

ABSTRACT. An annotated list of 210 corrections and emendations relative to the location (in recognized culture collections) of type strains, neotype strains and reference strains of bacteria as proposed by Sneath and Skerman (1966, 1).

On examining the above paper a number of errors and omissions have been discovered. Many of these have arisen from the use of the first edition and appendix of the Catalogue of Strains of the National Collection of Industrial Bacteria rather than the second edition published at the end of 1964. A list of corrections is appended.

In addition, the following points should be noted.

1. Abbreviations: Additional to those given by Sneath and Skerman should be listed:
   - CDA - probably same as Canad. 201
   - CN - Burroughs Wellcome Research Laboratories, Beckenham, Kent, England, U. K.
   - HMS - Hopkins Marine Station, Pacific Grove, California, U. S. A. (Catalogue of Cultures, 1951)

The abbreviations to the names of Culture Collections are as follows:
   - ATCC - American Type Culture Collection, Rockville, Maryland 20852, U. S. A.
   - CCEB - Culture Collection of Entomogenous Bacteria, Institute of Entomology, Prague 6, Czechoslovakia
   - CCMDB - Microbial Culture Collection Department, Faculty of Natural Sciences, University of J. E. Purkyne, Brno, Czechoslovakia

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1 National Collection of Industrial Bacteria and National Collection of Marine Bacteria. Torry Research Station, P. O. Box 31, 135 Abbey Road, Aberdeen, Scotland, U. K.
2. **Status**: From the introduction it is not clear exactly what is meant by the term "Authentic" in the table. When used in connection with holotypes it would seem superfluous. At other times it seems merely to emphasise "typical" etc., in the remarks column. If it indicates cultures checked for agreement with name and original description by the authors or others, it would be helpful if this were indicated.
3. **Bacillus**: In the annotations on *Bacillus*, references are made to "Aerobic Sporeforming Bacteria," U. S. Department of Agriculture Monograph No. 16, erroneously quoting this as "Aerobic Sporebearing Bacteria."

4. **Propionibacterium**: Sneath and Skerman do not regard van Niel's cultures as cotypes on the ground that these species were "founded" on recognizable varieties of earlier workers. If this interpretation is accepted, it would appear incorrect to cite *Lactobacillus brevis* ATCC 14869, *L. casei* ATCC 393, or *L. helveticus* Hansen Lh 12 as cotypes. Alternatively, it would seem a more logical extension of the type concept to regard van Niel's strains as cotypes for those species which he named and defined, even though his definitions may have embraced descriptions of previously described and recognisable strains. In this case *Rhodopseudomonas spheroides* ATCC 11167 should also be regarded as a cotype.

All references in the manuscript are to the pages where the taxon is named. The complete citations are included in the list of references.
1. *Acetobacter acetii* (Beijerinck 1898) Beijerinck 1900.
   
   **Author's strain No.** L40. **Culture collection No.** NCIB 8621.
   **Status:** no comment. **Annotation:** ADD: this strain (L40) is No. 4 from Collection 1, Delft, Frateur's monograph (1950, 313). According to Frateur "We can then conclude that Pasteur's *Mycoderma acetii* non mucous is the equivalent of Beijerinck's *A. acetii*. For this reason we must name this organism *A. acetii* (Pasteur) Beijerinck."

   **Author's strain No.** None. **Culture collection Nos.** ATCC 12879, NCIB 889. **Status:** Holotype. **Annotation:** AMEND: Parsons to ATCC and NCIB. Holotype, Kozulis and Parsons (1958, 47-50).

   **Author's strain No.** None. **Culture collection Nos.** ATCC 12879, NCIB 889. **Status:** Holotype. **Annotation:** AMEND: Parsons to ATCC and NCIB. Holotype, Kozulis and Parsons (1958, 47-50).

   **Author's strain No.** None. **Culture collection Nos.** NCIB 4943, ATCC 11894. **Status:** Holotype. AMEND: Shimwell to NCTC 1936, to NCIB to ATCC. Holotype, Shimwell (1936, 585).

   **Author's strain No.** 20. **Culture collection Nos.** NCIB 6428, ATCC 12877. **Status:** Holotype. AMEND: Tošić to NCTC 1942, to NCIB. Tošić to ATCC. NCIB 6428 was designated as the type strain by Tošić (number 20 in his collection). Tošić and Walker (1944, 296).

5. AMEND: *Acetobacter suboxydans* Kluyver and de Leeuw 1924 (not 1923)
   **Author's strain No.** None. **Culture collection No.** NCIB 9119. **Status:** Holotype. **Annotations:** Wikén to Carr to NCIB. Lineal descendant of the culture described by Kluyver and de Leeuw (1924, 170) and behaves in accordance with the original description. NCTC/NCIB 3734, sent direct to NCTC by Kluyver, has lost the property of converting glycerol to dihydroxyacetone, therefore NCIB 9119 is preferred. All genuine *Acetobacter suboxydans* are now classified by Shimwell and Carr (1959, 353) as *Acetomonas oxydans*.

   **Author's strain No.** 1. **Culture collection No.** NCIB 6249. **Status:** Holotype. **Annotations:** Walker to NCTC 1941, to NCIB. Cosbie, Tošić and Walker (1941, 382 and 1942, 82). This strain, No. 1 of Walker, was deposited in NCTC before publication of the second article and should rank as holotype. NCIB 6427 is then a paratype.

7. DELETE: *Acetobacter oxydans*
   REPLACE: *Acetomonas oxydans* (Henneberg 1897) Shimwell and Carr 1959.
   **Author's strain No.** None. **Culture collection No.** NCIB 9013. **Status:** Proposed neotype. **Annotations:** Carr to NCIB. Proposed as neotype of *Acetomonas oxydans* not *Acetobacter oxydans* (Henneberg) Bergey et al. 1923; Shimwell and Carr (1959, 353). NCIB 9014 was also proposed as a neotype by these authors.
8. *Achromobacter aquamarinus* ZoBell and Upham 1944.  
Author's strain No. 558. Culture Collection Nos. ATCC 14400, NCMB 557. Status: No comment. Annotations: AMEND: ZoBell to ATCC and Shewan to NCMB.

Author's strain No. None. Culture collection Nos. ATCC 14780, NCIB 9657. Status: No comment. Annotations: AMEND: Groupe to Rutgers University to ATCC to NCIB.


