

Astron. Astrophys. Suppl. Ser. **45**, 129-144 (1981)

Untrivial redshifts : a bibliographical catalogue

H. J. Reboul

Laboratoire d'Astronomie, Université des Sciences et Techniques du Languedoc, Montpellier, France

Received October 31, accepted December 11, 1980

Summary. — We present 780 coded references covering 70 years in the problem of *anomalous* — hereafter *untrivial* (NT) — redshifts (Z).

An arbitrary definition is primarily settled for *trivial* Z and *classical* theories. 17 classes of untrivial redshifts (NTZ) (part 1) and 19 classes of *unclassical* theories (part 2) are investigated in that frame.

Part 3 is the coded catalogue of references. Each paper has a three-digit hexadecimal number in addition to its serial number. That code and the place of the reference in parts 1 or 2 must help the reader to outline a profile for each paper.

Covering stopped at mid-78. An extension to mid-80 has been added for the most observational parts of the study : That extension, when present, is clearly announced in each class by a star (*).

A more elaborated french text (parts 1 and 2) is available on simple request from the author.

Key words : redshifts — untrivial — catalogue.

Introduction. — The interpretation of redshifts has been one of the most controverted subjects in Astronomy during the seventies.

Nevertheless the question of *anomalous redshifts* is actually seventy years old.

As the numerous argumentations on this subject are connected with a wide range of scopes, a classified catalogue of the related papers appeared useful.

This study involved the arbitrary choice of a criterion of anomaly or-to avoid a prejudice — of « untriviality » and, as a consequence, the arbitrary definition of a set of theories labelled as *classical*.

We arbitrarily define as *trivial* a redshift which can be easily explained by a combination of the three following effects : Doppler, Schwarzschild, Friedmann.

Those three effects presently are the only sources of clean redshifts (without diffusion and unrelated to frequency) to be widely accepted (save for the Friedman models which are an additional choice).

We define as *classical* :

- the theories which are widely accepted as ascertained by laboratory experiments,
- the three effects above-mentioned,
- the consequences of the three effects : relativistic effects, black holes, Big Bang...

The explicit choice is a frame of work and not the obvious author's own answer to the problem of redshifts : as a frame of work it is not very surprising if it coincides with that of the *center of mass* of the present thoughts in our astronomical community.

Part 1 displays 17 classes of untrivial redshifts (NTZ).

Part 2 is a compilation of 19 classes of *unclassical* theories.

Part 3 is the proper bibliography. Each reference has two numbers : a serial number (called in parts 1 and 2) and a code number (3-digit hexadecimal).

The search and the working out of that catalogue took its place in the years 74 to 78. Covering stopped at mid-78. A lengthening has been performed at mid-80. It acts on the only most observational aspects of the question. This lengthening is, when present, announced by a star (*) in the class or sub-class of parts 1 and 2.

There is no pretension to exhaustivity in the first part and even less in the second one : unclassical theories often are published in non-astronomical journals which have been explored less systematically.

The frontiers of the subject moreover remain blurred in spite of the arbitrary definition of the frame and the selection or reject of a paper has been sometimes depending on a subjective choice.

Two papers (224, 674) (*) which include more than 200 references each brought a substantial help to this work chiefly in the range of elder articles.

Un texte français de 50 pages constituant une présentation plus détaillée du sujet (parties 1 et 2) est disponible, sur simple demande auprès de l'auteur.

1. Untrivial redshifts (NTZ) in the frame of classical theories. — 1.1 NTZ AT THE SUN SURFACE. — First cases (639, 679). Following (226, 679, 506, 637, 638, 655, 343, 459, 682, 652). Classical explanations (143, 347, 676, 661, 654, 288, 713, 714).

1.2 NTZ OF RADIATIONS GRAZING MASSIVE BODIES. — First case (678). Following (643, 659, 677). Classical explanations (144, 648).

(*) Serial number in the bibliography (part 3).

1.3 NTZ ON STARS. — First case (228). Following (226, 354, 619, 551, 265, 84, 223, 662, 550, 586, 656, 575). Classical explanations (113, 551, 265, 656, 712).

1.4 MORPHOLOGICAL NTZ ON GALAXIES. — First cases (173, 266). Following (184, 185, 554, 276, 277, 569, 716, 22, 278). Classical explanations (266, 283, 182, 215, 554).

1.5 NTZ OF COMPANION GALAXIES. — First cases (17, 18). Following (21, 101, 82, 239, 29). Classical explanations (349, 526, 131).

1.6 NTZ AND THE HUBBLE CONSTANT. — Determinations of H_0 (179, 180, 181, 588, 259, 680, 494, 102, 103, 282, 560, 317, 672, 355, 107, 396, 247, 392, 583, 303, 591, 533, 474, 400). Classical possibilities for H_0 (396, 247, 292, 583, 303). Supercluster (first case) (663). Supercluster (following) (480, 429, 252, 447, 3, 175, 176, 556, 286, 2, 525, 495).

1.7 NTZ AND INHOMOGENEITY OF THE HUBBLE LAW. — First case (174). Following (341, 340, 338, 339). Classical explanations (559, 411, 597).

1.8 NTZ AND ANISOTROPY OF THE HUBBLE LAW. — First cases (55, 484). Hemispheric effect (*) (281, 289, 342, 487, 248, 485, 486, 482, 183, 186, 629, 483, 11, 768, 757, 758). Cluster effect (301, 302, 280, 300, 402, 403, 405, 323). Isotropy of 3 K (420, 156, 155, 261, 601, 458, 535, 7, 389, 541, 333). Classical explanations (*) (492, 250, 561, 240, 218, 217, 494, 248, 197, 159, 222, 555, 500, 185, 177, 127, 224, 210, 758). Related questions (250, 231, 98, 316, 408).

1.9 NTZ AND STRUCTURES IN THE HUBBLE DIAGRAM (*). — First case (567). Bands (567, 568, 569, 571, 573, 574, 576, 580, 581, 572, 575, 577, 578, 570, 579, 755, 756). Classical explanations (347, 716, 691, 596, 603, 605, 527, 528, 604). Related questions (253, 329).

1.10 SPREAD OF NTZ IN GALAXIES AND GROUPS OR CLUSTERS OF GALAXIES. — First cases (267, 636). Following (284, 251, 387). Classical explanations (267, 33, 391, 163).

1.11 NTZ AND ENERGETICS. — First case (269). Strongest case (201). Following (unindexed : quite all non-recent observations of quasars). Variations (234, 235, 669, 565, 566, 287). Classical explanations for energy (89, 417, 158, 361, 40, 331, 394, 507, 450, 490, 263, 264, 517, 519, 587, 631, 262, 585, 292, 56, 57, ... uncompleted). Classical explanations for variations (212, 213, 380, 448, 630, 751, ... uncompleted). Continuity (Sy, N, BL, Lac, Q) (5, 87, 93, 194, 255, 290, 346, 410, 472, 473, 491, 538, 605, 606, 214, 609, 748, 505). Related questions (335, 745, 279, 408).

1.12 NTZ AND Z- HISTOGRAMS (*). — First cases (119, 441, 120). Following (125, 126, 558, 595, 334, 294, 295, 69, 296, 71, 233, 312). Classical explanations (64, 315, 76, 509, 77, 78, 460, 505, 464, 465, 613, 356, 438, 488, 79, 236, 618, 616, 733, 737).

1.13 NTZ AND SPREAD IN THE HUBBLE DIAGRAM OF QUASARS. — First cases (353, 121). Following (unindexed : trivial spread). Classical explanations (128, 511, 540, 512, 336, 337, 321, 305, 440, 112, 138, 106, 220, 504, 503, 449, 438, 439, 208, 209, 207, 614, 617, 243, 91, 237, 706, 471, 200). Related questions (514, 633, 717, 413, 442, 59, 497, 68, 377, 632).

1.14 NTZ FROM SPATIAL REPARTITION AND APPEARANCE OF QUASARS OR PARENT OBJECTS (*). — First case (548). Following (644, 684, 685, 20, 297, 298, 279, 381, 462, 594). Classical explanations (612, 618, 452, 285, 249, 242, 268, 728). Classical explanations : Clusters at same z (50, 245, 41, 478, 409, 470, 246, 127, 383, 544, 545, 80, 457, 725, 724, 705). Classical explanations : Nebulosity (324, 621, 58, 83, 537, 451, 254, 432, 382, 386, 12, 727, 767, 770, 771).

1.15 MULTIPLE NTZ ON THE SAME OBJECT. — First cases (49, 599, 117). Following (48, 646, 665, 42, 668, 45, 46, 153, 647, 152, 100, 461, 615, 38, 1, 516). Classical explanations : intervening galaxies or haloes (322, 10, 118, 660, 51, 137, 94, 257, 435, 162, 645, 625, 623, 622, 698, 161, 502, 124, 607, 428, 524, 39, 13, 468, 670, 149, 434, 431). Classical explanations : ejections (434, 54, 390, 549, 547, 499, 498, 114, 688, 199, 434, 670).

1.16 ASSOCIATIONS WITH DISCREPANT NTZ (*). — First case (634). Stephan's quintet (707, 694, 9, 520, 24, 60, 61, 62, 291, 709). Following (510, 723, 293, 258, 404, 160, 731, 753, 759, 764, 735). Chains of galaxies (681, 23, 481, 63, 16, 522). Quasar-quasar (683, 686, 141, 26, 436, 693). Quasar-galaxy (642, 602, 116, 130, 33, 309, 25, 32, 27, 36, 328, 30, 543, 31, 397, 327, 14, 628, 397, 47, 110, 309, 95, 53, 730). Connexions (37, 19, 15, 35, 28, 34, 29, 291, 709, 732). Classical explanations (553, 370, 521, 62, 23, 52, 115, 479, 513, 256, 415, 388, 109, 196, 219, 406, 85, 454, 66, 6, 227, 3, 57, 357, 467, 664, 729, 746, 755, 769, 735).

1.17 NTZ THAT LEAD TO SUPERLUMINAL EXPANSIONS (*). — First case (244). Following (687, 649, 620, 501, 150, 308, 193, 739). Classical explanations (170, 150, 193, 169, 92, 355, 206, 598, 304, 369, 148, 496, 711, 760, 743, 763, 752, 740, 738).

1.18 RELATED STATISTICS (*). — General (306, 726, 88, 202). Catalogues (636, 399, 178, 530, 534, 695, 307, 749). Corrections (430, 326, 358, 528, 610, 211, 232, 531, 532, 673).

2. **Unclassical theories.** — 2.1 PERTURBED COSMOLOGIES. — Birth (96). Following (204, 205, 419, 715, 371, 372, 373, 557, 489, 165, 97, 72, 73, 75, 74, 690... uncompleted).

2.2 MULTIPLE BIG BANG COSMOLOGIES. — (345, 412, 689).

2.3 COSMOLOGIES WITH A NON-ZERO COSMOLOGICAL CONSTANT. — (463, 441, 120, 437, 466, 704).

2.4 STEADY-STATE COSMOLOGIES. — Critics (104, 105, 453).

2.5 STATIC COSMOLOGIES. — (702, 692, 71, 67).

2.6 VARIATION OF CONSTANTS, LARGE NUMBER HYPOTHESIS AND GAUGE INVARIANCE. — Birth (189, 190). Following (191, 700, 701, 476, 477, 408, 409, 590, 542, 134, 477, 270, 271, 393, 696, 697, 364, 667, 350, 518, 592, 192, 366, 188, 136, 729, 294, 352, 641, 407). Critics (221, 135, 365, 359, 360, 376, 142, 362, 363, 70, 164, 90, 81, 536, 418, 624, 455, 456, 81, 542).

2.7 CHRONOGEOMETRY (*). — Birth (718). Following (719, 720, 721, 722, 762). Critics (216, 750).

2.8 GENERALIZED GRAVITATIONAL POTENTIAL. — (145, 146, 147).

2.9 COSMOLOGICAL-GRAVITATIONAL REDSHIFTS. — (658, 667, 678, 626, 658, 699).

2.10 FUNDAMENTAL FIELD THEORY. — (318, 319, 320).

2.11 COSMOLOGICAL QUANTUM ELECTRODYNAMICS. — (310, 311, 312, 313, 314).

2.12 PHOTON-PHOTON, PHOTON-BOSON INTERACTIONS (*). — Birth (166, 167). Following (225, 226, 562, 600, 253, 422, 674, 99, 395, 652, 638, 653, 421, 423, 424, 384, 425, 703, 385, 171, 330, 172, 301, 302, 222, 708, 367, 368, 475, 674, 422, 742). Critics (375, 378, 8, 627, 600, 608, 151, 132, 584, 446, 157, 143, 348, 542, 744, 761, 734).

2.13 STATES OF MATTER. — (574, 575, 576, 581, 578, 17).

2.14 ENERGETICS AND EQUIVALENCE PRINCIPLE. — (388).

2.15 COSMOLOGICAL DÖPPLER REDSHIFTS. — (344, 195).

2.16 LOCAL THEORY OF QUASARS (*). — Galactic ejections (563, 564). Non-existence of quasars redshifts (593, 594, 595). Blueshifts of quasars (756).

2.17 COSMOLOGICAL RAMAN EFFECT. — (229).

2.18 STARK EFFECT ON QUASARS. — (589).

2.19 SPACE-TIME QUANTIFICATION. — (351).

3. **Catalogue.** — References are alphabetically classified in four sequences : 1 to 636, 637 to 687, 688 to 729 and 729 to 772.

Two numbers go in front of each reference :

- the serial number by which the paper is called in the text ;
- the three-digit hexa-decimal code number which is defined as follows.

