 53  
**B-type stars**, system of, 375  
**Belt of Orion**, 3, 24  
**Betelgeux**, 41, Plate VI (p. 49), 56, 59, 91, 129  
**Bifurcation**, points of, 189  
**Binary stars**, 20, 225, 288, 310, 323  
   " " eccentricities and periods of, 21, 289, 290, 291, 295, 301, 305, 306, 307  
   " " mass-ratio in, 326  
   " " number of, 22  
   " " planes of orbits of, 379  
   " " spectroscopic, 20, 288, 290, 310, 325, 326, 327  
   " " visual, 20, 178, 291, 310  
**Birth of stars**, 328, 350, 380  
**Bolometric correction**, 43, 45, 46  
   " magnitude, 42, 48  
**Braking action of radiation**, 274  
**Calcium clouds**, 28  
**Capella**, 41, Plate VI (p. 49), 57, 59, 180  
**Cepheid parallaxes**, 10, 18, 25  
   " variables, 11, 12, 23, 382, 387, 388, 391, 394  
**Chemical elements**, 51  
   " " in solar spectrum, 51  
   " " in stars, 133, 134  
**Clusters** (globular), 12, Plate III (p. 25), 25, 26, 372, 377  
   " (moving), 24, 26, 372, 375, 379, 417  
   " (open), 26  
**Collisions of stars**, 319  
**Colour-index**, 42, 43, 45, 54  
**Companion of Sirius** (Sirius *B*), 33, 58, 59, 182, 182  
**Condensations in spiral nebulae**, 345, 379, 416  
**Contraction-theory of stellar energy**, 110, 122  
**Convection currents**, 69, 92, 93  
 **$\delta$  Cephei**, 11, 383, 387  
**Decrease of stellar mass**, 114, 131, 298, 417  
**"Degeneracy" of stellar gas**, 74  
**Deneb**, 41, 53  
**Density of star distribution in space**, 8, 12, 15, 17, 368  
**Density distribution inside a star**, 91, 282  
**Distances**, stellar, 1, 5, 9  
   " nebular, 18, 341  
**Dwarf stars**, 61  
**Dwarfs (white)**, 63, 132, 143, 160, 165, 180, 181, 182, 184, 185, 419

- Earth-moon system**, 406, 407, 408  
**Eccentricity** of binary orbits, 288, 289, 290,  
     291, 295, 301, 305, 324  
     ,, of planetary orbits, 409  
**Eclipse**, flash spectrum at solar, 49  
**Eclipsing variables**, 22  
**Effective temperature**, 36, 37, 41, 54, 55  
**Ellipsoidal law** of velocity distribution, 362, 369  
**Emission lines** in stellar spectra, 48, 138  
**Encounters of stars**, 317, 416  
**Energy of stellar radiation**, 109  
**Equipartition of energy**, 308, 322  
**Evolution of nebulae**, 352  
     ,, stars, 166 ff., 184, 185, 380, 393  
     ,, star-clusters, 376  
  
**Fission of stars**, 176, 179, 180, 268, 388, 390  
     ,, theory of Cepheid variation, 388, 391  
**Flash spectrum**, 49  
**Friction**, tidal, 231, 293  
  
**Galactic coordinates**, 16  
     ,, system of stars, 14, 361, 368, 377, 378  
**Gaseous stars**, theory of, 64  
**Giant stars**, 61, 179, 419  
**Globular clusters**, 12, 18, 26, 372, 377, 380  
**Gravitational instability**, 345, 351, 379, 415  
  
**Hercules**, globular cluster in, Plate III (p. 25)  
**Hidalgo** (asteroid), 4  
**Highly penetrating radiation**, 137  
**Homologous configurations of stars**, 65, 119  
**Hyades**, 24  
  
**Ionisation of stellar matter**, 53, 72, 133, 139,  
     150, 159, 169  
**Irregular long-period variables**, 392  
**Irregular nebulae**, 18, 28, 333  
**Island universes**, 19, 331  
  
**Jacobian ellipsoids**, 211, 215, 223, 388  
**Jupiter**, system of, 3, 4, 396, 397, 399, 406, 407  
  
**Kruger 60**, 7, 58, 59, 74, 129  
  
**Lane's Law**, 64  
**Laplace's nebular hypothesis**, 255, 353, 396  
**Light-year**, 6  
**Linear series of equilibrium configurations**, 188  
**Liquid stars**, 140, 179, 183, 184  
**"Local System" of stars**, 17, 362  
**Long-period variables**, 382, 391  
**Luminosity**, stellar, 30  
     ,, -function, 34, 328  
  