11. DELETE: *Aerobacter cloacae* (Jordan 1890) Bergey et al. 1923.  

12. *Aeromonas hydrophila* (Chester 1901) Stanier 1943  
Author's strain No. P 2. Culture collection Nos. NCTC 7810, ATCC 9071, CCMDB 1242, NCMB 37, Canad 212, 494, CDC-RH 36, RH 252. Annotations: AMEND: Kulp to ATCC to NCTC to Miles to Shewan to NCMB. This strain was isolated by von Wolzogen Kühr and named *Pseudomonas fermentans* (1932, 239) but was received by Miles and Miles from Kluyver as *Aeromonas liquefaciens* (1951, 298). As Kluyver and van Niel proposed the genus *Aeromonas* this culture is presumably authentic.

Author's strain No. Kluvyer L 417. Culture collection Nos. NCMB 87, CDC-RH 47. Status: No comment. Annotations: AMEND: Kluyver to Miles to Shewan to NCMB. This strain was isolated by von Wolzogen Kühr and named *Pseudomonas fermentans* (1932, 239) but was received by Miles and Miles from Kluyver as *Aeromonas liquefaciens* (1951, 298). As Kluyver and van Niel proposed the genus *Aeromonas* this culture is presumably authentic.

Author's strain No. CDC-RH 39. Culture collection Nos. ATCC 14174, CCMDB 1249, NCMB 833. Status: no comment. Annotations: AMEND: Sniezko to Ewing to ATCC and NCMB.


Author's strain No. None. Culture collection Nos. ATCC 11624, NCIB 8915, CDA 837. Status: Holotype. Annotations: AMEND: Sacks to ATCC and Lochhead to Landebrkin to NCIB.
   Author's strain No. 541. Culture collection Nos. ATCC 13347, NCIB 9222, CDA 859. **Status**: Holotype (not cotype). **Annotations**: AMEND: Lochhead to ATCC and Keddie to NCIB. Holotype, Lochhead (1958, 166).

20. **Arthrobacter flavescens** Lochhead 1958.

   Author's strain No. None. Culture collection Nos. NCIB 8602, Canad-201, 425. **Status**: Cotype. **Annotations**: AMEND: Conn to Canad-201 as Conn's stock strain to NCIB. Used in several studies, biotin requiring. Conn has suggested ATCC 8010 as the type strain—see below. (Conn 1928) Conn and Dimmick 1947.

22. **Arthrobacter globiformis** (Conn 1928) Conn and Dimmick 1947.

   Author's strain No. 94. Culture collection Nos. ATCC 15236, NCIB 9458, CDA 883. **Status**: No comment. **Annotations**: Amend: Giovannozzi-Sermanni to ATCC and Lochhead to NCIB.

24. **Arthrobacter pascens** Lochhead and Burton 1953.
   Author's strain No. B 89. Culture collection Nos. ATCC 13346, NCIB 8910, CDA 858. **Status**: Holotype (not cotype). **Annotations**: AMEND: Lochhead to Landerk in to NCIB. Holotype, Lochhead and Burton (1953, 18).

   Author's strain No. 1 Gm 25. Culture collection Nos. ATCC 13727, NCIB 9066. **Status**: No comment. **Annotations**: AMEND: Jensen to ATCC and NCIB as type strain.

26. **Arthrobacter simplex** (Jensen 1934) Lochhead.
   Author's strain No. None. Culture collection Nos. ATCC 6946, NCIB 8929. **Status**: No comment. **Annotations**: AMEND: Jensen to NCTC to ATCC to NCIB. DELETE: Jensen (1933, 181). SUBSTITUTE: Jensen (1934, 43).

27. **Arthrobacter terrigenus** Lochhead and Burton 1953.
   Author's strain No. 88. Culture collection Nos. ATCC 13345, NCIB 8909 (not 8908), CDA 857. **Status**: Holotype (not cotype). **Annotations**: AMEND: Lochhead to Landerk in to NCIB. Holotype, Lochhead and Burton (1953, 17).

   Author's strain No. None. Culture collection Nos. ATCC 6947, NCIB 8914, CDA 836. **Status**: No comment. **Annotations**: AMEND: Jensen to NCTC to ATCC to Lochhead to Landerk in to NCIB. DELETE: Jensen (1933, 181). SUBSTITUTE: Jensen (1934, 45).

   Author's strain No. NC. Culture collection Nos. ATCC 7562, NCIB 7811. **Status**: No comment. **Annotations**: AMEND: ATCC to NCTC to NCIB.
30. Azotobacter beijerinckii Lipman 1955
   Author's strain No. 3. Culture collection Nos. HMS MB. 2. 3, NCIB 8948. Status: no comment. Annotations: AMEND: Soriano to van Niel to NCIB.

31. Azotobacter indicum Starkey and De 1939 (not A. indicus)

32. Azotobacter indicum Starkey and De 1939

33. Azotobacter macrocytogenes Kauffmann and Toussaint 1951
   Author's strain No. None. Culture collection No. NCIB 8846. Status: Cotype. Annotations: AMEND: Kauffmann to Jensen to NCIB. Kauffmann and Toussaint (1951, 553). Now considered a member of the genus Beijerinckia Derx, B. lacticogenes. Received by NCIB under latter name.

34. Azotobacter insolita Stapp 1940
   Author's strain No. None. Culture collection Nos. NCIB 8700, 8701 and 8702. Status: Paratype. Annotations: AMEND: Jensen to NCIB. Jensen (1955, 278). NCIB 8700 is Jensen's original (O) culture, NCIB 8701 and NCIB 8702 are his variants (M) and (I) respectively.

35. Azcotomonas insolita Stapp 1940
   Author's strain No. None. Culture collection Nos. ATCC 12412, NCIB 9747. Status: Holotype. Annotations: AMEND: Stapp to Hofer to ATCC to NCIB. Holotype, Stapp (1940, 1).

36. Bacillus alvei Cheshire and Cheyne 1895

37. Bacillus aminoverans den Dooren de Jong 1927
   Author's strain No. 299. Culture collection Nos. NCIB 8292, ATCC 7046. Private collection No. N. R. Smith 341. Status: No comment. Annotations: AMEND: den Dooren de Jong to NCTC to Smith to ATCC to NCIB.