First digit : concerned subject

- 1 : Inhomogeneity of the Hubble Law
- 2 : Anisotropy of the Hubble Law
- 3 : Multiple redshifts
- 4 : Redshifts on or by the Sun
- 5 : Uncoded
- 7 : 3 K radiation
- 8 : General problem of redshifts
- 9 : Superluminal expansions
- A : Associations
- B : (z , m) relation
- C : Companion galaxies
- D : Redshifts of stars
- E : Energetics, evolution and position of objects
- F : Morphological redshifts
- O : No direct concern with NTZ

Second digit : Matter

- 1 : Statistical study on quasars
- 2 : Statistical study on non-quasars objects
- 3 : Methodology of redshifts measurements
- 4 : Methodology of magnitudes measurements
- 5 : Methodology of redshifts and magnitudes measurements
- 6 : New experimental results except for magnitudes and redshifts
- 7 : Uncoded
- 8 : Theory ; Physical process
- 9 : Review paper ; catalogue
- A : New experimental results for redshifts of quasars
- B : New experimental results for magnitudes of quasars
- C : New experimental results for redshifts and magnitudes of quasars
- D : New experimental results of redshifts of non-quasar objects
- E : New experimental results of magnitudes of non-quasar objects
- F : New experimental results of redshifts and magnitudes of non-quasar objects

Third digit : Favoured interpretation

- 1 : Uncoded
- 2 : Several competitive interpretations
- 3 : Continuity between quasars and common objects
- 4 : High velocity of the Sun
- 5 : Value of H_0
- 6 : Relativistic objects
- 7 : Superclusters or inhomogeneities ~ 100 Mpc
- 8 : Intrinsic redshift of undefined origin
- 9 : Gravitational redshift
- A : Classical explanation (Friedmann, Classical Physics, black holes...)
- B : Classical explanation through bias
- C : Variation of constants, LNH
- D : Perturbed cosmologies
- E : Unsignificativeness of used statistics
- F : Photon-photon, photon-boson interactions
- O : No interpretation of NTZ

A star (*) which follows the code number points out that the paper encloses related references outside the catalogue.

Figure 1 shows the yearly distribution of the referenced papers.

libraries for having provided numerous copies. I wish to thank especially the librarians of the following institutes : Université des Sciences et Techniques du Languedoc, Observatoire de Haute-Provence, Observatoire de Meudon.

Acknowledgements. — I am much indebted to many

References

I

- 001 3 3 0 AARONSON M., Mc KEE C.F., WEISHEIT J. C. : 1975, *Astrophys. J.* **198**, 13.
 002 1 8 7 ABELL G. O. : 1974, *I.A.U. Symp. Neth.* **63**, 79.
 003 0 2 7 ABELL G. O. : 1975, in « *Galaxies and the Universe* » (University of Chicago Press.) p. 601.
 004 5 1 8 ABRAMENKO B. : 1974, *Astron. Astrophys.* **31**, 109.
 005 0 6 3 ADAMS T. F. : 1974, *Astrophys. J.* **188**, 463.
 006 A 6 A ADAMS T. F., WEYMANN R. J. : 1972, *Astrophys. Letters* **12**, 143.
 007 7 6 A ADE P. A. R., ROWAN-ROBINSON M., CLEGG P. E. : 1976, *Astron. Astrophys.* **53**, 403.
 008 8 8 A ALDROVANDI R., CASER S., OMNES R. : 1973, *Nature* **241**, 340.
 009 A 6 2 ALLEN R. J., SULLIVAN W. T. III : 1977, *Coll. Internat. C.N.R.S. N° 263* (C.N.R.S. Paris) p. 445.
 010 3 8 A ALVAREZ E., CRACIA-BONDIA J. M. : 1974, *Astron. Astrophys.* **36**, 299.
 011 2 8 7 ANONYME : 1978, *Phys. Today* **31**, 17.
 012 0 C 0 APPARAO K. M. U., BIGNAMI C. F., MARASCHI L., HELMKEN H., MARGON R., HJELLMING R., BRADT H. V., DOWER R. : 1978, *Nature*, **273**, 450.
 013 3 8 A ARONS J. : 1972, *Astrophys. J.* **172**, 553.
 014 AA 2 ARP G., ARP C. H., SARDZHEHT V., SARGENT W. L. W., KHACHINKYAN EH. E., ANDREASYAN N. K. : 1974, *Astron. Arm. S.S.S.R.*, **10**, 298.
 015 AA 2 ARP C. H., KHACHIKYAN F. E. : 1974, *Astron. Arm. S.S.S.R.*, **10**, 173.
 016 A 6 8 ARP H. : 1968, *Publ. Astron. Soc. Pacific* **80**, 129.
 017 8 0 8 ARP H. : 1969, *Nature* **223**, 380.
 018 C 2 8* ARP H. : 1970, *Nature* **225**, 1033.
 019 C 6 8 ARP H. : 1970, *Astrophys. Letters* **5**, 257.
 020 8 9 8 ARP H. : 1971, *Science* **174**, 1189.
 021 C 7 8 ARP H. : 1971, *Nature* **231**, 103.
 022 F 8 C ARP H. : 1972, *Bull. Amer. Astron. Soc.* **4**, 397.
 023 C 7 8 ARP H. : 1973, *Astrophys. J.* **185**, 797.
 024 A 6 8 ARP H. : 1973, *Astrophys. J.* **183**, 411.
 025 A 9 8 ARP H. : 1974, *I.A.U. Symp. Neth.* **63**, 61.
 026 A 1 8 ARP H. : 1974, *Astron. J.* **79**, 923.
 027 AA 8 ARP H. : 1976, *Astrophys. J.* **210**, L59.
 028 A 6 A ARP H. : 1976, *Astrophys. J.* **207**, L147.
 029 A 6 8 ARP H. : 1977, *Astrophys. J.* **218**, 70.
 030 A 6 8 ARP H. : 1977, *Coll. Internat. C.N.R.S. N°263* (C.N.R.S. Paris) p. 327.
 031 A 6 8 ARP H. : 1978, *Astrophys. J.* **220**, 401.
 032 A 1 8 ARP H., BALDWIN J. A., WAMPLER E. J. : 1975, *Astrophys. J.* **198**, L3.
 033 AC 8 ARP H., BURBIDGE E. M., MACKAY C. D., STRITTMATTER P. A. : 1972, *Astrophys. J.* **171**, L41.
 034 A 6 8 ARP H., LORRE J. : 1976, *Astrophys. J.* **210**, 58.
 035 A 1 8 ARP H., PRATT N. M., SULENTIC J. W. : 1975, *Astrophys. J.* **199**, 565.
 036 A 6 8 ARP H., SULENTIC J. W., WILLIS A. G., De RUITER H. R. : 1976, *Astrophys. J.* **207**, L13.
 037 A 2 2 ARP H., VISVANATHAN N. : 1970, *Astrophys. Letters* **5**, 73 et **5**, 75.
 038 3 AA BAHCALL J. N. : 1968, *Astrophys. J.* **153**, 679.
 039 3 8 2 BAHCALL J. N. : 1970, *Comment Astroph. Sp. Phys.* **2**, 221.
 040 0 8 3 BAHCALL J. N. : 1972, *Astrophys. J.* **172**, 265.
 041 A 1 A BAHCALL J. N., BAHCALL N. A., BURBIDGE G. R. : 1971, *Astrophys. J.* **166**, L77.
 042 3 A 2 BAHCALL J. N., GOLDSMITH S. : 1971, *Astrophys. J.*, **170**, 17.
 043 3 A 1 BAHCALL J. N., GREENSTEIN J. L., SARGENT W. L. W. : 1968, *Astrophys. J.* **153**, 689.
 044 B 1 A BAHCALL J. N., HILLS R. E. : 1973, *Astrophys. J.* **179**, 699.
 045 3 A 2 BAHCALL J. N., JOSS P. C. : 1973, *Astrophys. J.* **179**, 381.
 046 3 AA BAHCALL J. N., JOSS P. C., COHEN J. G. : 1973, *Astrophys. J.* **184**, 57.
 047 3 1 2 BAHCALL J. N., Mc KEE C. F., BAHCALL N. A. : 1972, *Astrophys. Letters* **10**, 147.
 048 3 A 2 BAHCALL J. N., OSMER P., SCHMIDT M. : 1969, *Astrophys. J.* **156**, L1.
 049 3 8 A BAHCALL J. N., SALPETER E. E. : 1966, *Astrophys. J.* **144**, 847.
 050 ADA BAHCALL J. N., SCHMIDT M., GUNN J. E. : 1969, *Astrophys. J.* **157**, L77.

- 051 3 8 A BAHCALL J. N., SPITZER L. : 1969, *Astrophys. J.* **156**, L63.
 052 A 1 E BAHCALL J. N., WOLTJER J. : 1974, *Nature* **247**, 22.
 053 AC 2 BAHCALL N. A., BAHCALL J. N., SCHMIDT M. : 1973, *Astrophys. J.* **183**, 777.
 054 3 8 A BAHAM MASHOON : 1973, *Astrophys. J.* **181**, L65.
 055 2 2 B BAHYL V. : 1974, *Bull. astr. Inst. Czeckosl.* **25**, 115.
 056 0 6 A BALDWIN J. A. : 1975, *Astrophys. J.* **201**, 26.
 057 BC 0 BALDWIN J. A. : 1977, *Astrophys. J.* **214**, 679.
 058 0 6 0 BALDWIN J. A., BURBIDGE E. M., ROBINSON L. B., WAMPLER E. J. : 1975, *Astrophys. J.* **195**, L55.
 059 0 6 A BALDWIN J. A., BURKE W. L., GASKELL C. M., WAMPLER E. J. : 1978, *Nature* **273**, 431.
 060 A 6 8 BALKOWSKI C., BOTTINELLI L., CHAMARAUX P., GOUGUENHEIM L., HEIDMANN J. : 1973, *Astron. Astrophys.* **25**, 319.
 061 A 6 8 BALKOWSKI C., BOTTINELLI L., CHAMARAUX P., GOUGUENHEIM L., HEIDMANN L. : 1974, *I.A.U. Symp. N° 63*, Longair editor p. 69.
 062 A 6 8 BALKOWSKI C., BOTTINELLI L., CHAMARAUX P., GOUGUENHEIM L., HEIDMANN J. : 1974, *I.A.U. Symp. Neth.* **58**, 237.
 063 A 6 A BALKOWSKI C., CHAMARAUX P. : 1975, *Astron. Astrophys.* **43**, 297.
 064 5 1 1 BARBIERI C., BONOMETTO S., SAGGION A. : 1968, *Astrophys. Letters* **2**, 225.
 065 BARNOTHY J. M. : 1971, *Bull. Amer. Astr. Soc.* **3**, 472.
 066 A 0 1 BARNOTHY J. M. : 1977, *Colloq. Inter. C.N.R.S. N° 263 (C.N.R.S. Paris)* p. 602 et p. 609.
 067 0 8 1 BARNOTHY J. M., BARNOTHY M. F. : 1972, *I.A.U. Symp. N° 44*, 478.
 068 E 8 9 BARNOTHY J. M., BARNOTHY M. F. : 1972, *Astrophys. J.* **174**, 477.
 069 5 1 D BARNOTHY J. M., BARNOTHY M. F. : 1977, *Publ. Astr. Soc. Pacific* **88**, 837.
 070 8 8 0 BARNOTHY J. M., TINSLEY B. M. : 1973, *Astrophys. J.* **182**, 343.
 071 5 8 1 BARNOTHY M. F., BARNOTHY J. M. : 1976, *Bull. Amer. Astr. Soc.* **8**, 309.
 072 0 8 A BARROW J. D. : 1977, *Nature* **267**, 117.
 073 0 8 D BARROW J. D. : 1977, *Mon. Not. R. Astron. Soc.* **179**, 47P.
 074 2 8 0 BARROW J. D., CARR B. J. : 1978, *Mon. Not. R. Astron. Soc.* **182**, 537.
 075 0 8 A BARROW J. D., MATZNER R. A. : 1977, *Mont. Not. R. Astron. Soc.* **181**, 719.
 076 5 1 B BASU D. : 1973, *Nature* **241**, 159.
 077 5 8 B BASU D. : 1975, *Astrophys. Letters* **16**, 53.
 078 5 1 B BASU D. : 1978, *Nature* **273**, 130.
 079 5 1 2 BASU D., ABDU M. A. : 1972, *Astrophys. Sp. Sci. Neth.* **19**, 303.
 080 A 6 A BATTISTINI P., BRACCESI A., FORMIGGINI L., LARI C. : 1975, *Astron. Astrophys.* **40**, 217.
 081 C 8 A BAUM W. A., FLORENTIN-NIESLIN R. : 1976, *Astrophys. J.* **209**, 319.
 082 CD 2 BAUTZ L. P. : 1972, *Astron. J.* **77**, 331.
 083 OCA BEAVER E. A., HARMS R., HAZARD C., MURDOCH H. S., CARWELL R. F., STRITTMATTER P. A. : 1976, *Astrophys. J.* **203**, L5.
 084 D 7 2 BELAS C. S. : 1930, *Publ. Dom. Astron. Obs.* **4**, 271.
 085 A 1 2 BELL M. B. : 1974, *Astrophys. J.* **194**, 245.
 086 5 1 8 BELL M. B., FORT D. N. : 1973, *Astrophys. J.* **186**, 1.
 087 E 9 A BERGERON J. : 1978, *The Messenger* **12**, 5.
 088 0 8 0 BIRNBAUN A. : 1962, *J. Amer. Stat. Assoc.* **57**, 269.
 089 E 8 A BISNOVATYJ : 1972, *Astr. Zh. S.S.S.R.* **49**, 243.
 090 C 8 A BLAKE G. M. : 1977, *Mon. Not. R. Astron. Soc.* **181**, 47 p.
 091 E 1 A BLAKE G. M. : 1978, *Mon. Not. R. Astron. Soc.* **183**, 21 p.
 092 9 9 A BLANDFORD R. D., Mc KEE C. F., REES M. J. : 1977, *Nature* **267**, 211.
 093 A 8 A BOCKSENBERG A., CARSWELL R. F., ALLEN D. A., FOSBURY R.A.E., PENSTON M. V., SARGENT W. L. W. : 1977, *Mon. Not. R. Astron. Soc.* **178**, 451.
 094 3 6 A BOCKSENBERG A., SARGENT W. : 1978, *Astrophys. J.* **220**, 42.
 095 A 1 2 BOGART R. S., WAGONER R. V. : 1973, *Astrophys. J.* **181**, 609.
 096 1 8 0 BONDI H. : 1947, *Mon. Not. R. Astron. Soc.* **107**, 410.
 097 0 8 A* BONNOR : 1974, *Mon. Not. R. Astron. Soc.* **167**, 55.
 098 0 2 2 BORCHKHADZE T. M., KOGOSHVILI N. G. : 1976, *Astron. Astrophys.* **53**, 431.
 099 8 8 F BORN M. : 1954, *Proc. Phys. Soc. A* **67**, 193.
 100 EA 2 BOROSON T. D., SARGENT W. L. W., BOCKSENBERG A., CARSWELL R. F. : 1978, *Astrophys. J.* **220**, 772.
 101 C 2 8 BOTTINELLI L., GOUGUENHEIM L. : 1973, *Astron. Astrophys.* **26**, 85.
 102 0 2 B BOTTINELLI L., GOUGUENHEIM L. : 1976, *Astron. Astrophys.* **51**, 275.
 103 1 6 5 BOTTINELLI L., GOUGUENHEIM L. : 1977, *Coll. Internat. C.N.R.S. N° 263, C.N.R.S. Paris* p. 481.
 104 7 9 A BOYTON P. E. : 1974, *I.A.U. Symp. N° 63*, p. 163.
 105 7 6 A BOYTON P. E., STOKES R. A. : 1974, *Nature* **247**, 528.
 106 5 1 8 BRACESI A. : 1972, *I.A.U. Symp. N° 44*, 453.
 107 0 7 A BRANCH : 1977, *Mon. Not. R. Astr. Soc.* **179**, 401.
 108 0 8 1 BRANS C., DICKE R. H. : 1961, *Phys. Rev.* **124**, 925.
 109 A 1 A BROWNE I. W. A., COHEN A. M. : 1978, *Mon. Not. R. Astron. Soc.* **182**, 181.
 110 A 1 2 BROWNE I. W. A., Mc EWAN N. J. : 1973, *Mon. Not. R. Astron. Soc.* **162**, 21 p.
 111 1 8 7 BUGRII A. I., TRUSHEVSKII A. A. : 1978, *Astrophysics.* **13**, 195.
 112 3 A 2 BURBIDGE E. M. : 1968, *Astrophys. J.* **152**, L111.
 113 8 8 A* BURBIDGE E. M., BURBIDGE G. R. : 1954, *Astrophys. J.* **45**, 1019.
 114 3 8 A BURBIDGE E. M., BURBIDGE G. R. : 1975, *Astrophys. J.* **202**, 287.
 115 A 1 E BURBIDGE E. M., BURBIDGE G. R., O'DELL S. L. : 1974, *Nature* **248**, 568.
 116 A 1 8 BURBIDGE E. M., BURBIDGE G. R., SOLOMON P. M., STRITTMATTER P. A. : 1971, *Astrophys. J.* **170**, 233.