**M 31, M 32, M 33, etc.** See under N.G.C. below  
**Magellanic clouds**, 11, 331, 333, 340, Plate XI  
     (p. 341), 341  
  
**Magnitude**, absolute, 31  
     ,, apparent, 32  
     ,, bolometric, 43, 48  
     ,, photographic, 42, 44, 48  
     ,, visual, 42, 44, 48  
**Main sequence**, 63, 179, 185  
**Mars**, 5, 407, 408  
**Mass**, diminution of stellar, 114, 131, 298, 417  
     ,, -luminosity relation, 83, 98, 130, 131, 141  
     ,, -luminosity-temperature relation, 95, 172,  
     174, 183, 184  
**Matter, annihilation of**, 113, 127, 132, 135,  
     139, 418  
**Maxwell's law** of velocity distribution, 302, 361,  
     368, 369, 371  
**Mercury**, 4, 5, 407, 408  
**Milky Way**, 14, 17, 361  
**Moon**, 406, 407, 408  
**Moving clusters of stars**, 24, 372, 417  
**Multiple stellar systems**, 23, 311  
  
**N.G.C. 221 (= M 32)**, Plates I (p. 15), IX (p. 334),  
     341, 342  
     ,, 224 (= M 31), Plates I (p. 15), VII (p. 331),  
     VIII (p. 332), 15, 18, 19, 333, 338,  
     341, 343, 352  
     ,, 598 (= M 33), Plate XI (p. 341), 18, 19,  
     341, 358  
     ,, 891, Plate II (p. 18)  
     ,, 1232, 358  
     ,, 1501, Plate IV (p. 27)  
     ,, 1976 (= M 42), Plate V (p. 28), 28  
     ,, 2022, Plate IV (p. 27)  
     ,, 2392, Plate IV (p. 27)  
     ,, 2835, 358  
     ,, 2841, Plate X (p. 336)  
     ,, 2859, Plate X (p. 336)  
     ,, 3031 (= M 81), Plate XII (p. 351), 333  
     ,, 3034 (= M 82), Plate IX (p. 334)  
     ,, 5115, Plates IX (p. 334) and XIII (p. 355)  
     ,, 3379, Plate IX (p. 334)  
     ,, 4231, 358  
     ,, 4250, 358  
     ,, 4359, Plate XVI (p. 405)  
     ,, 4401, Plate XVI (p. 405)  
     ,, 4449, Plate IX (p. 334)  
     ,, 4565, Plate XIII (p. 355)  
     ,, 4594, Plates X (p. 336) and XIII (p. 355),  
     333, 338, 352  
     ,, 4621 (= M 59), Plate IX (p. 334)  
     ,, 4826 (= M 64), Plate XIV (p. 357)  
     ,, 5194 (= M 51), Plate XV (p. 358), 358  
     ,, 5247, 358  
     ,, 5278-9, Plate XVI (p. 405)  
     ,, 5457 (= M 101), Plate X (p. 336), Plate  
     XV (p. 358), 341, 358  
     ,, 5746, Plate XIII (p. 355)