38. Bacillus anthracis Cohn 1872, emend Koch 1876
   Author's strain No. Vollum. Culture collection Nos. NCIB 9377, ATCC 14578, NCTC 10340. Status: no comment. Annotations: AMEND: Sneath to NCIB.

39. Bacillus aerothermus Fuller and Norman 1943
   Author's strain No. None. Culture collection Nos. ATCC 9500, NCIB 9555. Status: Cotype. Annotations: AMEND: Fuller to ATCC to NCIB.

40. Bacillus badus Batchelor 1919, emend. Saghafi and Appleman 1953
41. *Bacillus brevis* Migula 1900, emend. Ford 1916

42. *Bacillus cereus* Frankland and Frankland 1887

43. *Bacillus circulans* Jordan 1890, emend. Ford 1916

44. *Bacillus coagulans* Hammer 1915

45. *Bacillus firmus* Werner 1933

46. *Bacillus laterococcus* Laubach 1916

47. *Bacillus lentus* Gibson 1935
   Author's strain No. Gibson 165. Culture collection Nos. ATCC 10840, NCTC 4824, NCIB 8773, HMS RA 7.1, CCMDB 2179. Status: Holotype. Annotations: AMEND: Gibson to Smith and NCTC to NCIB. Smith to ATCC. Listed by Smith *et al.* (1964, 269) as type culture, therefore preferred to ATCC 10841.


49. *Bacillus macerans* Schardinger 1905

50. *Bacillus megaterium* de Bary 1884

51. *Bacillus pantothenticus* Proom and Knight 1950
52. *Bacillus pasteurii* (Miquel 1889) Migula 1900

53. *Bacillus polymyxa* (Prazmowski 1880) Migula 1900

54. *Bacillus pumilus* Gottheil 1901

55. *Bacillus sphaericus* Neide 1904

56. *Bacillus stearothermophilus* Donk 1920
   Author's strain No. None. Culture collection Nos. ATCC 12980, NCIB 8923, NCA 26, NCTC 10339, Smith T18. Status: no comment. Annotations: AMEND: Donk to NCA to Smith to ATCC to NCIB.

57. *Bacillus thuringiensis* Berliner 1915

58. DELETE: *Bacteroides ruminicola* Bryant et al. 1958
   Author's strain No. 23. Annotations: Received by, but never accessioned to NCIB.

59. DELETE: *Bacteroides ruminicola* Bryant et al. 1958
   Author's strain No. GA 33. Annotations: Received by, but never accessioned to NCIB.

60. ADD: *Beijerinckia indica* Starkey and De 1939, emend. Derx 1950
   Author's strain No. Starkey 10.1. Culture collection Nos. ATCC 9037, HMS MB 5.1, NCIB 8597. Status: Cotype. Annotations: Received by, but never accessioned to NCIB.

61. ADD: *Beijerinckia lactocatenes* Kauffmann and Toussaint, 1951
   Author's strain No. None. Culture collection No. NCIB 8846. Status: Cotype. Annotations: Kauffmann to Jensen to NCIB.

62. *Bacterica hyperoptica* (Campbell and Williams 1951) Campbell
   Author's strain No. None. Culture collection Nos. NCMB 678, CCMDB 251, ATCC 15803. Status: no comment. Annotations: AMEND: McCleskey to CCMDB to Smith to ATCC.

63. *Prevotobacter ammoniagenes* (Cooke and Keith 1927) Breed 1953
   Author's strain No. 9.6. Culture collection No. ATCC 6871, NCIB 8143. Status: no comment. Annotations: Cooke to NCTC to ATCC to NCIB.
64. *Brevibacterium lecinophagum* Kinney and Werkman 1960
   
   Author's strain No. None. Culture collection Nos. ATCC 13809, NCIB 9542. Status: no comment. Annotations: AMEND: Kinney to Werkman to ATCC to NCIB.

65. *Brevibacterium stations* (ZoBell and Upham 1944) Breed 1953
   
   Author's strain No. None. Culture collection Nos. CCMB 317, NCMB 565. Status: no comment. Annotations: AMEND: ZoBell to CCMB and Shewan to NCMB.

66. *Butyribacterium rettgeri* Barker and Haas 1944
   
   Author's strain Nos. 32 of GR, A 2. Culture collection Nos. ATCC 10825, NCIB 9554. Status: Holotype. Annotations: AMEND: Barker to ATCC to NCIB. ADD: Now shown to be synonymous with *Eubacterium limosum* and renamed *Butyribacterium limosum* - Moore and Cato (1965, 69).

67. ADD: *Butyribacterium limosum* (Eggerth 1935) Moore and Cato 1965
   

68. DELETE: *Butyribacterium fibrisolvens* Bryant and Small 1956
   
   Annotations: Received by, but never acceded to NCIB.

69. ADD: *Caryophanon latum* Peshkoff 1940
   
   Author's strain No. aa. Culture collection No. NCIB 9533. Status: no comment. Annotations: Kudriavzev to NCIB? Cotype. NCIB 9534, strain Sa is similar.

   
   Author's strain No. None. Culture collection Nos. ATCC 11764, NCIB 9082. Status: no comment. Annotations: ADD: Grula to NCIB.

71. *Cellulomonas firmi* (McBeth and Scales 1913) Bergey et al. 1923
   
   Author's strain No. 133. Culture collection Nos. ATCC 484, NCIB 8980, QM B 527. Private collection No. Smith 133. Status: no comment. Annotations: ADD: Grimes to NCTC.

72. *Chromobacterium lividum* (Eisenberg 1891) Bergey
   

73. *Chromobacterium violaceum* (Schroeter 1872) Bergonzini 1881
   
   Author's strain No. MK. Culture collection Nos. ATCC 9757, NCIB 9131. Private collection No. Sneath D-252. Status: no comment. Annotations: ADD: Sneath to NCIB.

74. *Chromobacterium viscosum* Grimes 1927
   
   Author's strain No. None. Culture collection Nos. ATCC 2416, NCIB 6918, NCDO 743, Canad-242B, B-150, NCIB 8180. Status: no comment. Annotations: ADD: Grimes to NCTC to ATCC to NCIB.