- 117 3A2 BURBIDGE E. M., LYND S. C. R., STOCKTON A. N. : 1968, *Astrophys. J.* **152**, 1077.
 118 362 BURBIDGE E. M., SMITH H. E., WEYMANN R. J. : 1977, *Astrophys. J.* **218**, 1.
 119 51A BURBIDGE G. R. : 1967, *Astrophys. J.* **147**, 851.
 120 518 BURBIDGE G. R. : 1968, *Astrophys. J.* **154**, L41.
 121 B98 BURBIDGE G. R. : 1973, *Nature* **246**, 17.
 122 892 BURBIDGE G. : 1973, *Ann. New York Acad. Sci.* **224**, 70.
 123 892 BURBIDGE G. : 1977, *Coll. Internat. C.N.R.S. N° 263 (C.N.R.S. Paris)* p. 555.
 124 681 BURBIDGE G. R., BURBIDGE E. M. : 1967, *Astrophys. J.* **148**, L107.
 125 512 BURBIDGE G. R., O'DELL S. L. : 1972, *Astrophys. J.* **178**, 583.
 126 528 BURBIDGE G. R., O'DELL S. L. : 1973, *Astrophys. J.* **186**, L59.
 127 A12 BURBIDGE G. R., O'DELL S. L. : 1973, *Astrophys. J.* **182**, L47.
 128 B12 BURBIDGE G. R., O'DELL S. L. : 1973, *Astrophys. J.* **183**, 759.
 129 368 BURBIDGE G., O'DELL S. L., ROBERTS D. H., SMITH H. E. : 1977, *Astrophys. J.* **218**, 33.
 130 A18 BURBIDGE G. R., O'DELL S. L., STRITTMATTER P. A. : 1972, *Astrophys. J.* **175**, 601.
 131 C5B BURKE J. A., HARTWICK F. D. A. : 1974, *Astron. Astrophys.* **34**, 445.
 132 BYRNE J. C. : 1977, *Astrophys. Space Sci. Neth.* **46**, 115.
 133 76A CADERNI N., DE COSMO V., FABBRI R., MELCHIORRI B., MELCHIORRI F., NATALE V. : 1977, *Phys. Rev. D* **16**, 2424.
 134 78C CANUTO V., HSIEH S. H. : 1977, *Astron. Astrophys.* **61**, L5.
 135 08C CANUTO V., HSIEH S. H. : 1978, *Astron. Astrophys.* **65**, 389.
 136 68A CARTER B. : 1974, *I.A.U. Symp. N° 63*, P. 291.
 137 08A CARTER B. : 1977, *Mon. Not. R. Astron. Soc.* **178**, 137.
 138 E8A CAVALIERE A., MORRISON P., WOOD K. : 1971, *Astrophys. J.* **170**, 223.
 139 362 CHAN Y. W. T., BURBIDGE E. M. : 1971, *Astrophys. J.* **167**, 213.
 140 880 CHANG K., REFSDAL S. : 1977, *Coll. Internat. C.N.R.S. N° 263 (C.N.R.S. Paris)* p. 369.
 141 A11 CHAO-CHIU B., MORRISON P., SARTORI L. : 1973, *Astrophys. J.* **181**, 295.
 142 88A* CHAO-WEN CHIN, STOTHERS R. : 1976, *Phys. Rev. Letters* **36**, 833.
 143 88A CHASTEL A. A. : 1976, *Astron. Astrophys.* **53**, 67.
 144 48A CHASTEL A., HEYVAERTS J. F. : 1974, *Nature* **249**, 21.
 145 881 CHERRY N. H. : 1971, *Nuovo Cimento* **4B**, 144.
 146 A81 CHERRY N. H. : 1973, *Int. J. Theor. Phys.* **8**, 47.
 147 A81 CHERRY N. H. : 1974, *Nature* **250**, 127.
 148 98A CHRISTIANSEN W. A., SCOTT J. S. : 1977, *Astrophys. J.* **216**, L1.
 149 332 COHEN M. H. : 1972, *Nature* **237**, 273.
 150 99A COHEN M. H., KELLERMAN K. I., SHAFFER D. B., LINFIELD R. P., MOFFET R. T., ROMNEY J. D., SEIELSTAD G. A., PAULINY-TOTH I. K., PREUSS E., WITZEL A., SCHILIZZI R. T., GELDZAHLER A. J. : 1977, *Nature* **268**, 405.
 151 88A COHEN R. L., WERTHEIM G. K., *Nature* **241**, 109.
 152 512 COLEMAN G., CARSWELL R. F., STRITTMATTER P. A., WILLIAMS R. E., BALDWIN J., ROBINSON L. B., WAMPLER E. J. : 1976, *Astrophys. J.* **207**, 1.
 153 330 COLVIN J. D. : 1975, *Astrophys. J.* **202**, 303.
 154 A6A CONDON J. J., DRESSEL L. L. : 1978, *Astrophys. J.* **221**, 456.
 155 76A CONKLIN E. K. : 1979, *Nature* **222**, 972.
 156 76A CONKLIN E. K. : 1972, *I.A.U. Symp. N° 44*, p. 158.
 157 86A CRANE P., HOFFMAN A. W. : 1977, *Coll. Internat. C.N.R.S. N° 263 (C.N.R.S. Paris)* p. 531.
 158 E8A* DALTAUIT E., MAC ALPINE G. M., COX D. P. : 1978, *Astrophys. J.* **219**, 372.
 159 187 DAUTCOURT G. : 1975, *Astron. Astrophys.* **38**, 335.
 160 A82 DAUTCOURT G. : 1977, *Astr. Nachr.* **298**, 81.
 161 36A DAVIDSEN A. F., HARTIG G. F., FASTIE W. G. : 1977, *Nature* **269**, 203.
 162 E6A DAVIS M. M., MAY L. S. : 1978, *Astrophys. J.* **219**, 1.
 163 08A DEARBORN D. S. : 1973, *Astrophys. J.* **179**, 45.
 164 C8A DEARBORN D. S., SCHRAMM D. N. : 1974, *Nature* **247**, 441.
 165 28D DEBNEY G. : 1976, *Mon. Not. R. Astron. Soc.* **176**, 561.
 166 080 DE BROGLIE L. : 1924, *Thèse Paris*.
 167 080 DE BROGLIE L. : 1940, « *La mécanique ondulatoire du photon* » (Hermann).
 168 881 DE BROGLIE L. : 1963 (*Elsevier publ. Co. Amsterdam*).
 169 986 DEHNEN H., OBREGON O. : 1973, *Astrophys. Letters* **14**, 91.
 170 98A DENT W. A. : 1972, *Astrophys. J.* **175**, L55.
 171 48F DEPAQUIT S., VIGIER J. P., PECKER J. C. : 1974, *C.R. Hebd. Séan. Acad. Sci. Paris* **279**, B 559.
 172 48F DEPAQUIT S., VIGIER J. P., PECKER J. C. : 1975, *C.R. Hebd. Séan. Acad. Sci. Paris* **80**, 113.
 173 F22 DE VAUCOULEURS G. : 1961, *Astrophys. J. S. S.* **6**, 213.
 174 127 DE VAUCOULEURS G. : 1972, *I.A.U. Symp. N° 44*, p. 353.
 175 077 DE VAUCOULEURS G. : 1976, *Astrophys. J.* **203**, 33.
 176 027 DE VAUCOULEURS G. : 1976, *Astrophys. J.* **202**, 319.
 177 227 DE VAUCOULEURS G. : 1976, *Astrophys. J.* **205**, 13.
 178 090 DE VAUCOULEURS G., DE VAUCOULEURS A., CORWIN H. G. : 1976, « *Second Reference Catalogue of bright Galaxies* » (University of Texas Press).
 179 065 DE VAUCOULEURS G. : 1977, *Nature* **266**, 126.
 180 045 DE VAUCOULEURS G. : 1977, *C.R. Hebd. Séan. Acad. Sci. Paris* **284**, B 227.
 181 125 DE VAUCOULEURS G. : *Coll. U.A.I. N° 37, C.N.R.S. Paris*, p. 289.
 182 F3A DE VAUCOULEURS G., DE VAUCOULEURS A. : 1963, *Astron. J.* **68**, 96.
 183 227 DE VAUCOULEURS G., PETERS W. C. : 1968, *Nature* **220**, 868.
 184 F08 DE VAUCOULEURS G., DE VAUCOULEURS A. : 1972, *Nature* **236**, 166.