## Index of Subjects

425

- N.G.C. 5850**, Plate X (p. 336)  
 „ 5866, Plate XIII (p. 355).  
 „ 6720 (= *M* 57), Plate IV (p. 27)  
 „ 6822, 18, 341  
 „ 7009, Plate IV (p. 27)  
 „ 7217, Plate XIV (p. 357)  
 „ 7479, Plate X (p. 336)  
 „ 7662, Plate IV (p. 27)
- Nebulae**, elliptical, 18, 332, 334  
 „ extra-galactic (great), 18, 29, 331 ff., 415  
 „ extra-galactic, masses of, 352, 353, 415  
 „ irregular, 18, 28, 333  
 „ spindle, 18, 333  
 „ spiral, 12, 18, 332, 357, 379
- Nebular hypothesis** of Laplace, 255, 353, 396
- Neptune**, 4, 5, 408
- o **Ceti**, Plate VI (p. 49), 63, 392
- Orion**, belt of, 24  
 „ great nebula in, Plate V (p. 28), 18, 28
- Pallas** (asteroid), 4
- Parallax** (defined), 6  
 „ Cepheid, 10, 18, 25  
 „ spectroscopic, 10
- Parsec** (defined), 6
- Partial stability**, 239, 293
- Pear-shaped configurations** of a rotating mass, 216, 221
- Fearce's star** (H.D. 1337), 57, 92, 120, 129, 288, 289
- Period-luminosity law**, 11, 12, 385
- Planetary nebulae**, 27  
 „ systems in space, 409, 416, 420
- Planetesimal theory**, 399
- Planets**, 3, 399, 405 ff., 409, 420
- Plaskett's star** (B.D. 6°, 1309), 32, 57, 92, 109, 120, 129, 185
- Pleiades**, 24, 380
- Poincaré's Theorem** ( $2T + W = 0$ ), 67  
 „ „ (rotating masses), 279
- Polaris**, 41, 53, 313, 382
- Pressure of radiation**, 37, 74, 141  
 „ „ in liquid stars, 141, 142
- Procyon**, 7, 33, 59, 63, 132, 182
- Proxima Centauri**, 5, 7, 23, 24, 32, 59
- Pulsations of gaseous stars**, 384, 393, 394
- R Scuti**, 392
- Radiation**, 35 ff.  
 „ energy of, per unit volume, 37, 79  
 „ partition of energy of, 37  
 „ pressure of, 37, 74, 80
- Radiative equilibrium**, 79, 80  
 „ transfer of energy, 77, 79  
 „ viscosity, 270, 277
- Radii of stars**, 47, 60, 419
- Radioactivity**, 111, 127, 135
- Resisting medium**, effects of, 408, 409
- Roche's limit**, 232, 243
- Rotating stars**, 194, 206, 223, 245, 268, 279, 284, 411  
 „ stellar systems, 371
- Rotation of nebulae**, 333, 414, 415
- Satellites**, the birth of planetary, 399, 406
- Saturn**, rings of, 243, 407  
 „ system of, 3, 4, 7, 243, 255, 406, 407, 408
- Secular decrease of mass**, 114, 131, 298, 417
- Secular instability**, 199, 201
- Sirliometer**, 6, 32
- Sirius**, 5, 7, 31, 33, 41, Plate VI (p. 49), 58, 59, 129, 130, 182  
 „ companion of (Sirius *B*), 33, 58, 59, 74, 132, 182
- Solar constant**, 36  
 „ spectrum, 49, 51, 53  
 „ system, 3, 4, 394 ff.  
 „ „ origin of, 395 ff., 400, 416
- Spectra**, stellar, 48, 53
- Spectral type**, 52, 292
- Spectroscopic parallaxes**, 10
- Spiral nebulae**, 12, 18, 332, 357
- Stability** of motion of stellar systems, 367  
 „ „ stellar structures, 117, 144, 149, 190  
 „ „ rotating stars, 212, 221  
 „ ordinary, of a dynamical system, 190, 198, 214  
 „ secular, 199, 201  
 „ „ of binary systems, 229, 236  
 „ „ „ Maclaurin spheroids, 214  
 „ „ „ Jacobian ellipsoids, 215  
 „ „ „ pear-shaped configurations, 221
- Star-clouds**, 17, 18
- Star-clusters** (globular), 12, Plate III (p. 25), 25, 26, 372, 377  
 „ (moving), 24, 26, 372, 375, 379  
 „ (open), 26
- Star-streaming**, 362, 366, 368
- Stellar distances**, 1, 5  
 „ luminosities, 30  
 „ magnitudes, 30  
 „ radiation, 35  
 „ radii, 47, 60, 419  
 „ spectra, 48, 53  
 „ velocities (law of distribution), 302, 361, 368, 369, 371
- Sun**, physical data for, 55
- Surface-brightness** of nebulae, 339

- Taurus cluster**, 24, 26, 375  
**Temperature-luminosity diagram**, 60, 61, 161, 183, 184  
 „ of stellar interiors, 68, 72, 73, 92, 163, 170  
 „ „ „ surfaces, 54, 55, 60  
**Tidal friction**, 231, 293  
**Tidal theories** of origin of solar systems, 398, 400, 409, 416  
**Trifid nebula**, 28, Plate V (p. 28)  
**Triple star-systems**, 23, 311
- Uranus**, 4, 408  
**Ursa Major cluster**, 24, 375, 380
- V Puppis**, 58, 109, 129, 288  
**Variable stars**, 23, 382 ff.  
**Vega** ( $\alpha$  Lyrae), 8, 31, 41  
**Velocity-distribution** of stellar motions, 302, 361, 368, 369, 371  
**Venus**, 5, 407, 408  
**Viscosity**, 268, 270, 286
- W Crucis**, 180, 392  
**White dwarfs**, 63, 132, 143, 160, 165, 180, 181, 182, 184, 185, 419
- Zodiacal light**, 409