75. *Clostridium butyricum* Prazmowski 1880
   
   Author's strain No. Rowett. Culture collection Nos. NCTC 7423, NCIB 7423. Annotations: AMEND: Howie to NCTC to NCIB. Status: no comment.
76. *Clostridium felsineum* (Carbone and Tombolato 1917) Bergey et al. 1930.
   **Authors strain No.** None. **Culture collection Nos.** Canad 212a, A-7, DELETE NCIB 8656. **Private collection No.** McCoy A-41.
   **Status:** no comment. **Annotations:** ADD: Discarded from NCIB as stock found not to agree with description of *C. felsineum.* Similarly, NCIB 9338 (ATCC 13160) does not agree with original description being pink pigmented and not liquefying gelatin. Strains NCIB 9539 and 9540 (McClung to Vaughn to NCIB) are suggested as working types.

77. *Clostridium histolyticum* (Weinberg and Séguin 1916) Bergey et al. 1923.
   **Author's strain No.** Weinberg. **Culture collection Nos.** NCTC 503, NCIB 503. **Status:** no comment. **Annotations:** ADD: NCTC to NCIB.

78. *Clostridium pasteurianum* Winogradsky 1895
   **Author's strain No.** 5. **Culture collection Nos.** ATCC 6013, Canad 212A, A-5, NCIB 9486. **Private collection No.** McCoy 5.
   **Status:** no comment. **Annotations:** AMEND: Winogradsky to McCay to Canad NRC (212) and ATCC to NCIB. Delete NCIB 8654.

79. *Clostridium rubrum* Ng and Vaughn 1963
   **Author's strain No.** 34. **Culture collection Nos.** ATCC 14949, NCIB 9503. **Status:** no comment. **Annotations:** ADD: Vaughn to NCIB.

80. *Clostridium septicum* (Mace 1888) Ford 1927
   **Authors strain No.** Pasteur III. **Culture collection Nos.** NCTC 547, ATCC 12464, NCIB 547. **Status:** no comment. **Annotations:** AMEND: Muriel Robertson to NCTC to NCIB and ATCC.

81. *Clostridium sporogenes* (Metchnikoff 1908) Bergey et al. 1923
   **Author's strain No.** S. R. 5. **Culture collection Nos.** NCTC 532, NCIB 532. **Status:** no comment. **Annotations:** AMEND: Muriel Robertson to NCTC to NCIB.

82. *Clostridium tertium* (Henry 1916) Bergey et al. 1923
   **Author's strain No.** P 11, Col 54. **Culture collection Nos.** NCTC 541, NCIB 541. **Status:** no comment. **Annotations:** AMEND: Petrie to Robertson to NCTC to NCIB.

83. *Corynebacterium aquaticum* Leifson
   **Author's strain No.** 150. **Culture collection Nos.** ATCC 14665, NCIB 9460. **Status:** no comment. **Annotations:** AMEND: Leifson to ATCC to NCIB.

84. *Corynebacterium rubrum* Crowle 1962
   **Author's strain No.** None. **Culture collection Nos.** ATCC 14898, NCIB 9433, NCTC 10391. **Annotations:** AMEND: Crowle to ATCC and NCIB.

85. *Cytophaga hutchinsonii* Winogradsky 1929
   **Author's strain No.** None. **Culture collection No.** ADD: NCIB 9469. **Private collection No.** Sneath D 465. **Status:** no comment. **Annotations:** AMEND: De II. **Culture collection No.** NCIB 9064. **Status:** Paratype. **Annotations:** Jenzen to NCIB. Paratype, Jenzen et al. (1960, 182). Strain De I (NCIB 9063) is no longer available.

87. *Desulfovibrio gigas* LeGall 1963
   **Author's strain No.** None. **Culture Collection No.** NCIB 9332. **Status:** Holotype. **Annotations:** AMEND: LeGall to Postgate to NCIB.
88. ADD: Enterobacter aerogenes Hormaeche and Edwards 1960


90. Escherichia coli (Migula 1895) Castellani and Chalmers 1919
   Author's strain No. Escherich. Culture collection Nos. NCTC 86, ATCC 4157, NCIB 86. Status: Cotype. Annotations: ADD: Lister Institute to NCTC to NCIB.


92. Eubacterium limosum (Eggerth 1935) Prevot 1938

93. DELETE: Eubacterium ruminantium Bryant 1959
   Author's strain No. GA 195. Annotations: Received by, but never acceded to NCIB.

94. Flavobacterium aquatile (Frankland and Frankland 1889) Bergey et al. 1923. Author's strain No. F 36. Culture collection Nos. ATCC 11947, NCIB 8694, NCMB 644, DELETE NCIB 9758. Status: no comment. Annotations: ADD: Taylor to Weeks to ATCC, NCIB and NCMB.

95. Flavobacterium marinotypicum ZoBell and Upham 1944
   Author's strain No. None. Culture collection Nos. NCMB 1050, CCMDB 319. Status: no comment. Annotations: AMEND: ZoBell to CCMDB to NCMB.

96. Flavobacterium oceanokoites ZoBell and Upham 1944
   Author's strain No. None. Culture collection Nos. CCMDB 320, NCMB 1054. Status: no comment. Annotations: AMEND: ZoBell to CCMDB to NCMB.

97. Flavobacterium resinovorum Delaporte and Daste 1956 (not Delapate)

98. Halobacterium halobium (Petter 1931) Elazari-Volcani 1940
   Author's strain No. EVG-32.1. Culture collection Nos. HMS EVG-32.1, DELETE NCIB 8720. Status: no comment. Annotations: AMEND: No longer held by NCIB.

99. Halobacterium halobium (Petter 1931) Elazari-Volcani 1940
   Author's strain EV-6.31.1. Culture collection No. DELETE NCIB 8720. Status: no comment. Annotations: AMEND: No longer held in NCIB. Other strains of Halobacterium halobium, originally from Elazari-Volcani (to Hutner to NRC Ottawa to Shewan to NCMB) are available from NCMB.
100. *Halobacterium trapanicum* (Petter 1931) Elazari-Volcani 1940
Author's strain No. EV. 32. 1. Culture collection No. DELETE NCIB 8719. Annotations: AMEND: No longer held in NCIB.