- 185 F 3 7 DE VAUCOULEURS G., DE VAUCOULEURS A. : 1973, *Astron. Astrophys.* **28**, 109.
 186 0 FA DE VAUCOULEURS G., PETERS W. L., CORWIN H. G. Jr. : 1977, *Astrophys. J.* **221**, 319.
 187 1 2 7 DE VAUCOULEURS G., PETERS W. L., CORWIN H. G. Jr. : 1977, *Coll. U.A.I. N° 37 (C.N.R.S. Paris)* p. 149.
 188 8 8 A DICKE R. H. : 1961, *Nature* **192**, 440.
 189 8 8 C DIRAC P. : 1937, *Nature* **139**, 323.
 190 8 8 C DIRAC P. : 1938, *Proc. R. Soc. London A* **165**, 199.
 191 8 8 C DIRAC P. A. M. : 1973, *Proc. R. Soc. London A* **333**, 403.
 192 8 8 C* DIRAC P. A. M. : 1975, *Nature* **254**, 273.
 193 9 8 2 DISHON G., WEBER T. A. : 1977, *Astrophys. J.* **212**, 31.
 194 0 C 3 DISNEY M. J., PETERSON B. A., RODGERS A. W. : 1974, *Astrophys. J.* **194**, L79.
 195 8 8 D DOLAN J. F. : 1971, *Nature* **229**, 47.
 196 A 7 2 DOLAN J. F. : 1975, *Astrophys. Letters* **16**, 65.
 197 2 8 7 DOROSHKVICH A. G., SHANDARIN S. F. : 1976, *Mont. Not. R. Astron. Soc.* **175**, 15 p.
 198 0 8 0 DOROSHKVICH A. G., SHANDARIN S. F. : 1978, *Mont. Not. R. Astron. Soc.* **182**, 27.
 199 5 1 0 DREW J. E. : 1978, *Astron. Astrophys.* **66**, 343.
 200 3 8 9 DURGAPAL M. C. : *J. Phys. A* **7**, 1676.
 201 E 1 2 EACHIUS L. J., LILLER W. : 1975, *Astrophys. J.* **200**, L61.
 202 0 7 E EDWARDS A. W. F. : 1969, *Nature* **222**, 1233.
 203 0 8 A EINSTEIN A. : 1911, *Ann. Phys. Germany* **35**, 898.
 204 1 8 D EISENSTAEDT J. : 1975, *Phys. Rev.* **D11**, 2021 et **D12**, 1573.
 205 1 8 D EISENSTAEDT J. : 1976, *C.R. Hebd. Séan. Acad. Sci. Paris* **282**, A 1063.
 206 9 8 A EPSTEIN R. I., GELLER M. J. : 1977, *Nature* **265**, 219.
 207 B 8 A EVANS A. : 1974, *Observatory* **94**, 999.
 208 8 8 A EVANS A. : 1974, *Observatory* **94**, 50.
 209 B 8 A EVANS A., HART D. : 1975, *Astron. Astrophys.* **43**, 13.
 210 2 2 B EVANS A., HART D. : 1976, *Nature* **259**, 468.
 211 0 4 0 EVANS A., HART D. : 1977, *Astron. Astrophys.* **58**, 241.
 212 E 8 2 FAHLMAN G. C., ULRICH T. J. : 1976, *Astrophys. J.* **201**, 277.
 213 E 8 A FAHLMAN G. C., ULRICH T. J. : 1976, *Astrophys. J.* **209**, 663.
 214 EC 3 FAIRALL A. P. : 1977, *Mon. Not. R. Astron. Soc.* **180**, 391.
 215 F 2 A FAIRALL A. P. : 1978, *Mon. Not. R. Astron. Soc.* **183**, 59 p.
 216 B 8 1* FAIRCHILD E. E. Jr. : 1977, *Astron. Astrophys.* **56**, 199.
 217 2 2 B FALL S. M., JONES B. J. T. : 1976, *Nature* **262**, 457.
 218 2 2 2 FALL S. M., JONES B. J. T. : 1977, *Coll. U.A.I. N° 37 (C.N.R.S. Paris)* p. 141.
 219 A 1 1 FALLA D. F. : 1972, *Observatory* **92**, 179.
 220 5 1 A FANTI R., FORMIGINI L., LARI C., PADRIELLI L., KATGERT-MERKEJLIN J. K., KATGERT P. : 1973, *Astron. Astrophys.* **23**, 171.
 221 8 2 2 FAULKNER D. J. : 1976, *Mon. Not. R. Astron. Soc.* **176**, 621.
 222 2 8 9 FENNELLY A. J. : 1977, *Mon. Not. R. Astron. Soc.* **181**, 121.
 223 D 6 2 FERNIE J. D. : 1973, *Astrophys. J.* **183**, 583.
 224 8 9 2 FIELD G. B., ARP H., BAHCALL J. N. : 1973, « *The Redshift Controversy* » W. A. Benjamin.
 225 8 8 F* FINLAY-FREUNLICH E. : 1954, *Philos. Mag.* **45**, 303.
 226 8 8 F* FINLAY-FREUNLICH E. : 1954, *Proc. Phys. Soc. A* **67**, 192.
 227 A 6 A FORD H. C., EPPS H. W. : 1972, *Astrophys. Letters* **12**, 139.
 228 DD 2* FREUNDLICH E. F. : 1919, *Phys. Zeits.* **20**, 561.
 229 8 8 1 GALLO G. F. : 1975, *Inst. J. Theor. Phys.* **13**, 417.
 230 0 3 B GOLDEN L. M. : 1974, *Observatory* **94**, 122.
 231 0 1 A GOLDEN L. M. : 1974, *Mont. Not. R. Astron. Soc.* **166**, 383.
 232 0 7 0 GOLDSMITH S. : 1972, *Nature* **236**, 122.
 233 5 1 1 GORBACHEV B. I. : 1975, *Astr. Cirk. Izdav. Bjuro. Ast Soobshch. Akad. Nauk. S.S.S.R.* **859**, 5.
 234 E 9 0 GOTTLIEB E. W., LILLER W. : 1978, *Astrophys. J.* **222**, L1.
 235 E 9 2* GRANDI S., TIFFT W. G. : 1974, *Publ. astr. Soc. Pacific* **86**, 873.
 236 5 1 A GREEN R. F., RICHSTONE D. O. : 1976, *Astrophys. J.* **208**, 639.
 237 E 1 A GREEN R. F., SCHMIDT M. : 1978, *Astrophys. J.* **220**, L1.
 238 9 8 1* GREGORY C. : 1972, *Nature* **239**, 56.
 239 AD 8 GREGORY S. A., CONNOLLY L. P. : 1973, *Astrophys. J.* **182**, 351.
 240 2 4 B GROSS, P. G. : 1977, *Astrophys. J.* **215**, 417.
 241 1 2 7 GROTH E. J., PEEBLES P. J. E., SELDNER M., SONEIRA R. M. : 1977, *Scientific American* **237**, N° 5 p. 76.
 242 E 1 3 GRUEFF G., SCHIAVOCAMPO P., VIGOTTI M., ZANNI M. : 1977, *Astron. Astrophys.* **60**, 321.
 243 E 8 A GRUEFF G., VIGOTTI M. : 1977, *Astron. Astrophys.* **54**, 475.
 244 9 6 A GUBBAY J., LEGG A. J., ROBERTSON P. S., MOFFET A. T., EKKERS R. D., SEIDEL B. : 1969, *Nature* **224**, 1094.
 245 ADA GUNN J. E. : 1971, *Astrophys. J.* **164**, L113.
 246 A 9 A GUNN J. E. : 1973, *Ann. New York Acad. Sci.* **224**, 56.
 247 B FA GUNN J. E., OKE J. B. : 1975, *Astrophys. J.* **195**, 255.
 248 2 2 2 GUTHRIE B. N. G. : 1976, *Astrophys. Space Sci.* **43**, 425.
 249 8 6 A HARRIS D. E. : 1973, *Astron. J.* **78**, 369.
 250 2 4 B HARTWICK F. D. A. : 1975, *Astrophys. J.* **195**, L7.
 251 6 2 2 HARTWICK F. D. A. : 1978, *Astrophys. J.* **219**, 345.
 252 1 2 7 HAUSER M. G., PEEBLES P. J. E. : 1973, *Astrophys. J.* **185**, 757.
 253 8 2 F HAWKINS G. S. : 1962, *Nature* **194**, 563.
 254 E 6 3 HAWKINS M. R. S. : 1978, *Mon. Not. R. Astron. Soc.* **182**, 361.
 255 1 6 7 HAWKINS M. R. S., REDDISH V. C. : 1975, *Nature* **257**, 772.

- 256 A 1 A HAZARD C., SANITT N. : 1972, *Astrophys. Letters* **11**, 77.
 257 3 6 A HEGYI O. J., GERBER G. L. : 1977, *Astrophys. J.* **218**, L7.
 258 A 9 2 HEIDMANN J. : 1977, *Coll. Internat. C.N.R.S. N° 263 (C.N.R.S. Paris)* p. 427.
 259 1 2 5 HEIDMANN J. : 1971, *Coll. Internat. C.N.R.S. N° 263 (C.N.R.S. Paris)* p. 487.
 260 3 6 2 HEILES C., MILLEY G. K. : 1970, *Astrophys. J.* **160**, L83.
 261 7 6 A HENRY P. S. : 1971, *Nature* **231**, 516.
 262 E 8 A HILLS J. G. : 1975, *Nature* **254**, 295.
 263 E 8 A HILLS J. G. : 1977, *Mon. Not. R. Astron. Soc.* **179**, 1p.
 264 E 8 A HILLS J. G. : 1978, *Mon. Not. R. Astron. Soc.* **182**, 517.
 265 DDA HILTNER W. A. : 1945, *Astrophys. J.* **101**, 356.
 266 F 2 B HOLMBERG E. : 1961, *Astron. J.* **66**, 620.
 267 B 2 2 HOLMBERG E. : 1961, *Uppsala Obs. Medd.* **42**, 559.
 268 0 1 A HOOLEY A., LONGAIR M. S., RILEY J. M. : 1978, *Mon. Not. R. Astron. Soc.* **182**, 127.
 269 E 8 8 HOYLE F., BURBIDGE G. R., SARGENT W. L. W. : 1966, *Astrophys. J.* **144**, 534 et 551.
 270 8 8 6 HOYLE F., NARLIKAR J. V. : 1971, *Nature* **233**, 41.
 271 8 8 C HOYLE F., NARLIKAR J. V. : 1972, *Mon. Not. R. Astron. Soc.* **155**, 305 et 323.
 272 BFA HUBBLE E. : 1929, *Proc. of the Nat. Acad. of Science* **15**, 168.
 273 8 8 2 HUBBLE E., TOLMAN R. C. : 1935, *Astrophys. J.* **82**, 302.
 274 HUGHES : *Astrophys. Space Sci. Neth.* **46**, L15.
 275 BFA HUMASON M. L. : 1931, *Astrophys. J.* **74**, 35.
 276 F 2 9 JAAKOLA T. : 1971, *Visn. Kyjuu. Univ. astr. S.S.S.R.* **13**, 97.
 277 F 2 8 JAAKOLA T. : 1971, *Nature* **234**, 534.
 278 F 2 F JAAKOLA T. : 1973, *Astron. Astrophys.* **27**, 449.
 279 E 1 8 JAAKOLA J., DONNER K. J., TEERIKORPI P. : 1975, *Astrophys. Space Sci. Neth.* **37**, 301.
 280 2 2 8 JAAKOLA T., KAROJI H., LEDENMAT G., MOLES M., NOTTALE L., VIGIER J. P., PECKER J. C. : 1976, *Mon. Not. R. Astron. Soc.* **177**, 191.
 281 2 2 8 JAAKOLA T., KAROJI H., MOLES M., VIGIER J. P. : 1975, *Nature* **256**, 25.
 282 1 4 7 JAAKOLA T., LE DENMAT G. : 1976, *Mon. Not. R. Astron. Soc.* **176**, 307.
 283 F 7 F JAAKOLA T., MOLES M. : 1976, *Astron. Astrophys.* **53**, 389.
 284 6DF JAAKOLA T., TEERIKORPI P., DONNER K. J. : *Astron. Astrophys.* **40**, 257.
 285 E 8 1 JACKSON J. C. : 1973, *Mon. Not. R. Astron. Soc.* **162**, 11p.
 286 1 8 7 JACKSON J. C. : 1975, *Mon. Not. R. Astron. Soc.* **173**, 41p.
 287 E 8 2 JONES T. W., TOBIN W. : 1977, *Astrophys. J.* **215**, 474.
 288 4 8 2 * JORAND M. : 1962, *Ann. Astrophys.* **25**, 57.
 289 A 1 A JOSS P. C., SMITH D. A., SOLINGER A. B. : 1976, *Astron. Astrophys.* **47**, 461.
 290 B 2 3 KACHIKIAN E. Y., WEEDMANN D. W. : 1977, *Coll. Internat. C.N.R.S. N° 263 (C.N.R.S. Paris)* p. 411.
 291 A 6 8 KAF TAN KASSIM M. A., SULENTIC J. W. : 1974, *Astron. Astrophys.* **33**, 343.
 292 E 8 A KAFKA P. : 1972, *I.A.U. Symp. Neth. N° 44*, 296.
 293 ADA KARACHENTSEV I. D., TIFFT W. G. : 1978, *Astron. Astrophys.* **63**, 411.
 294 5 1 8 KARLSSON K. G. : 1971, *Astron. Astrophys.* **13**, 333.
 295 5 3 2 KARLSSON K. G. : 1973, *Nature* **245**, 68.
 296 5 1 8 KARLSSON K. G. : 1977, *Astron. Astrophys.* **58**, 237.
 297 A 7 8 KAROJI H. : 1975, *C.R. Hebd. Séan. Acad. Sci. Paris* **280**, B 421.
 298 A 1 8 KAROJI H. : 1975, *C.R. Hebd. Séan. Acad. Sci. Paris* **280**, B 455.
 299 2 2 8 KAROJI H., MOLES M. : 1975, *C.R. Hebd. Séan. Acad. Sci. Paris* **280**, B 609.
 300 2 2 2 KAROJI H., NOTTALE L. : 1976, *Nature* **259**, 31.
 301 2 2 8 KAROJI H., NOTTALE L., VIGIER J. P. : 1975, *Astrophys. Space Sci.* **44**, 229.
 302 2 2 F KAROJI H., NOTTALE L., VIGIER J. P. : 1975, *C.R. Hebd. Séan. Acad. Sci. Paris* **281**, B 409.
 303 1 0 0 KELLERMANN K. I. : 1977, *Coll. Internat. C.N.R.S. N° 263 (C.N.R.S. Paris)* p. 607.
 304 9 9 2 KELLERMANN K. I., SHAFFER D. B. : 1977, *Coll. Internat. C.N.R.S. N° 263 (C.N.R.S. Paris)* p. 347.
 305 B 1 A KEMBHAVI A. K., KULKARNI V. K. : 1977, *Mon. Not. R. Astron. Soc.* **181**, 19 p.
 306 0 8 0 KENNEY J. F. : 1939, *Mathematics of statistics (3^e éd. part 1)* p. 181.
 307 0 9 0 KESTEVEN M. J. L., BRIDLE A. H. : 1977, *J.R. Astr. Soc. Canada* **71**, 21.
 308 E 1 2 KINMAN T. D. : 1977, *Nature* **267**, 798.
 309 A 1 8 KIPPENHAM R., DE VRIES H. L. : 1973, *Astrophys. Space Sci.* **26**, 131.
 310 3 8 1 KIPPER A. : 1972, *Publ. Tartukoj Astron. Observat.* **40**, 11.
 311 3 8 1 KIPPER A. : 1972, *Publ. Tartukoj Astron. Observat.* **40**, 73.
 312 3 1 1 KIPPER A. : 1973, *Publ. Tartukoj Astron. Observat.* **41**, 253.
 313 3 1 1 KIPPER A. YA. : 1974, *Astr. Arm. S.S.S.R.* **10**, 283.
 314 B 8 1 KIPPER A. : 1975, *Publ. Tartu. Astrofiz. Obs. V. Struve, E.S.S.R.* **43**, 3.
 315 5 1 A KNIGHT J. W., STURROCK P. A., SWITZER P. : 1976, *Astrophys. J.* **203**, 286.
 316 2 8 0 KOLOBOV V. M., REINHARDT M., SAZONOV V. N. : 1976, *Astrophys. Letters* **17**, 183.
 317 1 2 A KORMENDY J. : 1977, *Coll. U.A.I. N° 37 (C.N.R.S. Paris)* p. 155.
 318 8 8 0 KRAT V. A., GERLOVIN I. L. : 1974, *Astrophys. Space Sci.* **26**, 521.
 319 8 8 0 * KRAT V. A., GERLOVIN I. L. : 1974, *Dokl. Akad. Nauk S.S.S.R.* **215**, 305.
 320 8 8 1 KRAT V. A., GERLOVIN I. L. : 1975, *Astrophys. Space Sci. Neth.* **33**, L5.
 321 B 1 A KRIEGER C. J. : 1974, *Astrophys. Space Sci. Neth.* **27**, 241.
 322 3 1 A KRIEGER C. J. : 1974, *Astrophys. Space Sci. Neth.* **30**, 443.
 323 2 1 B KRIEGER J. : 1978, *Astrophys. J.* **221**, L101.
 324 E 6 A KRISTIAN J. : 1973, *Astrophys. J.* **179**, L61.