## INDEX OF NAMES

*The numbers refer to the pages*

- Abbott**, 41, 56, 57, 58  
 „ and Fowle, 36  
**Adams, W. S.**, 10, 283  
 „ and Joy, 62, 383  
 „ Joy and Humason, 63  
 „ „ „ Russell, 128, 167, 169  
 „ and Kohlschütter, 10, 50  
**Aitken**, 58, 182, 290, 291, 292, 293, 326, 327, 379  
**Ambarzumian** and Kosirev, 79  
**Anderson**, 74  
**Aristarchus** of Samos, 6  
**Aston, F. W.**, 112  
  
**Babinet**, 395, 398  
**Balley, S. L.**, 25, 390  
**Baker, H. F.**, 223  
**Baker, R. H.**, 336  
**Bessel**, 7  
**Boss**, 26  
**Bowen**, 137  
**Bradley**, 6  
**Brill**, 44  
**Brown, E. W.**, 359  
**Bruggencate**, 390  
**Bryan**, 214  
**Burnham**, 313  
**Burton**, 137  
  
**Campbell, W. W.**, 27, 28  
 „ and Moore, 28  
**Chamberlin** and Moulton, 399  
**Chapman, S.** and Melotte, 14  
**Charlier**, 6, 17, 18, 375  
**Chevalier**, 283  
**Coblentz**, 35, 41, 43, 56  
**Compton**, 138  
**Cook**, 137  
**Copernicus**, 36  
**Courvoisier**, 313  
**Curtis**, 339, 377  
**Curtiss** and Rufus, 48  
  
**Darwin (Sir G. H.)**, 206, 210, 211, 216, 219,  
 222, 223, 231, 233 ff., 250, 294  
**Descartes**, 72  
**Dirac**, 138, 181  
**Dugan** (Russell, Stewart and), 46, 50, 54, 55  
**Dyson (Sir F. W.)**, 283  
  
**Eddington, A. S.**, 46, 67, 73, 75, 79, 82, 83, 84,  
 94, 98, 112, 126, 128, 130, 141,  
 166, 170, 181, 366, 384, 387  
**Einstein, A.**, 48, 50, 112, 127  
**Emden**, 70, 75, 77, 90, 271  
  
**Fechner**, 30  
**Fermi**, 74, 181  
  
**Fouché**, 396  
**Fowle** (Abbott and), 36  
**Fowler, R. H.**, 150, 181  
 „ and Milne, 50, 52, 53, 57  
**Fox**, 283  
**Fraunhofer**, 49  
**Freundlich**, 80  
**Frost**, 22  
**Furner** (Jackson and), 370  
  
**Galileo**, 3, 6, 268  
**Gordon**, 138  
**Gray**, 139  
**Groot**, 358  
  
**Halm**, 303  
**Hardcastle**, 339  
**Hartmann**, 28  
**Helmholtz**, 110  
**Henderson**, 7  
**Henroteau**, 390  
**Herschel (Sir W.)**, 6, 14, 16, 18, 26  
**Herschel (Sir J.)**, 14, 26, 30  
**Hertzprung**, 21, 22, 24, 43, 46, 61, 62, 128,  
 167, 169, 310, 383  
  
**Hinks, A. R.**, 25  
**Hipparchus**, 30  
**Holetschek**, 339  
**Holmes**, 110, 395  
**Hopf**, 80  
**Hopman**, 339  
**Hubble, E.**, 12, 18, 19, 138, 331, 332, 333, 339,  
 340, 341, 343, 350, 352, 357, 414  
**Huggins (Sir W.)**, 166  
**Hull** (Nichols and), 37  
**Humason** (Adams, Joy and), 63  
  
**Jackson, J.** and Furner, 370  
**Jacobi**, 206, 209  
**Jeffreys**, 397, 398, 409  
**Jonckheere**, 24, 313  
**Joy**, 392  
 „ (Adams and), 62  
 „ (Adams, Humason and), 63  
 „ (Russell, Adams and), 128, 167, 170  
  
**Kant**, 353  
**Kapteyn**, 14, 15, 16, 17, 34, 316, 362, 363, 369  
**Keeler**, 27  
**Kelvin** (Lord), 199, 206  
**Kepler**, 7  
**Klein** and Nishina, 139  
**Kobold**, 6  
**Kohlschütter** (Adams and), 10, 50  
**Kolhörster**, 137  
 „ and van Salis, 137  
**Kosirev** (Ambarzumian and), 79  
**Kramers**, 83