101. *Jensenia canicruria* Bissett and Moore 1950
Author's strain No. None. Culture collection Nos. NCTC 8036, ATCC 11048, NCIB 8147. Status: Holotype. Annotations: ADD: NCTC to NCIB.

102. DELETE: *Lachnospira multiparus* Bryant and Small 1956
Annotations: Received by, but never accessioned to NCIB.

103. *Lactobacillus caucasicus* (Beijerinck 1889) Beijerinck 1901
Author's strain No. Ke 10. Culture collection Nos. ATCC 8007, DELETE NCIB 8120. Annotations: ADD: Discarded by NCIB as being a strain of *L. brevis*.

104. AMEND: *Lactobacillus fermenti* Beijerinck 1901 (not *L. fermentum*)

105. *Lactobacillus frigidus* Bhandari and Walker 1953
Author's strain No. None. Culture collection Nos. ATCC 11307, NCIB 8518. Status: no comment. Annotations: ADD: Now listed by NCIB as a strain of *L. buchneri*.

106. *Lactobacillus malefermentans* Russell and Walker 1953
Annotations: ADD: Discarded from NCIB, stock re-identified as *Bacillus circulans*.

107. *Leuconostoc citrovorum* (Hammer 1920) Hucker and Pederson 1930

108. *Lincola longa* Pringsheim 1950
Annotations: ADD: Shown to be a sporing rod—*Bacillus macroides*, Bennett and Canale-Parola (1965, 197).

Author's strain No. OJ. 8. Culture collection Nos. ATCC 10340, NCIB 8707. Status: no comment. Annotations: AMEND: Orla-Jensen to Doetsch to ATCC to NCIB.

110. *Microbacterium lacticum* Orla-Jensen 1919
Author's strain No. 6. Culture collection Nos. ATCC 8181, NCIB 8541 (not 8451). Private collection No. Pederson 6. Annotations: AMEND: Orla-Jensen to Pederson to ATCC to NCIB.

111. AMEND: *Microbispora rosea* Nonomura and Ohara 1957 (not *Microbispora*, based on bispora—two spored)
Culture collection Nos. ATCC 12950, NCIB 9560. Annotations: Nonomura to ATCC to NCIB.

112. *Micrococcus conglomeratus* Migula 1900
Author's strain No. 349. Culture collection Nos. ATCC 401, CCMB 547, NCIB 2677, NCDO 761. Status: no comment. Annotations: AMEND: Hucker to ATCC to NCTC to NCIB.

113. *Micrococcus eucinetus* Leifson 1964
Author's strain No. XQ 40. Culture collection Nos. ATCC 15234, NCMB 1349. Annotations: AMEND: Leifson to ATCC to NCMB.

114. *Micrococcus halodenitrificans* Robinson and Gibbons 1952
Culture collection Nos. Canad-201 732, Canad-212 509, NCMB 700. Annotations: AMEND: Robinson to Canad-201 and Canad-212 to NCMB.
115. **Micrococcus luteus** (Schroeter 1872) Cohn 1872  
Author's strain No. Hucker 426. Culture collection Nos. NCTC 8512, ATCC 398, NCIB 8165, CCMBD 810. Status: no comment. Annotations: ADD: Hucker to ATCC to NCTC to NCIB.

116. **Micrococcus sodonensis** Aaronson 1955  
Author's strain No. B. Culture collection Nos. ATCC 11880, NCIB 8854. Status: Holotype. Annotations: AMEND: Aaronson to ATCC to NCIB.

117. **Microdeboulliea cinerea** Cross et al. 1963  
Author's strain No. None. Culture collection Nos. IMRU 3855, NCIB 9586. Status: Holotype. Annotations: AMEND: Cross to IMRU and NCIB.

118. **Microdeboulliea flavicola** Cross et al. 1963  
Author's strain No. None. Culture collection Nos. IMRU 3857, NCIB 9587. Status: Cotype. Annotations: AMEND: Cross to IMRU and NCIB. IMRU 3858 (NCIB 9588) is another cotype.

119. **Moraxella nonliquefaciens** Murray and Truant 1954  

120. **Mycoplasma dimorphum** Gray and Thornton 1928  

121. **Neisseria haemolysans** Thijssen and Boë 1938  

122. **Pediococcus cerevisiae** Balcke 1884  

123. ADD: **Pediococcus cerevisiae** Balcke 1884

124. **Pediococcus damnosus var. salicinaceus** (Johnson and Shunk 1936) Breed and Lessel 1954. Author's strain No. None. Culture collection Nos. ATCC 14126, NCMB 1280. Status: Holotype. Annotations: AMEND: Johnson to ATCC to NCMB.

125. **Pediococcus damnosus** van Niel 1928  
Author's strain No. 4. Culture collection Nos. ATCC 4875, NCIB 8070, NCDO 570, HMS E. 2.1. Status: no comment. Annotations: AMEND: van Niel to ATCC to NCIB.

126. **Pediococcus petersonii** van Niel 1928  
Author's strain No. 20. Culture collection Nos. ATCC 4870, NCIB 5962, NCDO 565. Annotations: AMEND: van Niel to ATCC and NCTC to NCIB to NCDO. Status: no comment.
127. *Propionibacterium technicum* van Niel 1928
   Author's strain No. 22. Culture collection Nos. ATCC 4873, NCIB 5965, NCDO 567, HMS E. 6.1. Status: no comment. Annotations: AMEND: van Niel to ATCC to NCTC to NCIB.

128. *Propionibacterium theonii* van Niel 1928
   Author's strain No. 19. Culture collection Nos. ATCC 4872, NCIB 8072. Status: no comment. Annotations: AMEND: van Niel to ATCC to NCIB.

129. *Propionibacterium geae* Hitchner 1932
   Author's strain No. None. Culture collection Nos. ATCC 4964, NCIB 5967, NCDO 569. Status: no comment. Annotations: AMEND: Hitchner to ATCC and NCTC to NCIB. NCTC.

130. *Protaminobacter alboflavus* den Dooren de Jong 1926

131. *Protaminobacter ruber* den Dooren de Jong 1926

132. *Pseudomonas aeruginosa* (Schroeter 1872) Migula 1900
   Author's strain No. D. Culture collection Nos. ATCC 12417, NCIB 9391. Status: Holotype. Annotations: AMEND: Anderson to ATCC to NCIB.