- 325 E F 2 KRISTIAN J., SANDAGE A., WESTPHAL J. A. : 1978, *Astrophys. J.* **221**, 383.
326 0 4 0 KRON G. E., SHANE C. D. : 1976, *Astrophys. Space Sci. Neth.* **39**, 401.
327 A 6 2 KRONBERG P. P. : 1977, *Coll. U.A.I. N° 37, Paris* p. 219.
328 A 6 8 KRONBERG P. P., BURBIDGE E. M., SMITH H. E., STROM R. C. : 1977, *Astrophys. J.* **218**, 8.
329 B 2 A KRUSZEWSKI A., SEMENIUK I. : 1976, *Act. Astron.* **26**, 193.
330 D 8 F KUHI L. V., PECKER J. C., VIGIER J. P. : 1974, *Astron. Astrophys.* **32**, 111.
331 E 8 A KULKARNI V. H. : 1977, *Nature* **266**, 513.
332 1 8 A* KURSKOV A. A., OZERNOI L. M. : 1975, *Soviet Astr.* **19**, 569.
333 3 6 2 LAKE G., PARTRIDGE R. B. : 1977, *Nature* **270**, 502.
334 5 1 2 LAKE R. G., ROEDER R. C. : 1972, *J. R. Astron. Soc. Canada* **66**, 111.
335 E 8 0 LAKE K., ROEDER R. C. : 1978, *Nature* **273**, 449.
336 B 1 A LANG K. R., LORD S. D., JOHANSON J. M., SAUAGE P. D. : 1975, *Astrophys. J.* **202**, 583.
337 B 1 3 LANG K. R., MUMFORD G. S. : 1976, *Sky and Telescope* **51**, 83.
338 2 2 2 LE DENMAT G. : 1976, *Thèse, Pierre et M. Curie Paris VI*.
339 1 2 D LE DENMAT G. : 1976, *Astrophys. Space Sci.* **45**, 159.
340 1 2 2 LE DENMAT G., MOLES M., NIETO J. L. : 1975, *Astron. Astrophys.* **45**, 219.
341 1 2 2 LE DENMAT G., MOLES M., VIGIER J. P., NIETO J. L. : 1975, *Nature* **257**, 30.
342 2 2 8 LE DENMAT G., VIGIER J. P. : 1975, *C.R. Hebd. Séan. Acad. Sci. Paris* **280**, 459.
343 4 8 A LEFEVRE J., PECKER J. C. : 1961, *Ann. Astrophys.* **24**, 238.
344 8 8 2 LE FLOCH A. C. : 1970, *Nature* **226**, 737.
345 E 8 D LE FLOCH A. C., LEBRETON J. : 1972, *Nature* **235**, 25.
346 E 6 3 LELIEVRE G. : 1976, *Thèse Paris VII*.
347 5 6 A LE MONNET G., DEHARVENG J. M. : 1977, *Astron. Astrophys.* **58**, L1.
348 8 0 2 LEQUEUX J., PECKER J. C. : 1977, *La Recherche* **8**, 1008.
349 C 7 A LEWIS B. M. : 1971, *Nature* **230**, 13.
350 8 8 C LEWIS B. M. : 1976, *Nature* **261**, 302.
351 8 8 1 LI XIAO-QING : 1976, *Acta Astr. Sinica* **17**, 129.
352 8 7 C LOISEAU J. : 1972, *Appl. Opt.* **11**, 470.
353 B 8 8 LONGAIR M. S., SCHEUER P. A. G. : 1967, *Nature* **215**, 919.
354 DD 8 LUYTEN W. J., EBBICHAUSEN E. G. : 1935, *Astrophys. J.* **82**, 248.
355 9 8 A LYNDEN-BELL D. : 1977, *Nature* **270**, 396.
356 3 8 B LYNDS C. R. : 1972, *I.A.U. Symp. N° 44*, 127.
357 A 6 A LYNDS R., MILLIKAN A. G. : 1972, *Astrophys. J.* **176**, L5.
358 2 2 0 LYNGA G., STEWOLM B. : 1974, *Astron. Astrophys.* **31**, 111.
359 8 8 A LYTTLETON R. A., FITCH J. P. : 1977, *Mon. Not. R. Astron. Soc.* **180**, 471.
360 8 8 2 LYTTLETON R. A., FITCH J. P. : 1978, *Astrophys. J.* **221**, 412.
361 E 8 A MAC ALPINE G. M. : 1972, *Astrophys. J.* **175**, 11.
362* 8 7 2 MAEDER A. : 1977, *Astron. Astrophys.* **56**, 359.
363* 8 8 0 MAEDER A. : 1978, *Astron. Astrophys.* **63**, 175.
364* 0 8 C MAEDER A. : 1978, *Astron. Astrophys.* **65**, 337.
365 8 8 2 MANSFIELD V. N., MALIN S. : 1976, *Astrophys. J.* **209**, 335.
366 8 8 2 MARCHANT A., MANSFIELD V. : 1977, *Nature* **270**, 699.
367 6 8 F MARIC Z., MOLES M., VIGIER J. P. : 1976, *Astron. Astrophys.* **53**, 191.
368 2 8 F MARIC Z., MOLES M., VIGIER J. P. : 1977, *Nuovo Cimento Let.* **18**, 269.
369 9 8 A MARSCHER A. P. : 1978, *Astrophys. J.* **219**, 392.
370 A 6 A MATERNE J., TAMMANN G. A. : 1974, *Astron. Astrophys.* **35**, 441.
371 1 8 7 MAVRIDES S. : 1976, *C.R. Hebd. Séan. Acad. Sci. Paris* **282**, A451.
372 1 8 7 MAVRIDES S. : 1976, *Mon. Not. R. Astron. Soc.* **177**, 709.
373 1 8 D MAVRIDES S. : 1977, *Coll. Internat. C.N.R.S. N° 263 (C.N.R.S. Paris)* p. 549.
374 1 8 0 MC CLELLAND J., SILK J. : 1978, *Astrophys. J.S.S.* **36**, 389.
375 8 8 A MC CREA W. H. : 1954, *Astrophys. J.* **45**, 1010.
376 8 8 A MC ELHINNY M. W. : 1978, *Nature* **271**, 316.
377 E 8 8 MC VITTIE : 1965, *Astrophys. J.* **141**, 333.
378 8 8 2 MELVIN M. A. : 1955, *Phys. Rev.* **98**, 884.
379 4 8 F MERAT P., PECKER J. C., VIGIER J. P. : 1974, *Astron. Astrophys.* **30**, 167.
380 E 8 A MERTZ L. : 1974, *Nature* **247**, 324.
381 8 1 2 MILEY G. K. : 1971, *Mon. Not. R. Astron. Soc.* **152**, 477.
382 E F A MILLER J. S., FRENCH H. B., HAWLEY S. A. : 1978, *Astrophys. J.* **219**, L87.
383 AAA MILLER J. S., ROBINSON L. B., WAMPLER E. J. : 1973, *Astrophys. J.* **179**, L83.
384 8 8 F MOLES M., VIGIER J. P. : 1973, *C.R. Hebd. Séan. Acad. Sci. Paris* **276**, B 697.
385 8 8 F* MOLES M., VIGIER J. P. : 1974, *C.R. Hebd. Séan. Acad. Sci. Paris* **278**, B 969.
386 3 A A MORTON D. C., WILLIAMS T. B., GREEN R. F. : 1978, *Astrophys. J.* **219**, 381.
387 0 F 0 MOSS C., DICKENS R. J. : 1977, *Mon. Not. R. Astron. Soc.* **178**, 701.
388 E 8 1 MOTZ L. : 1972, *Nuovo Cimento* **9**, 77.
389 1 6 A MUEHLNER D. J., WEISS R., BENFORD R. L., FRERKING M. A., OWENS D. K. : 1976, *Mass. Inst. Techn. R.L.E. Prog. rep.* **117**, 19.
390 E 8 2 MUSHOTSKY R. F., SOLOMON P. M., STRITTMATTER P. A. : 1972, *Astrophys. J.* **174**, 7.
391 1 6 7 MURRAY S. S., FORMAN W., JONES C., GIACCONI R. : 1978, *Astrophys. J.* **219**, L89.
392 B 2 A NANNI D., VIGNATO A. : 1975, *Astrophys. Space Sci. Neth.* **33**, 11.
393 8 8 C NARLIKAR J. V. : 1977, *Coll. Internat. C.N.R.S. N° 263 (C.N.R.S. Paris)* p. 497.

- 394 E 8 A NETZER H. : 1977, *Mon. Not. R. Astron. Soc.* **178**, 489.
 395 8 8 1 NEUGEBAUER T. : 1954, *Acta Phys. Acad. Sci. Hung* **4**, 31.
 396 B 2 2 NICOLL J. F., SEGAL I. E. : 1975, *Proc. nat. Acad. Sci. U.S.A.* **72**, 4691.
 397 A 9 0 NIETO J. L. : 1977, *Astron. Astrophys. S.S.* **28**, 363.
 398 A 8 B NIETO J. L. : 1977, *Nature* **270**, 411.
 399 0 9 0 NILSON P. : 1973, *Nova Acta R. Soc. Sci. Uppsala vol. 1*.
 400 2 8 2 NOERDLINGER P. D. : 1977, *Astrophys. J.* **218**, 317.
 401 2 8 0 NOERDLINGER P. D. : 1978, *Astrophys. J.* **220**, 373.
 402 A 2 8 NOTTALE L. : 1976, *Astrophys. J.* **208**, L103.
 403 2 2 F NOTTALE L. : 1976, *C.R. Hebd. Séan. Acad. Sci. Paris* **282**, 519.
 404 A 2 8 NOTTALE L., MOLES M. : 1978, *Astron. Astrophys.* **66**, 355.
 405 2 2 F NOTTALE L., VIGIER J. P. : 1977, *Nature* **268**, 608.
 406 A 8 6 OBREGON O., DEHNEN H. : 1975, *Astrophys. Space Sci. Neth.* **34**, 481.
 407 8 9 C* OCCHIONERO F., VAGNETTI F. : 1975, *Astron. Astrophys.* **44**, 329.
 408 B 8 8 O'DELL S. L., ROBERTS D. H. : 1976, *Astrophys. J.* **210**, 294.
 409 AAA OEMLER A., GUNN J. E., OKE J. B. : 1972, *Astrophys. J.* **176**, L47.
 410 E 8 3 OKE J. B., GUNN J. E. : 1974, *Astrophys. J.* **189**, L5.
 411 1 2 B OLEAK H., SCHMIDT K. H. : 1977, *Astr. Nachr.* **298**, 33.
 412 F 8 D OMER G. C. : 1949, *Astrophys. J.* **109**, 164.
 413 E 1 0 OSMER P. S., SMITH M. G. : 1977, *Astrophys. J.* **217**, L73.
 414 E 8 A OZERNOJ L. M. : 1972, *Astr. Zh. S.S.S.R.* **49**, 712.
 415 A 2 E OZERNOJ L. M. : 1972, *Astr. Zh. S.S.S.R.* **49**, 1148.
 416 E 8 2 OZERNOY L. M., CHERTOPRUD V. E., GUDZENKO L. I. : 1977, *Astrophys. J.* **216**, 237.
 417 E 8 2* OZERNOY L. M., USOV V. V. : 1977, *Astron. Astrophys.* **56**, 163.
 418 8 1 A PAGEL B. E. J. : 1977, *Mon. Not. R. Astron. Soc.* **179**, 81p.
 419 1 8 D PAPAPETROU A. : 1976, *Ann. Inst. Henri Poincaré* **24**, 165.
 420 7 9 2 PARTRIDGE R. B. : 1974, *I.A.U. Symp. N° 63*, p. 157.
 421 8 8 F PECKER J. C. : 1972, *Nature* **237**, 227.
 422 8 8 F* PECKER J. C. : 1977, *Coll. Internat. C.N.R.S. N° 263 (C.N.R.S. Paris)* p. 451.
 423 8 8 F PECKER J. C., ROBERTS P., VIGIER J. P. : 1972, *C.R. Hebd. Séan. Acad. Sci. Paris* **274**, B 765.
 424 8 7 2 PECKER J. C., ROBERTS A. P., VIGIER J. P. : 1972, *C.R. Hebd. Séan. Acad. Sci. Paris* **274**, B 1159.
 425 8 8 F PECKER J. C., TAIT W., VIGIER J. P. : 1973, *Nature* **241**, 338.
 426 1 8 4 PECKER J. C., VIGIER J. P. : 1975, *C.R. Hebd. Séan. Acad. Sci. Paris* **281**, B 369.
 427 8 8 F PECKER J. C., VIGIER J. P. : 1976, *Astr. Arm. S.S.R.* **12**, 315.
 428 3 8 A PEEBLES P. J. E. : 1969, *Astrophys. J.* **154**, L121.
 429 0 2 0 PEEBLES P. J. E., HAUSER M. G. : 1974, *Astrophys. J.* **28**, 19.
 430 0 2 0 PENCE W. : 1976, *Astrophys. J.* **203**, 39.
 431 3 8 B PENSTON M. V. : 1977, *Mon. Not. R. Astron. Soc.* **180**, 29p.
 432 AFA PENSTON M. V., PENSTON M. J. : 1973, *Mon. Rot. R. Astron. Soc.* **162**, 109.
 433 PEROLA G. C. : 1976, *Mem. Soc. Astron. Ital.* **47**, 387.
 434 3 1 1 PERRY J. J., O'DELL S. L. : 1978, *Astron. Astrophys.* **69**, 229.
 435 3 8 A PETERSON B. M., COLEMAN G. D., STRITTMATTER P. A., WILLIAMS R. E. : 1977, *Astrophys. J.* **218**, 605.
 436 AC0 PETERSON B. A., JAUNCIKY D. L., WRIGHT A. E., CONDON J. J. : 1976, *Astrophys. J.* **207**, L5.
 437 5 1 2 PETROSIAN V. : 1970, *Astrophys. Letters* **6**, 71.
 438 5 8 2 PETROSIAN V. : 1972, *I.A.U. Symp. N° 44*, 464.
 439 E 1 1 PETROSIAN V. : 1973, *Astrophys. J.* **183**, 359.
 440 B 1 A PETROSIAN V. : 1974, *Astrophys. J.* **188**, 443.
 441 5 8 D PETROSIAN V., SALPETER E., SZEKERES P. : 1967, *Astrophys. J.* **147**, 1222.
 442 E 8 1 PETROSIAN V., SOLDATE M. A. : 1977, *Colloq. U.A.I. N° 37 (C.N.R.S. Paris)* p. 273.
 443 0 6 0 POUND R. V., REBKA G. A. : 1960, *Phys. Rev. Lett.* **4**, 337.
 444 0 D 0 POUND R. V., SNIDER J. L. : 1965, *Phys. Rev.* **140**, B 788.
 445 0 8 0 PRESS W. H., LIGHTMAN A. P. : 1978, *Astrophys. J.* **219**, L73.
 446 8 8 A PUGET J. L., SCHATZMAN E. S. : 1974, *Astron. Astrophys.* **32**, 477.
 447 0 2 2 REAVES G. : 1974, *Astr. Zh. S.S.S.R.* **51**, 520.
 448 E 8 A REES M. J. : 1967, *Mon. Not. R. Astr. Soc.* **135**, 345.
 449 E 1 A REES M. J. : 1972, *I.A.U. Symp. Neth.* **44**, 407.
 450 E 8 A REES M. J. : 1977, *Quart. J. R. Astron. Soc.* **18**, 429.
 451 ADA RICHSTONE D. O., OKE J. B. : 1977, *Astrophys. J.* **213**, 8.
 452 8 3 B RICHTER G. M. : 1973, *Astrophys. Letters* **13**, 63.
 453 8 8 0 RITTER R. C., GILLIES G. T., ROOD R. T., BEAMS J. W. : 1978, *Nature* **271**, 228.
 454 A 1 2 ROBERTS D. H., O'DELL S. L., BURBIDGE G. R. : 1977, *Astrophys. J.* **216**, 227.
 455 0 2 A ROBERTS M. S. : 1977, *Coll. Internat. C.N.R.S. N° 263 (C.N.R.S. Paris)* p. 501.
 456 3 AA ROBERTS M. S., BROWN R. L., BRUNDAGE W. D., ROTS H. S., HAYNES M. P., WOLFE A. M. : 1976, *Astron. J.* **81**, 293.
 457 ADA ROBINSON L. B., WAMPLER E. J. : 1972, *Astrophys. J.* **171**, L83.
 458 ROBSON E. I., CLEGG P. F. : 1977, *I.A.U. Symp. Neth.* **74**, 319.
 459 4 DA RODDIER F. : 1965, *Ann. Astrophys.* **28**, 463 et 478.
 460 5 3 B ROEDER R. C. : 1971, *Nature* **233**, 74.
 461 3 8 2 ROEDER R. C. : 1972, *I.A.U. Symp. Neth.* **44**, 471.
 462 1 8 0 ROEDER R. C. : 1975, *Nature* **255**, 124.