- Kreiken**, 379
- Lamb, H.**, 201, 204, 210, 268, 286
- Lane, J. H.**, 65
- Laplace**, 4, 70, 255, 265, 347, 353, 355, 357, 397, 411, 412
- Leavitt**, 11
- Lebedew**, 37
- Liapounoff**, 206, 222, 223
- Lindemann**, 135
- Lockyer (Sir J. N.)**, 166
- Lundmark**, 359, 380
- Maclaurin**, 206, 209
- McLennan**, 137
- Maunder**, 283
- Maxwell, J. Clerk**, 1, 37, 323
- Mayer, R.**, 109
- Melotte**, 25  
 „ (Chapman and), 14
- Menzel**, 178
- Meyer, C. O.**, 211
- Millikan, R. A.**, 35, 137
- Milne, E. A.**, 80, 84, 94  
 „ (R. H. Fowler and), 50, 52, 53, 57
- Moore**, 58  
 „ (Campbell and), 28
- Moulton, F. R.**, 395  
 „ (Chamberlin and), 399
- Münch**, 41
- Newkirk**, 27
- Newton (Sir Isaac)**, 7, 115, 352, 353, 415
- Nichols and Hull**, 37
- Nicholson (Pettit and)**, 43, 47
- Nishina (Klein and)**, 139
- Nort**, 18
- Nutting**, 40, 46
- Ohlsson**, 142
- Oort**, 18
- Fahlen, van**, 358
- Pannekoek**, 17, 93
- Payne**, 50, 52
- Pearce**, 57
- Pease**, 333, 338  
 „ and Shapley, 25
- Perrin**, 112, 113, 126
- Persico**, 271
- Pettit and Nicholson**, 43, 47
- Planck**, 35
- Plaskett**, 18, 28, 32, 41
- Plateau**, 212
- Plummer**, 25, 384
- Pogson**, 30
- Poincaré, H.**, 67, 188, 192, 206, 215, 222, 223, 248, 249, 264, 279, 320, 397
- Ptolemy**, 6, 30
- Raab**, 26
- Rasmuson**, 375
- Redman, H. O.**, 63
- Reesinck**, 387
- Reynolds, J. H.**, 358
- Ritter**, 123
- Roberts**, 289
- Roche**, 225, 227, 229, 232, 243, 251, 255, 265
- Rosenberg**, 41
- Rosseland**, 84, 93, 138
- Rufus (Curtiss and)**, 152
- Russell, H. N.**, 23, 56, 62, 127, 168, 169, 170, 185, 295, 313, 314  
 „ Adams and Joy, 128, 167, 169  
 „ Dugan, and Stewart, 46, 50, 54, 55
- Rutherford (Sir E.)**, 137
- Saha, M. N.**, 50, 53, 150
- Sampson, R. A.**, 41, 56, 57, 58, 79
- Scheiner**, 41
- Schuster (Sir A.)**, 70
- Schwarzschild**, 79, 199, 216, 222, 362, 379
- Seares**, 17, 34, 46, 54, 56, 183, 303, 307, 308, 316, 385  
 „ and van Rhijn, 14, 370
- Seeliger**, 6, 14
- Shajn**, 328
- Shapley, H.**, 11, 12, 17, 18, 24, 25, 289, 290, 380, 383, 384, 386, 387, 390  
 „ (Pease and), 25
- Slipher**, 25, 333
- Smart**, 328
- Stefan**, 35
- Stewart (Russell, Dugan and)**, 46, 50, 54, 55
- Stromberg**, 18
- Struve**, 7
- Struve, Otto**, 23, 57, 391
- Tait (Thomson and)**, 199, 210
- Thomson (Sir J. J.)**, 115
- Thomson (Sir W., Lord Kelvin)**, 199, 206, 210
- Trumpler**, 377, 380, 381
- Turner, H. H.**, 6, 24, 366
- Van Maanen**, 27, 59, 359
- van Fahlen**, 358
- van Rhijn (Seares and)**, 14, 17
- van Sals (Kohörster and)**, 137
- v. Zelpel**, 94
- Vogt**, 118, 328, 392
- Voute**, 289
- Walkey**, 18
- Wegner**, 80
- Wien**, 35
- Wilsing**, 41
- Wolf**, 333
- Zessewitsch**, 391