140. *Pseudomonas diminuta* Leifson and Hugh 1954
Author's strain No. RH 342. Culture collection Nos. NCTC 8545, CCEB 513, NCIB 9393, ATCC 11568. Status: no comment. Annotations: AMEND: Leifson to NCTC and ATCC to NCIB.

141. *Pseudomonas echinoides* Heumann 1962
Author's strain No. None. Culture collection Nos. ATCC 14820, NCIB 9420. Status: no comment. Annotations: AMEND: Heumann to ATCC and NCIB.

142. *Pseudomonas elongata* Humm 1946
Author's strain No. None. Culture collection Nos. ATCC 10144, NCMB 1141, (Delete NCIB 8294). Status: no comment. Annotations: AMEND: Humm to Levinson to ATCC to NCMB. Discarded from NCIB.

143. *Pseudomonas fluorescens* Migula 1895
Author's strain No. None. Culture collection Nos. NCTC 10038, ATCC 13525, NCIB 9046. Status: no comment. Annotations: AMEND: Rhodes to NCTC, ATCC and NCIB.

144. *Pseudomonas formicicidae* Crawford 1954
Private collection No. R.Hugh 514. Culture collection Nos. ATCC 13137, NCMB 23, NCIB 9235. Status: no comment. Annotations: AMEND: Crawford to Shewan (to NCMB) and Hugh to ATCC and NCIB.


146. *Pseudomonas gemiculata* (Wright 1895) Chester 1901
Author's strain No. None. Culture collection Nos. NCIB 9428, CCEB 338. Status: no comment. Annotations: ADD: Lysenko to NCIB.

147. *Pseudomonas indoloxidans* Gray 1928
Author's strain No. None. Culture collection Nos. ATCC 9355, NCIB 2760, ATCC 13751. Status: no comment. Annotations: AMEND: Gray to ATCC and NCTC to NCIB. Gray to CCMB.

148. *Pseudomonas iodinum* (Davis 1939) Tobie 1939

149. *Pseudomonas maltophilia* Hugh 1960 (not maltophilia)

150. *Pseudomonas mucilaginosa* Levine and Anderson 1932

151. *Pseudomonas natriegens* Payne et al. 1961
Author's strain No. None. Culture collection Nos. ATCC 14048, NCMB 857. Status: no comment. Annotations: AMEND: Payne to ATCC and NCIB.
152. *Pseudomonas oleovorans* Lee and Chandler 1941
Author's strain No. None. Culture collection Nos. ATCC 8062, NCIB 6576, (DELETE NCMB 30). Status: no comment.
Annotations: AMEND: Chandler to ATCC to NCTC to NCIB.

153. *Pseudomonas ovalis* Chester 1901
Author's strain No. None. Culture collection Nos. ATCC 8209, NRRL B-1595, CCEB 380, NCIB 8296. Status: no comment.
Annotations: ADD: Smith to ATCC to NCIB.

154. *Pseudomonas perlirida* Kellerman et al. 1913

155. *Pseudomonas pictorum* Gray and Thornton 1928
Author's strain No. None. Culture collection Nos. CCMB 284, CCEB 322, NCIB 9152. Status: no comment. Annotations: AMEND: Gray to CLIP and CCMB to NCIB.

156. *Pseudomonas pseudomallei* (Whitmore 1913) Haynes comb. nov.
Author's strain No. None. Culture collection Nos. ATCC 15682, NRRL B-1112, CCEB 472, NCIB 9674, NCTC 4845. Status: no comment. Annotations: ADD: NCTC to NRRL to NCIB and CCEB.

Author's strain No. None. Culture collection Nos. ATCC 14235, NCIB 9280. Status: No comment. Annotations: ADD: Daste to NCIB.

158. *Pseudomonas rhodos* Heumann 1962
Author's strain No. None. Culture collection Nos. ATCC 14821, NCIB 9421. Status: no comment. Annotations: AMEND: Heumann to ATCC and NCIB.

159. *Pseudomonas riboflavina* Foster 1944
Private collection No. Foster (Merck) 4 R 3337. Culture collection Nos. ATCC 9526, NCIB 8177, IFO 3140. Status: no comment. Annotations: AMEND: Foster to ATCC to NCIB.

160. *Pseudomonas rubescens* Pivnick 1955 (not 1944)

161. *Pseudomonas saccharophila* Doudoroff 1940
Author's strain No. None. Culture collection Nos. ATCC 9114, NRRL B-1492, NCIB 8570. Status: no comment. Annotations: AMEND: Doudoroff to ATCC and NRRL. Doudoroff and Palleroni to NCIB.

162. *Pseudomonas stutzeri* (Lehmann and Neumann 1896) Kluyster 1942
Author's strain No. M. D. 41.1. Private collection No. van Nie 61.1. Culture collection Nos. ATCC 11607, NCIB 9721. Status: no comment. Annotations: AMEND: van Nie to ATCC to NCIB.

163. *Pseudomonas sylvestris* (Ehrenberg 1840) Holland 1920
Author's strain No. None. Culture collection Nos. ATCC 9890, NCIB 8178, NRRL B-780, CCEB 607. Status: no comment. Annotations: AMEND: Hammer to Breed to ATCC to NCIB and CCEB. ADD: N. B. CCEB 293 was stated to be the same as ATCC 9890 (CCEB Catalogue, 1960; Lysenko 1961, 379). In the 1963 CCEB Catalogue, strain CCEB 293 (a contaminant, erroneously proposed as neotype) has been withdrawn from the genus *Pseudomonas* and placed in *Serratia*. CCEB 607 has been substituted as
being equivalent to ATCC 9890, Pseudomonas synxantha. As the proposal of the neotype was based on a contaminant, and not on the authentic culture, it is doubtful if it is now valid.

164. **Pseudomonas taetrolens** Haynes 1957
   - **Author's strain No.** None. **Culture collection Nos.** NRRL B-14, CCEB 381, ATCC 4683, NCIB 9396. **Status:** no comment. **Annotations:** ADD: Levine to Anderson to Burns to ATCC to NCIB.

165. **Rhodopseudomonas capsulata** (Molisch 1907) van Niel 1944
   - **Author's strain No.** Ewart C 10. **Culture collection No.** HMS ATH 2.3.1, ATCC 11166, NCIB 8524 (not 8286). **Status:** no comment. **Annotations:** AMEND: van Niel (1944, 92).