- 463 8 8 1* ROEDER R. C., CHAMBERS R. H. : 1967, *Nature* **216**, 774.
 464 5 3 B ROEDER R. C., DYER C. C. : 1972, *Nature* **235**, 3.
 465 5 3 B ROEDER R. C., DYER C. C. : 1972, *Nature* **240**, 104.
 466* 3 8 1 ROEDER R. C., VERREAU R. T. : 1968, *Astrophys. J.* **153**, L127.
 467 A 6 B ROSE J. A., GRAHAM J. A. : 1977, *Astron. Astrophys.* **54**, 305.
 468 3 8 A RÖSER H. J. : 1975, *Astron. Astrophys.* **45**, 329.
 469 8 8 D ROSS D. K. : 1973, *Astron. Astrophys.* **24**, 471.
 470* E 9 2 ROWAN-ROBINSON M. : 1972, *Nature* **236**, 112.
 471 E 8 1 ROWAN-ROBINSON M. : 1973, *Astron. Astrophys.* **23**, 331.
 472* E 9 A ROWAN-ROBINSON M. : 1976, *Nature* **262**, 97.
 473 E 8 A ROWAN-ROBINSON M. : 1977, *Astrophys. J.* **213**, 635.
 474 1 9 0 ROWAN-ROBINSON M. : 1977, *Coll. Internat. C.N.R.S. N° 263 (C.N.R.S. Paris)* p. 607.
 475 6 6 2 ROWLEY W. R. C., HAMON J. : 1963, *Revue d'optique* **42**, 519.
 476 8 8 A ROXBURGH I. W. : 1977, *Mon. Not. R. Astron. Soc.* **181**, 637.
 477 8 8 C ROXBURGH I. W. : 1977, *Nature* **268**, 504.
 478 0 1 2 ROZYCZKA M. : 1972, *Acta Astr.* **22**, 93.
 479 A 1 A ROZYCZKA M. : 1973, *Acta Astr.* **23**, 233.
 480 2 2 4 RUBIN V. C. : 1951, *Astron. J.* **56**, 47.
 481 ADA RUBIN V. C. : 1974, *Astrophys. J.* **191**, 645.
 482 2 2 4 RUBIN V. C. : 1977, *Astrophys. J.* **211**, L1.
 483 2 9 4 RUBIN V. C. : 1977, *Colloq. U.A.I. C.N.R.S. N° 37 (C.N.R.S. Paris)* p. 119.
 484 2 F 8 RUBIN V. C., FORD W. K. Jr., RUBIN J. S. : 1973, *Astrophys. J.* **183**, L111.
 485 2 F 0 RUBIN V. C., FORD W. K. Jr., THONNARD N., ROBERTS M. S., GRAHAM J. A. : 1976, *Astron. J.* **81**, 687.
 486 2 2 4 RUBIN V. C., THONNARD N., FORD W. K. Jr., ROBERTS M. S. : 1976, *Astron. J.* **81**, 719.
 487 RUST B. W. : 1975, *Bull. Amer. Astron. Soc.* **7**, 236.
 488 5 8 A RUTHMEISELES, BEN-ZION, KOZSLOVSKY, GIORASHAVIV : 1974, *Astrophys. Sp. Sci. Neth.* **29**, 221.
 489 2 8 0 RUZMAJKIN A. A. : 1977, *Astrofiz. Arm. S.S.S.R.* **13**, 345.
 490 E 8 A SALPETER E. E. : 1964, *Astrophys. J.* **140**, 796.
 491 E 8 A SANDAGE A. : 1973, *Astrophys. J.* **180**, 687.
 492 2 F A SANDAGE A. : 1975, *Astrophys. J.* **202**, 563.
 493 B F A SANDAGE A., KRISTIAN J., WESTPHAL J. A. : 1976, *Astrophys. J.* **205**, 688.
 494 2 7 A SANDAGE A., TAMMANN G. A. : 1975, *Astrophys. J.* **197**, 265.
 495 1 2 A SANDAGE A., TAMMANN G. A., HARDY E. : 1972, *Astrophys. J.* **172**, 253.
 496 9 8 A SANDERS R. H. : 1974, *Nature* **248**, 390.
 497 E 8 1 SANITT N. : 1971, *Nature* **234**, 199.
 498 3 1 2 SARGENT W. L. W., BOROSON T. A. : 1977, *Astrophys. J.* **212**, 383.
 499 3 8 1 SCARGLE J. D. : 1975, *Astrophys. J.* **179**, 709.
 500 2 9 A SCHATZMANN E. : 1978, *La Recherche* **91**, 654.
 501 9 6 2 SCHEUER P. A. G. : 1976, *Mon. Not. R. Astron. Soc.* **177**, 1p.
 502 3 8 D SCHLOVSKY J. : 1967, *Astrophys. J.* **150**, L1.
 503 E 1 A SCHMIDT M. : 1977, *Astrophys. J.* **176**, 273 et 289.
 504 E 1 2 SCHMIDT M. : 1974, *ESO/SRC/CERN Conf.* 253.
 505 E 9 A SCHMIDT M. : 1975, « *Quasars* », in « *Galaxies and the Universe* » (The University of Chicago Press).
 506 4 8 A SCHRÖTER E. H. : 1957, *Z. Astrophys.* **41**, 141.
 507 E 8 A* SCOTT M. A. : 1977, *Mon. Not. R. Astron. Soc.* **178**, 329.
 508 E 6 2 SEIELSTAD G. A. : 1977, *Nature* **270**, 502.
 509 5 3 B SEMENIUK I., KRUSZEWSKI A. : *Acta Astron.* **21**, 437.
 510 A F 8 SERSIC J. L. : 1976, *Astrophys. Space Sci. Neth.* **39**, 477.
 511 B 1 2 SETTI G., WOLTJER L. : 1973, *Ann. New York Acad. Sci.* **224**, 8.
 512 B 1 2 SETTI G., WOLTJER L. : 1973, *Astrophys. J.* **181**, L61.
 513 A 1 2 SETTI G., WOLTJER L. : 1977, *Astrophys.* **218**, L33.
 514 B 1 A SETTI G., ZAMORANI G. : 1978 : *Astron. Astrophys.* **66**, 249.
 515 4 D 0 SHALLIS M. J. : 1978, *Mon. Not. R. Astron. Soc.* **183**, 1.
 516 0 3 2 SHAVIV : 1972, *Astrophys. Space Sci. Neth.* **19**, 159.
 517 E 8 A SHIELDS G. A. : 1978, *Nature* **272**, 706.
 518 0 8 C SHIELDS G. A. : 1978, *Nature* **273**, 519.
 519 E 8 A SHIELDS G. A., WHEELER J. C. : 1978, *Astrophys. J.* **222**, 667.
 520 A 6 A SHOSTAK G. S. : 1974, *Astrophys. J.* **187**, 19.
 521 A 6 A SHOSTAK G. S. : 1974, *Astrophys. J.* **189**, L1.
 522 A 6 A SHOSTAK G. S. : 1977, *Coll. Internat. C.N.R.S. N° 263 (C.N.R.S. Paris)* p. 489.
 523 3 6 2 SHUTER W. L. H., GOWER J. F. R. : 1969, *Nature* **223**, 1046.
 524 3 8 A SILK J. : 1970, *Astrophys. J.* **160**, 793.
 525 1 8 A SILK J. : 1974, *Astrophys. J.* **193**, 525.
 526 C 3 B SIMKIN S. M. : 1972, *Nature* **239**, 43.
 527 B 3 B SIMKIN S. M. : 1977, *Coll. U.A.I. C.N.R.S. N° 37 (C.N.R.S. Paris)* p. 167.
 528 B 3 B SIMKIN S. M. : 1977, *Astron. Astrophys.* **55**, 369.
 529 3 6 2 SMITH H. E., BURBIDGE E. M., JUNKKARINEN V. T. : 1977, *Astrophys. J.* **218**, 611.
 530 0 9 0 SMITH H. E., SPINRAD H., SMITH E. O. : 1976, *Publ. Astr. Soc. Pac.* **88**, 621.
 531 0 3 0 SMITH M. G. : 1975, *Astrophys. J.* **202**, 591.
 532 0 C 0 SMITH M. G. : 1977, *Mon. Not. R. Astron. Soc.* **181**, 67 p.