166. **Rhodopseudomonas gelatinosa** (Molisch 1907) van Niel 1944
   - **Author's strain No.** ATH 2.2.1. **Culture collection Nos.** HMS ATH 2.2.1, NCIB 8290, ATCC 11169. **Status:** no comment. **Annotations:** AMEND: van Niel (1944, 98).

167. **Rhodopseudomonas palustris** (Molisch 1907) van Niel 1944
   - **Author's strain No.** ATH 2.1.6. **Culture collection Nos.** ATCC 11168, NCIB 8288, HMS ATH 2.1.6. **Status:** no comment. **Annotations:** AMEND: van Niel (1944, 89).

168. **Rhodopseudomonas spheroides** van Niel 1955
   - **Author's strain No.** ATH 2.4.1. **Culture collection Nos.** HMS ATH 2.4.1, ATCC 11167, NCIB 8253. **Status:** no comment. **Annotations:** AMEND: van Niel to Elsden to NCIB to ATCC. NCIB 8253 and NCIB 8287 are the same strain, the latter being received by NCIB direct from van Niel.

169. **Sarcina ureae** (Beijerinck 1901) Löhnis 1911
   - **Private collection No.** Smith 42. **Culture collection Nos.** ATCC 6473, NCIB 9251. **Status:** no comment. **Annotations:** ADD: Kluyver to Gibson to NCIB.

170. **Serratia marcescens** Bizio 1823
   - **Author's strain No.** Delft 137. **Culture collection Nos.** NCTC 1377, ATCC 274, NCDO 740, NCIB 1377. **Status:** no comment. **Annotations:** ADD: Kluyver to NCTC to NCIB.

171. **Serratia marcescens** Bizio 1823
   - **Author's strain No.** None. **Culture collection Nos.** NCTC 10211, ATCC 13880, NCIB 9155, CCMDB 303. **Status:** no comment. **Annotations:** ADD: Kocur to NCIB.

172. **Spirillum anulus** Williams and Rittenberg 1957
   - **Author's strain No.** None. **Culture collection Nos.** ATCC 11879, NCIB 9012. **Status:** Holotype. **Annotations:** AMEND: Williams to ATCC and NCIB.

173. **Spirillum beijerinckii** Williams and Rittenberg 1957
   - **Author's strain No.** None. **Culture collection Nos.** ATCC 12754, NCMB 52. **Status:** Holotype. **Annotations:** AMEND: Williams to NCMB to ATCC.

174. **DELETE:** **Spirillum curvatum** Williams and Rittenberg 1957
   **Annotations:** Culture no longer available.

175. **Spirillum delicatum** Leifson 1962
   - **Author's strain No.** 146. **Culture collection Nos.** ATCC 14667, NCIB 9419. **Status:** Holotype. **Annotations:** AMEND: Leifson to ATCC and NCIB. Holotype, Leifson (1962, 161).
<table>
<thead>
<tr>
<th>176.</th>
<th><em>Spirillum giesbertii</em></th>
<th>Williams and Rittenberg 1957</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Authors' strain No.</strong></td>
<td>None.</td>
<td><strong>Culture collection Nos.</strong> ATCC 11334, NCIB 9073. <strong>Status:</strong> Holotype. <strong>Annotations:</strong> AMEND: Williams to NCIB to ATCC.</td>
</tr>
</tbody>
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<thead>
<tr>
<th>177.</th>
<th><em>Spirillum graniferum</em></th>
<th>Williams and Rittenberg 1957</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Authors' strain No.</strong></td>
<td>None.</td>
<td><strong>Culture collection Nos.</strong> ATCC 9785, NCIB 8230. <strong>Status:</strong> Holotype. <strong>Annotations:</strong> ADD: ATCC to NCIB.</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>178.</th>
<th><em>Spirillum itersonii</em> var. <em>vulgatun</em></th>
<th>Williams and Rittenberg 1957</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Culture collection Nos.</strong> ATCC 11441, NCIB 9071, NCMB 58, NRRL B-2054. <strong>Status:</strong> Holotype. <strong>Annotations:</strong> ADD Not <em>S. itersonii</em> Giesberger 1936 which is available as a reisolate by Giesberger (type cultures lost) as ATCC 12639, NCIB 9070, NRRL B-2053,</td>
<td></td>
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<thead>
<tr>
<th>179.</th>
<th><em>Spirillum linum</em></th>
<th>Williams and Rittenberg 1957</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Authors' strain No.</strong></td>
<td>None.</td>
<td><strong>Culture collection Nos.</strong> ATCC 11336, NCMB 56. <strong>Status:</strong> Holotype. <strong>Annotations:</strong> ADD: ATCC to NCMB to ATCC.</td>
</tr>
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<tbody>
<tr>
<td><strong>Authors' strain No.</strong></td>
<td>None.</td>
<td><strong>Culture collection Nos.</strong> ATCC 15280, IFO 12012, NCIB 9509. <strong>Status:</strong> Holotype. <strong>Annotations:</strong> AMEND: Terasaki to ATCC and NCIB. <strong>Holotype, Terasaki (1961, 200).</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>181.</th>
<th><em>Spirillum polymorphum</em></th>
<th>Williams and Rittenberg 1957</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Authors' strain No.</strong></td>
<td>None.</td>
<td><strong>Culture collection Nos.</strong> NCIB 9072, ATCC 11332, NCMB 51. <strong>Status:</strong> Holotype. <strong>Annotations:</strong> AMEND: Williams to NCIB to ATCC.</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>182.</th>
<th><em>Spirillum putridocyclus</em></th>
<th>Terasaki 1961 (not 1962)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Authors' strain No.</strong></td>
<td>None.</td>
<td><strong>Culture collection Nos.</strong> ATCC 15279, IFO 12013, NCIB 9508. <strong>Status:</strong> Holotype. <strong>Annotations:</strong> ADD: Terasaki to NCIB. <strong>AMEND: Terasaki (1961, 79).</strong></td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>183.</th>
<th><em>Spirillum serpens</em> var. <em>agatum</em></th>
<th>Williams and Rittenberg 1957 (not <em>S. serpens</em> (Müller) Winter)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Authors' strain No.</strong></td>
<td>None.</td>
<td><strong>Culture collection Nos.</strong> ATCC 11335, NCIB 9011. <strong>Status:</strong> Holotype. <strong>Annotations:</strong> AMEND: Williams to NCIB to ATCC.</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>184.</th>
<th><em>Spirillum sinuosum</em></th>
<th>Williams and Rittenberg 1957</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Authors' strain No.</strong></td>
<td>None.</td>
<td><strong>Culture collection Nos.</strong> ATCC 9786, NCIB 9010, NCMB 59, CCMB 558. <strong>Status:</strong> Holotype. <strong>Annotations:</strong> AMEND: Lewis to O. B. Williams to ATCC to Marion Williams to NCIB.</td>
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<tr>
<td><strong>Author's strain No.</strong> S. 41.</td>
<td><strong>Culture collection Nos.</strong> NCTC 7292 (not 7297), NCIB 8711. <strong>Status:</strong> no comment. <strong>Annotations:</strong> AMEND: NCTC to NCIB.</td>
<td></td>
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<tr>
<th>186.</th>
<th>DELETE: <em>Streptococcus asalignus</em></th>
<th>Frost, Gumm and Thomas 1927</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Annotations:</strong> Discarded from NCIB (no streptococci present in all stock examined).</td>
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<thead>
<tr>
<th>187.</th>
<th><em>Streptococcus cremoris</em></th>
<th>Orla-Jensen 1919</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Author's strain No.</strong> HP.</td>
<td><strong>Culture collection Nos.</strong> NCDO 607, NCIB 8662. <strong>Status:</strong> no comment. <strong>Annotations:</strong> ADD: NIRD to NCIB.</td>
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</tbody>
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<tr>
<th>188.</th>
<th><em>Streptococcus faecalis</em></th>
<th>Andrews and Horder 1906</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Author's strain No.</strong></td>
<td>None.</td>
<td><strong>Culture collection Nos.</strong> NCTC 775, NCDO 581, NCIB 775. <strong>Status:</strong> no comment. <strong>Annotations:</strong> ADD: NCTC to NCIB.</td>
</tr>
</tbody>
</table>
18. **Streptococcus mucilaginosus** Kulka et al. 1949  
Author's strain No. None. Culture collection No. ATCC 11304, (DELETE NCIB 8274). Annotations: ADD: Discarded from NCIB.