- 533 8 4 E SMITH M. G. : 1977, *Coll. U.A.I. C.N.R.S. N° 37 (C.N.R.S. Paris)* p. 75.
534 0 9 0 SMITH-HAENI A. L. : 1977, *Astron. Astrophys. S. S. 27*, 205.
535 2 6 4 SMOOT G. F., GORENSTEIN M. V., MULLER R. A. : 1977, *Phys. Rev. Lett.* **39**, 898.
536 8 6 A SOLHEIM J. E., BARNES T. G. III, SMITH H. J. : 1976, *Astrophys. J.* **209**, 330.
537 E F 3 SPINRAD H., SMITH H. E. : 1976, *Astrophys. J.* **206**, 355.
538 E F 3 SPINRAD H., SMITH H. E., HUNSTEAD R., RYLE M. : 1975, *Astrophys. J.* **198**, 7.
539 E A 2 SRAMEK R. A., WEEDMAN D. W. : 1978, *Astrophys. J.* **221**, 468.
540 B 1 A STANNARD D. : 1973, *Nature* **246**, 295.
541 7 8 0 STECKER F. W., PUGET J. L., FAZIO G. G. ; 1977, *Astrophys. J.* **214**, L51.
542 7 8 A* STEIGMAN G. : 1978, *Astrophys. J.* **221**, 407.
543 A A 8 STOCKE J., ARP H. : 1978, *Astrophys. J.* **219**, 367.
544 A F A STOCKTON A. : 1973, *Nature* **246**, 25.
545 A F A STOCKTON A. : 1974, *Nature* **250**, 308.
546 8 2 2 STOTHERS R. : 1976, *Nature* **262**, 476.
547 3 A 1 STRITTMATTER P. A., CARSWELL R. F., BURBIDGE E. M., HAZARD C., BALDWIN J. A., ROBINSON L., WAMPLER E. J. : 1973, *Astrophys. J.* **183**, 767.
548 6 1 1 STRITTMATTER P. A., FAULKNER J., WALMSLEY M. : 1966, *Nature* **212**, 1441.
549 3 9 2 STRITTMATTER P. A., WILLIAMS R. E. : 1976, *Ann. Rev. Astron. Astrophys.* **14**, 307.
550 DD 2 STRUVE O. : 1944, *Astrophys. J.* **100**, 188.
551 DDA* STRUVE O., SHERMAN F. : 1941, *Astrophys. J.* **93**, 84.
552 F 2 F SULENTIG J. W. : 1977, *Astrophys. J.* **211**, L59.
553 A 7 A TAMMANN G. A. : 1970, *Astrophys. Letters* **7**, 111.
554 F 2 A TAMMANN G. A. : 1972, *Astron. Astrophys.* **21**, 355.
555 2 9 2 TAMMANN G. A. : 1977, *Coll. U.A.I. C.N.R.S. N° 37 (C.N.R.S. Paris)* p. 43.
556 1 D 7 TARENGHI M. : 1977, *Coll. U.A.I. C.N.R.S. N° 37 (C.N.R.S. Paris)* p. 313.
557 1 8 D TARANTOLA A. : 1976, *C. R. Hebd. Séan Acad. Sci. Paris*, **283**, B405.
558 5 2 F TEERIKORPI P. : 1974, *Nature* **252**, 110.
559 B 1 A TEERIKORPI P. : 1975, *Astron. Astrophys.* **45**, 117.
560 0 2 5 TEERIKORPI P. : 1976, *Astron. Astrophys.* **50**, 455.
561 2 2 B TEERIKORPI P. : 1978, *Astron. Astrophys.* **64**, 379.
562 8 8 2 TER HAAR D. : 1954, *Phil. Mag.* **45**, 1023.
563 E 8 1 TERRELL J. : 1977, *Nature* **236**, 166.
564 E 8 1 TERRELL J. : 1975, *Nature* **258**, 132.
565 E 8 8 TERRELL J. : 1977, *Astrophys. J.* **213**, L93.
566 E 8 8 TERRELL J. : 1977, *Coll. Internat. C.N.R.S. N° 263 (C.N.R.S. Paris)* p. 517.
567 B 2 8 TIFFT W. G. : 1971, *Bull. Am. Astron. Soc.* **3**, 391.
568 B 2 8 TIFFT W. G. : 1971, *Bull. Am. Astron. Soc.* **4**, 238.
569 B 2 8 TIFFT W. G. : 1972, *Astrophys. J.* **175**, 613.
570 B 2 8 TIFFT W. G. : 1972, *I.A.U. Symp. N° 44*, 368.
571 B 2 8 TIFFT W. G. : 1973, *Astrophys. J.* **179**, 29.
572 B 1 8 TIFFT W. G. : 1973, *Astrophys. J.* **181**, 305.
573 B 2 8 TIFFT W. G. : 1974, *Astrophys. J.* **188**, 221.
574 BD 8 TIFFT W. G. : 1974, *I.A.U. Symp. Neth.* **58**, 243.
575 6 2 8 TIFFT W. G. : 1977-7, *Astrophys. J.* **206**, 38 ; **211**, 31 ; **211**, 377.
576 BD 8 TIFFT W. G. : 1977, *Coll. U.A.I. C.N.R.S. N° 37 (C.N.R.S. Paris)* p. 159.
577 6 2 8 TIFFT W. G. : 1978, *Astrophys. J.* **221**, 449.
578 B 2 8 TIFFT W. G. : 1978, *Astrophys. J.* **221**, 756.
579 B 3 8 TIFFT W. G. : 1978, *Astrophys. J.* **220**, 418.
580 0 F 0 TIFFT W. G. : 1978, *Astrophys. J.* **222**, 54.
581 B 2 1 TIFFT W. G. : 1978, *Astrophys. J.* **222**, 421.
582 FD 8 TIFFT W. G., TARENGHI M. : 1975, *Astrophys. J.* **199**, 10.
583 8 0 0 TINSLEY B. : 1977, *Coll. Internat. C.N.R.S. N° 263 (C.N.R.S. Paris)* p. 608.
584 8 8 A TREDER H. J. : 1977, *Astron. Nachr.* **298**, 35.
585 8 9 A TRITTON K. P. : 1974, *Sci. Prog.* **61**, 275.
586 DD 9 TRUMPLER R. J. : 1935, *Publ. Astron. Soc. Pac.* **47**, 249.
587 E 8 A TSURUTA S. : 1977, *Astron. Astrophys.* **61**, 647.
588 1 D 7 TULLY R. B., FISCHER J. R. : 1977, *Colloq. U.A.I. C.N.R.S. N° 37 (C.N.R.S. Paris)* p. 95.
589 8 8 1 URBANOVICH S. I. : 1971, *Astr. Zh. S.S.S.R.* **48**, 957.
590 8 8 2 VANDENBERG D. A. : 1977, *Mon. Not. R. Astron. Soc.* **181**, 695.
591 0 9 0 VAN DEN BERGH S. : 1977, *Colloq. U.A.I. C.N.R.S. N° 37 (C.N.R.S. Paris)* p. 13.
592 0 2 C VAN FLANDERN T. C. : 1975, *Mon. Not. R. Astron. Soc.* **170**, 333.
593 E 1 1 VARSHNI Y. P. : 1975, *Astrophys. Space Sci.* **37**, L1.
594 E 1 1 VARSHNI Y. P. : 1976, *Astrophys. Space Sci.* **42**, 369.
595 5 1 1 VARSHNI Y. P. : 1976, *Astrophys. Space Sci.* **43**, 3.
596 B 1 B VERON P., VERON M. P. : 1974, *Astron. Astrophys.* **30**, 155.
597 1 6 A VISVANATHAN N., SANDAGE A. : 1977, *Astrophys. J.* **216**, 214.
598 9 8 0 VITELLO P., PACINI F. : 1978, *Astrophys. J.* **220**, 756.
599 3 8 2 WAGONER R. V. : 1967, *Astrophys. J.* **149**, 465.
600 8 8 F WARD A. : 1961, *Nature* **192**, 858.
601 2 6 A WEBSTER A. : 1974, *Mon. Not. R. Astron. Soc.* **166**, 358.

- 602 A 0 8 WEEDMAN D. W. : 1970, *Astrophys. J.* **161**, L113.
 603 BE 2 WEEDMAN D. W. : 1975, *Astrophys. J.* **195**, 587.
 604 BEA WEEDMAN D. W. : 1976, *Astrophys. J.* **203**, 6.
 605 8 9 A WEEDMAN D. W. : 1976, *Quart. J. R. Astron. Soc.* **17**, 227.
 606 E 6 A WEEDMAN D. W. : 1976, *Astrophys. J.* **208**, 30.
 607 3 1 A WEISHEIT J. C. : 1978, *Astrophys. J.* **219**, 829.
 608 8 6 A WEISS : 1962, *Phys. Lett.* **1**, 342.
 609 EC 3 WEST R. M., DANKS A. C., ALCAINO G. : 1978, *Astron. Astrophys.* **62**, L13.
 610 0 3 0 WESPHAL J. A., KRISTIAN J., SANDAGE A. : 1975, *Astrophys. J.* **197**, L95.
 611 3 A 2 WEYMANN R. J., WILLIAMS R. E. : 1977, *Astrophys. J.* **213**, 619.
 612 8 1 A WILLS D. : 1971, *Nature* **234**, 168.
 613 5 1 B WILLS D. : 1972, *Nature* **238**, 70.
 614 E 1 2 WILLS D. : 1974, *ESO/SRC/CERN Conf. Genève*, 275.
 615 E 1 2 WILLS D. : 1976, *Observatory* **96**, 1013.
 616 5 1 B* WILLS D. : 1977, *Publ. astr. Soc. Pacific* **89**, 643.
 617 0 A 2 WILLS D., LYNDY R. : 1978, *Astrophys. J. S.S.* **36**, 317.
 618 5 1 B WILLS D., RICKLEFS R. L. : 1976, *Mon. Not. R. Astron. Soc.* **175**, 81 p.
 619 DD 8 WILSON O. C. : 1940, *Astrophys. J.* **91**, 379 et 394.
 620 9 6 8 WITTELS J. J., COTTON W. D., COUNSELMAN C. C. II, SHAPIRO I. I., HINTEREGGER H. F., KNIGHT C. A., RODGERS A. E. E., WHITNEY A. R., CLARK T. A., HUTTON L. K., RÖNNANG B. O., RYDBECK O. E. H., NIELL A. E. : 1976, *Astrophys. J.* **206**, L75.
 621 E 6 A WLERICK G., LELIEVRE G. : 1974, *ESO/CRC/CERN Conf. S.L.*, 211.
 622 3 6 A WOLFE A. M. : 1977, *Coll. Internat. C.N.R.S. N° 263 (C.N.R.S. Paris)* p. 511.
 623 E 6 A WOLFE A. M., BRODERICK J. J., JOHNSON K. J. : 1976, *Astrophys. J.* **208**, L47.
 624 8 8 A* WOLFE A. M., BROWN R. L., ROBERTS M. S. : 1976, *Phys. Rev. Letters* **37**, 179.
 625 3 8 2 WOLFE A. M., BURBIDGE G. R. : 1975, *Astrophys. J.* **200**, 548.
 626 8 2 F WOODWARD J. F., YOUNGRAU W. : 1972, *Nuovo Cimento (B)* **9**, 440.
 627 8 8 2 WOODWARD J. F., YOUNGRAU W. : 1973, *Nature* **241**, 338.
 628 AA 2 WRIGHT A. E., JAUNCEY D. L., PETERSON B. A., CONDON J. J. : 1977, *Astrophys. J.* **211**, L115.
 629 2 2 0 YAHIL A., TAMMANN G. A., SANDAGE A. : 1977, *Astrophys. J.* **217**, 903.
 630 E 8 1 YOSHIOKA S. : 1970, *Publ. astr. Soc. Jap.* **22**, 423.
 631 E 8 A YOUNG P. J., SHIELDS G. A., WHEELER J. C. : 1977, **212**, 367.
 632 E 8 2 ZAPOLSKY H. S. : 1968, *Astrophys. J.* **153**, L163.
 633 E 1 2 ZOTOV N. V., DAVIDSON W. : 1973, *Mon. Not. R. Astron. Soc.* **162**, 127.
 634 AD 2 ZWICKY F. : 1956, *Ergeb. Exakt. Naturwiss.* **39**, 354.
 635 6 9 9 ZWICKY F. : 1970, *Adv. in astr. and Astrophys.* **7**, 227.
 636 6 9 9 ZWICKY F. : 1971, *Catalogue of selected compact galaxies and of post eruptive galaxies* p. XXV.

II

- 637 4 D 8 ADAM M. G. : 1948, *Mon. Not. R. Astron. Soc.* **108**, 446.
 638 4 D 2 ADAM M. G. : 1959, *Mon. Not. R. Astron. Soc.* **119**, 460.
 639 4 D 2 ADAMS W. : 1910, *Astrophys. J.* **31**, 30.
 640 0 9 A ANDRILLAT H. : 1970, « *Introduction à l'étude des cosmologies* » (Armand Colin Paris).
 641 0 9 2* ARNAUD M. : 1972, *Thèse U.S.T.L.*
 642 A 1 8 ARP H. : 1967, *Astrophys. J.* **148**, 321.
 643 4 DA BALL J. A., DIRKINSON O. F., LILLEY A. E., PENFIELD H., SHAPIRO I. : 1970, *Science* **167**, 1755.
 644 E 1 8 BELL M. B. : 1969, *Nature* **224**, 229.
 645 ECA BROWN R. L., ROBERTS M. S. : 1973, *Astrophys. J.* **184**, L7.
 646 3 A 2 BURBIDGE E. M. : 1969, *Astrophys. J.* **155**, L43.
 647 3 DA BURBIDGE E. M., CALDWELL R. D., SMITH H. E., LIEBERT J., SPINRAD H. : 1976, *Astrophys. J.* **205**, L117.
 648 4 8 A CHASTEL A. A., HEYVAERTS J. F. : 1976, *Astron. Astrophys.* **51**, 171.
 649 9 6 2 COHEN M. M., MOFFET A. T., ROMNEY J. D., SCHILIZZI R. T., SEIELSTAD G. A., KELLERMANN K. I., PURCELL G. H., SHAFFER D. B., PURCELL G. M., PAULINY-TOTH I. I. K., PREUSS E., WITZEL A., RINEHART R. : 1976, *Astrophys. J.* **206**, L1.
 650 0 9 0 DE VAUCOULEURS G. : 1976, « *Le Monde des galaxies* » *Cours au Collège France Paris*.
 651 0 8 A EINSTEIN A. : 1916, *Ann. der Phys.* **49**, 769.
 652 4 2 F FINLAY-FREUNDLICH E., FORBES E. G. : 1956, *Ann. Astrophys.* **19**, 183 et 215.
 653 4 8 2* FORBES E. G. : 1962, *Ann. Astrophys.* **25**, 337.
 654 4 D 2 FORBES E. G. : 1962, *Mon. Not. R. Astron. Soc.* **125**, 1.
 655 4 D 2 FREUNDLICH E. F., BRÜNN A VAN., BRUCK H. : 1930, *Z. Astrophys.* **1**, 43.
 656 6 2 A FRICKE W., TSIUMIS A. : 1975, *Astron. Astrophys.* **42**, 449.
 657 0 8 A FRIEDMANN A. : 1922, *Z. für Phys.* **10**, 377.
 658 8 8 1 FURTH : 1964, *Phys. Lett.* **13**, 221.
 659 4 D 2 GOLDSTEIN R. M. : 1969, *Science* **166**, 598.
 660 3 7 2 GREWING M., STRITTMATTER P. A. : 1973, *Astron. Astrophys.* **28**, 39.
 661 4 D 2 HART A. B. : 1954/6, *Mon. Not. R. Astron. Soc.* **114**, 17 ; **116**, 38.

- 662 DD2 HEARD J. F., FERNIE J. D. : 1968, *J. Roy. Astron. Soc. Can.* **62**, 99.
 663 1 2 0 HOLMBERG E. : 1937, *Ann. Obs. Lund* N° 6.
 664 A 6 A KAP-HERR A. VAN., HASLAM C. G. T., WIELEBINSKI R. : 1977, *Astron. Astrophys.* **57**, 337.
 665 3 A 0 LYNDS C. R. : 1971, *Astrophys. J.* **164**, L73.
 666 E 6 A MAC GIMSEY B. Q., MILLER H. R. : 1978, *Astrophys. J.* **219**, 387.
 667 0 8 1 MAEDER A. : 1978, *Astron. Astrophys.* **67**, 81.
 668 3 A 0 MC KEE C. F., SARGENT W. L. W. : 1973, *Astrophys. J.* **182**, L99.
 669 EE 2 MILLER H. R. : 1978, *Astrophys. J.* **223**, L67.
 670 3 A 2 MORTON W. A., MORTON D. C. : 1972, *Astrophys. J.* **178**, 607.
 671 3 A 2 MORTON D. C., RICHSTONE D. O. : 1973, *Astrophys. J.* **184**, 65.
 672 2 2 5 NOONAN T. W. : 1970, *Astron. Astrophys.* **55**, 288.
 673 0 3 0 OSMER P. S. : 1977, *Astrophys. J.* **214**, 1.
 674 8 8 F PECKER J. C. : 1976, « Possible explanations of non cosmological redshifts » Institut d'Astrophysique de Paris.
 675 E 1 2 PLAGEMANN S. H., 1973, *Mon. Not. R. Astron. Soc.* **164**, 303.
 676 4 8 A SCHATZMAN E., MAGNAN C. : 1975, *Astron. Astrophys.* **38**, 373.
 677 8 D 2 SADEH D., KNOWLES S. H., AU B. : *Science* **161**, 567.
 678 4 D 2 SADEH D., YAPLEE B. S., KNOWLES S. H. : 1968, *Science* **159**, 307.
 679 4 D 2 SAINT-JOHN C. E. : 1928, *Astrophys. J.* **67**, 195.
 680 1 2 6 SANDAGE A., TAMMANN G. A. : 1974/5, *Astrophys. J.* **190**, 525 ; **191**, 603 ; **194**, 223 ; **194**, 559 ; **196**, 313.
 681 AD 1 SARGENT W. L. W. : 1968, *Astrophys. J.* **153**, L135.
 682 4 DA SNIDER J. L. : 1972, *Phys. Rev. Letters* **28**, 853.
 683 AA 8 STOCKTON A. N. : 1972, *Nature* **238**, 87.
 684 E 1 8 VIRTANEN T. : 1970, *Ann. Acad. Sci. Fenn.* **A6**, 353.
 685 E 1 8 VIRTANEN T., PYYKKO S. A. : 1971, *Astrophys. Space Sci.* **11**, 463.
 686 AA 8 WAMPLER E. J., BALDWIN J. A., BURKE W. L., ROBINSON L. E., HAZARD C. : 1973, *Nature* **246**, 203.
 687 9 6 2 WHITNEY A. L., SHAPIRO I. I., ROGERS A. E. E., ROBERTSON D. S., KNIGHT C. A., CLARK I. A., GOLDSTEIN R. M., MARANDINO G. E., VANDENBERG N. R. : 1971, *Science* **173**, 225.

III

- 688 3 AA ADAMS M. T., COLEMAN G. D., STOCKMAN H. S., STRITTMATTER P. A., WILLIAM R. E. : 1978, *Astrophys. J.* **223**, 758.
 689 8 8 D AMBARTSUMIAN V. A. : 1961, *Astron. J.* **66**, 536.
 690 0 8 D ANILE A. M., MOTTA S. : 1978, *Mon. Not. R. Astron. Soc.* **184**, 319.
 691 B 8 E BARNOTHY J. M., BARNOTHY M. F. : 1974, *Astrophys. J.* **189**, 11.
 692 BARNOTHY J., FORRO M. : 1974, *Csillagaszati Lapok*.
 693 AA 8 BOLTON J. G., PETERSON B. A., WILLS B. J., WILLS D. : 1976, *Astrophys. J.* **210**, L1.
 694 AD 2 BURBIDGE E. M., BURBIDGE G. R. : 1961, *Astrophys. J.* **134**, 244.
 695 0 9 0 BURBIDGE G. R., CROWNE A. H., SMITH H. E. : 1977, *Astrophys. J. S.S.* **33**, 113.
 696 8 8 C CANUTO V., ADAMS P. J., HSIEH S. H., TSIANG E. : 1977, *Phys. Rev. D.* **16**, 1643.
 697 8 8 C CANUTO V., HSIEH S. H., ADAMS P. J. : 1977, *Phys. Rev. Lett.* **39**, 429.
 698 3 6 A CONWAY, GILBERT : 1970, *Nature* **226**, 332.
 699 8 8 1 DAUTCOURT G. : 1974, *I.A.U. Symp. N° 64*, 299.
 700 8 8 C DIRAC P. A. M. : 1974, *Proc. R. Soc. Lond. A*, **338**, 439.
 701 8 8 C DIRAC P. A. M. : 1974, in « *The Physicist's conception of Nature* » 6.
 702 0 8 D ELLIS G. F. R., MAARTENS R., NEL S. D. : 1978, *Mon. Not. R. Astron. Soc.* **184**, 439.
 703 8 8 0 FLATO M. : 1972, *Phys. Rev. Lett.* **28**, 385.
 704 0 1 1 FLICHE H. H., SOURIAU J. M. : 1978, *Astron. Astrophys.* **78**, 87.
 705 8 6 A HINTZEN P., SCOTT J. S. : 1978, *Astrophys. J.* **224**, L47.
 706 E 8 9 HOYLE F., FOWLER W. A. : 1967, *Nature* **213**, 373.
 707 AD 2 HUMASON M. L., MAYALL N. U., SANDAGE A. R. : 1956, *Astron. J.* **61**, 97.
 708 8 8 F JAAKOLA T., MOLES M., VIGIER J. A., PECKER J. C., YOURGRAU W. : 1975, *Found. Phys.* **5**, 257.
 709 A 6 2 KAFTAN-KASSIM, MAY, SULENTIC J. W. : 1974, *Nature* **253**, 176.
 710 E 8 0 MC INTOSH C. B. G. : 1970, *Nature* **226**, 339.
 711 9 8 A MILGROM M., BAHCALL J. N. : 1978.
 712 D 2 A MISSANA M. : 1977, *Astrophys. Sp. Sci. Neth.* **50**, 409 et **53**, 339.
 713 4 2 A MISSANA M., PIANA A. : 1975, *Astrophys. Sp. Sci. Neth.* **37**, 263.
 714 4 2 A MISSANA M., PIANA A. : 1976, *Astrophys. Sp. Sci. Neth.* **43**, 129.
 715 0 8 D PERRENOD S. C. : 1978, *Astrophys. J.* **224**, 285.
 716 2 2 A PINEAU DES FORETS G., SCHNEIDER I. : 1973, *Astron. Astrophys.* **26**, 397.
 717 E 1 0 SCHMIDT M. : 1976, *Astrophys. J.* **209**, L55.
 718 8 8 1 SEGAL I. E. : 1972, *Astron. Astrophys.* **18**, 143.
 719 8 8 1 SEGAL I. E. : 1975, *Proc. Not. Acad. Sci. U.S.A.* **72**, 2473.
 720 8 8 1 SEGAL I. E. : 1976, in « *Mathematical cosmology and extragalactic astronomy* » (Academic Press. New York).
 721 8 8 1 SEGAL I. E. : 1978, *Astron. Astrophys.* **68**, 343.
 722 8 2 1 SEGAL I. E. : 1978, *Astron. Astrophys.* **68**, 353.
 723 SEYFERT : 1951, *Publ. astr. Soc. Pacific* **63**, 72.

- 724 E F A STOCKTON A. : 1978, *Nature* **274**, 342.
 725 E 2 A STOCKTON A. : 1978, *Astrophys. J.* **223**, 747.
 726 0 8 0 TRUMPLER R. J., WEAVER H. F. : 1962, « *Statistical Astronomy* » (Dover Publ. Inc. New York).
 727 E 6 A WEHINGER P. A., WYCKOFF S. : 1978, *Mon. Not. R. Astron. Soc.* **184**, 335.
 728 E 1 0 YOU JUN-HAN, CHENG FU-ZHEN, FANG LIZHI : 1977, *Acta Astron. Sinica* **18**, 239.

IV

- 729 A 6 A ALLEN R. J., SULLIVAN W. T. III : 1980, *Astron. Astrophys.* **84**, 181.
 730 A 1 8 ARP H. : 1980, *Astrophys. J.* **239**, 463.
 731 A F 8 ARP H. : 1980, *Astrophys. J.* **239**, 469.
 732 A A 8 ARP H., SULENTIC J. W. : 1979, *Astrophys. J.* **229**, 496.
 733 5 1 B BASU D. : 1979, *Astron. Astrophys.* **77**, 255.
 734 4 8 A* BECKERS J. M., CRAM L. E. : 1979, *Nature* **280**, 255.
 735 A 1 2 BURBIDGE G. : 1979, *Nature* **282**, 451.
 736 8 8 C CANUTO V., HSIEH S. H. : 1978, *Astrophys. J.* **224**, 302.
 737 5 8 E CARSWELL R. F., SMITH M. E. : 1978, *Mon. Not. R. Astron. Soc.* **185**, 381.
 738 9 8 2 CHITRE S. M., NARLIKAR J. V. : 1979, *Mon. Not. R. Astron. Soc.* **187**, 655.
 739 9 7 6 COHEN M. H., KELLERMAN W. I., SHAFFER D. B., LINDFIELD R. P., MOFFET A. T., ROMNEY J. D., SEIELSTAD G. A., PAULINY-TOTH I. K. K., PREUSS E., WITZEL A., SCHILIZZI R. T., GELDZAHLER B. J. : 1977, *Nature* **268**, 405.
 740 9 1 6 COHEN M. H., PEARSON T. J., READHEAD A. C. S., SEIELSTAD G. A., SIMON R. S., WALKER R. C. : 1979, *Astrophys. J.* **231**, 293.
 741 9 6 2 COTTON W. D., COUNSELMANN C. C. III, GELLER R. B., SHAPIRO I. I., WITTELS J. J., HINTEREGGER H. F., KNIGHT C. A., ROGERS A. E. E., WHITNEY A. R., CLARK T. A. : 1979, *Astrophys. J.* **229**, L115.
 742 8 8 F* CRAWFORD D. F. : 1979, *Nature* **277**, 633.
 743 9 8 2 DAVIDSON W. : 1978, *Nature* **224**, 449.
 744 4 8 A DURGAPAL M. C., UPRETI T. C. : 1979, *Mon. Not. R. Astron. Soc.* **186**, 501.
 745 8 1 A* EVANS A. : 1973, *Nature* **241**, 5.
 746 A D A GORDON K. J., GORDON C. P. : 1979, *Astrophys. Letters* **20**, 9.
 747 8 3 0 HARRISON E. R., NOONAN T. W. : 1979, *Astrophys. J.* **232**, 18.
 748 E C 3 HAWLEY S. A., PHILLIPS M. M. : 1978, *Astrophys. J.* **225**, 780.
 749 0 9 0 HEWITT A., BURBIDGE G. : 1980, *Astrophys. J. Suppl. Ser.* **43**, 57.
 750 9 7 2 KOHLER E. : 1978, *Astron. Astrophys.* **70**, 163.
 751 E 8 6* KONIGL A. : 1978, *Astrophys. J.* **225**, 732.
 752 9 9 6 MARSCHER A. P., SCOTT J. S. : 1980, *Publ. Astr. Soc. Pacific* **92**, 127.
 753 A 1 8 MOLES M., NOTTALE L. : 1978, *Astron. Astrophys.* **70**, 13.
 754 6 8 2 MURDOCH H. S. : 1977*, *Quart. J. R. Astr. Soc.* **18**, 242.
 755 A 1 E NIETO J. L. : 1978, *Astron. Astrophys.* **70**, 219.
 756 6 3 2 PUTSIL'NIK S. A. : 1979, *Astron. Astrophys.* **78**, 248.
 757 2 1 2 REBOUL H. : 1979, *Annales de Physique* **4**, 213.
 758 2 1 2 REBOUL H. : 1980, *Astron. Astrophys.* **80**, 272.
 759 A 1 2 ROBERTS D. H., O'DELL S. L. : 1979, *Astron. Astrophys.* **76**, 254.
 760 9 8 6 SANDERS R. H., DA COSTA N. : 1978, *Astron. Astrophys.* **70**, 477.
 761 8 8 A SCHATZMAN E. : 1979, *Astron. Astrophys.* **74**, 12.
 762 9 7 1 SEGAL I. E. : 1979, *Astrophys. J.* **227**, 15.
 763 9 6 1 SEIELSTAD G. A., COHEN M. H., LINFIELD R. P., MOFFET A. T., ROMNEY J. D., SCHILIZZI T., SHAFFER D. B. : 1979, *Astrophys. J.* **229**, 53.
 764 A 1 2 SELDNER M., PEEBLES P. J. E. : 1979, *Astrophys. J.* **227**, 30.
 765 8 2 8 TIFFT W. G. : 1979, *Astrophys. J.* **253**, 799.
 766 5 2 8 TIFFT W. G. : 1980, *Astrophys. J.* **236**, 70.
 767 E 6 3 VANDERIEST C., SCHNEIDER J. : 1979, *Astron. Astrophys.* **76**, 297.
 768 2 2 4 VISVANATHAN N. : 1979, *Astrophys. J.* **228**, 81.
 769 A 1 B WEEDMAN D. W. : 1980, *Astrophys. J.* **237**, 326.
 770 E 6 3 WEHINGER P. A., GEHREN T., WYCKOFF S. : 1980, *The Messenger* **20**, 1.
 771 E 6 3 WYCKOFF S., WEHINGER P. A., SPINRAD A., BOCKSENBERG A. : 1980, *Astrophys. J.* **240**, 25.
 772 9 8 0 YAHIL A. : 1979, *Astrophys. J.* **233**, 775.

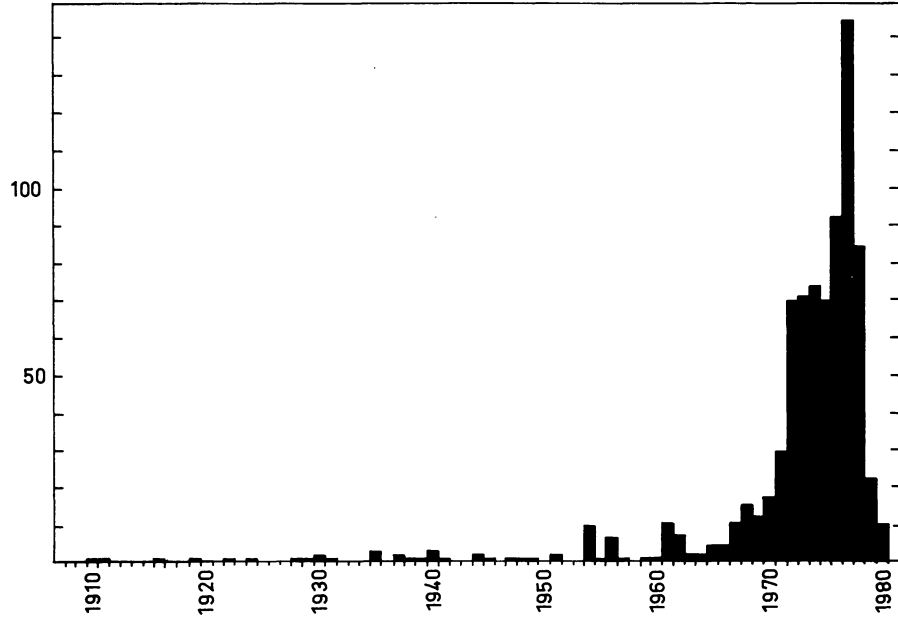


FIGURE 1. — Yearly distribution of the 780 referenced publications. The decrease after 1977, though likely real, is greatly enlarged by the partial character of the lengthening 78-80.