1. **Streptococcus thermophilus** Orla-Jensen 1916  
Author's strain No. B of R. Culture collection Nos. NCDO 573, NCIB 8510. Status: no comment. Annotations: ADD: Mattick to NCIB.

19. **Streptomyces albus** (Rossi-Doria 1891, **emend.** Krainsky 1914)  
Author's strain No. None. Culture collection Nos. ATCC 3004, IMRU 3004, NCIB 9558. Status: Neotype. Annotations: AMEND: ATCC to Pridham and NCIB.

19. **Streptomyces kentuckensis** Barr and Carman 1956  

19. **Streptomyces oliveae** (Waksman 1923) Waksman and Henrici 1948  
Author's strain No. None. Culture collection Nos. ATCC 11626, NRRL B-1125, PSA 137, NCIB 8238. Status: no comment. Annotations: ADD: Lumb to NCIB.

19. **Streptomyces rimosus** Sobin et al. 1950  

19. **Streptomyces rubriglucae** (Waksman and Henrici 1948 (not S. rubireticulae))

19. **Streptomyces tendae** Ettlinger et al.  
Author's strain No. None. Culture collection Nos. PSA 92, NCIB 9614. Status: no comment. Annotations: ADD: Ettlinger to PSA to NCIB.

19. **Succinivibrio dextrinolytica** Bryant and Small 1956  
Author's strain No. 24. Annotations: Received by but never accessioned to NCIB.

19. **Succinomonas amylolytica** Bryant et al. 1958  
Author's strain No. B4. Annotations: Received by but never accessioned to NCIB.

19. **Thiobacillus concretivoros** Parker 1945  

**Thiobacillus novellus** Starkey 1914  
Author's strain No. None. Culture collection Nos. ATCC 8093, NCIB 9113. Status: no comment. Annotations: AMEND: Starkey to ATCC to NCIB.

20. **Thiobacillus thiocyanoxidans** Happold et al. 1954  
201. *Thiobacillus thioparus* Beijerinck 1904

   Author's strain No. None. Culture collection Nos. ATCC 8158, NCIB 8370. Status: no comment. Annotations: AMEND: Starkey to ATCC to NCIB.

202. *Vibrio adaptatus* ZoBell and Upham 1944

   Author's strain No. None. Culture collection Nos. CCMD 326, NCMB 1052. Status: Cotype. Annotations: AMEND: ZoBell to CCMD to NCMB.

203. *Vibrio anguillarum* Bergman 1909


204. *Vibrio cholinitus* Hayward and Stadtman 1959

   Author's strain No. None. Culture collection Nos. ATCC 13541, NCIB 9467. Status: no comment. Annotations: AMEND: Hayward to ATCC and Postgate to NCIB.

205. *Vibrio cyneatus* Gray and Thornton 1928

   Author's strain No. None. Culture collection Nos. ATCC 6972, NCIB 8194. Status: Holotype. Annotations: AMEND: Gray and Thornton to NCTC to ATCC to NCIB.

206. *Vibrio cyclolitites* Gray and Thornton 1928

   Author's strain No. None. Culture collection Nos. NCIB 2581, ATCC 14635. Status: Holotype. Annotations: AMEND: Gray and Thornton to NCTC to NCIB to ATCC.

207. *Vibrio nasiolites* Gray and Thornton 1928

   Author's strain No. None. Culture collection Nos. NCIB 2582, ATCC 14636. Status: Cotype. Annotations: AMEND: Gray and Thornton to NCTC to NCIB to ATCC.

208. *Vibrio percolans* Mudd and Warren 1923


209. *Zymomonas mobilis* (Lindner 1928) Kluvyer and van Nei 1936

   Author's strain No. None. Culture collection Nos. ATCC 10988, NRRL B-806, NCIB 8938. Status: Cotype. Annotations: AMEND: NRRL to ATCC to Elsden to NCIB. NCIB cultures are nonmotile.

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