

Appendix

i. The annual contribution to the global annual dissipation rate

Table 1: Annual contribution to the global annual dissipation rate of silver.

| Year | World production (t) | Net extratction (t) | Contribution to anthropogenic stock (t) | Contribution to dissipation rate (t/year) |
|------|----------------------|---------------------|---|---|
| 1921 | 5,330 | 6,833 | | |
| 1922 | 6,530 | 8,372 | | |
| 1923 | 7,650 | 9,808 | | |
| 1924 | 7,450 | 9,551 | | |
| 1925 | 7,650 | 9,808 | | |
| 1926 | 7,890 | 10,115 | | |
| 1927 | 7,900 | 10,128 | | |
| 1928 | 8,020 | 10,282 | | |
| 1929 | 8,120 | 10,410 | | |
| 1930 | 7,740 | 9,923 | | |
| 1931 | 6,080 | 7,795 | | |
| 1932 | 5,130 | 6,577 | | |
| 1933 | 5,340 | 6,846 | | |
| 1934 | 5,990 | 7,679 | | |
| 1935 | 6,890 | 8,833 | | |
| 1936 | 7,920 | 10,154 | 0 | 126.9230769 |
| 1937 | 8,640 | 11,077 | 138 | 138.4615385 |
| 1938 | 8,320 | 10,667 | 267 | 133.3333333 |
| 1939 | 8,300 | 10,641 | 399 | 133.0128205 |
| 1940 | 8,570 | 10,987 | 549 | 137.3397436 |
| 1941 | 8,140 | 10,436 | 652 | 130.4487179 |
| 1942 | 7,780 | 9,974 | 748 | 124.6794872 |
| 1943 | 6,380 | 8,179 | 716 | 102.2435897 |
| 1944 | 5,740 | 7,359 | 736 | 91.98717949 |
| 1945 | 5,040 | 6,462 | 727 | 80.76923077 |
| 1946 | 3,970 | 5,090 | 636 | 63.62179487 |
| 1947 | 5,220 | 6,692 | 920 | 83.65384615 |
| 1948 | 5,440 | 6,974 | 1,046 | 87.17948718 |
| 1949 | 5,570 | 7,141 | 1,160 | 89.26282051 |
| 1950 | 6,320 | 8,103 | 1,418 | 101.2820513 |
| 1951 | 6,210 | 7,962 | 1,493 | 99.51923077 |
| 1952 | 6,700 | 8,590 | 1,718 | 107.3717949 |
| 1953 | 6,900 | 8,846 | 1,880 | 110.5769231 |

| | | | | |
|------|--------|--------|--------|-------------|
| 1954 | 6,670 | 8,551 | 1,924 | 106.8910256 |
| 1955 | 7,000 | 8,974 | 2,131 | 112.1794872 |
| 1956 | 7,020 | 9,000 | 2,250 | 112.5 |
| 1957 | 7,190 | 9,218 | 2,420 | 115.224359 |
| 1958 | 7,430 | 9,526 | 2,620 | 119.0705128 |
| 1959 | 6,910 | 8,859 | 2,547 | 110.7371795 |
| 1960 | 7,320 | 9,385 | 2,815 | 117.3076923 |
| 1961 | 7,370 | 9,449 | 2,953 | 118.1089744 |
| 1962 | 7,650 | 9,808 | 3,188 | 122.5961538 |
| 1963 | 7,780 | 9,974 | 3,366 | 124.6794872 |
| 1964 | 7,730 | 9,910 | 3,469 | 123.8782051 |
| 1965 | 8,010 | 10,269 | 3,723 | 128.3653846 |
| 1966 | 8,300 | 10,641 | 3,990 | 133.0128205 |
| 1967 | 8,030 | 10,295 | 3,989 | 128.6858974 |
| 1968 | 8,560 | 10,974 | 4,390 | 137.1794872 |
| 1969 | 9,200 | 11,795 | 4,865 | 147.4358974 |
| 1970 | 9,360 | 12,000 | 5,100 | 150 |
| 1971 | 9,170 | 11,756 | 5,143 | 146.9551282 |
| 1972 | 9,380 | 12,026 | 5,412 | 150.3205128 |
| 1973 | 9,700 | 12,436 | 5,752 | 155.4487179 |
| 1974 | 9,260 | 11,872 | 5,639 | 148.3974359 |
| 1975 | 9,430 | 12,090 | 5,894 | 151.1217949 |
| 1976 | 9,840 | 12,615 | 6,308 | 157.6923077 |
| 1977 | 10,300 | 13,205 | 6,768 | 165.0641026 |
| 1978 | 10,700 | 13,718 | 7,202 | 171.474359 |
| 1979 | 10,800 | 13,846 | 7,442 | 173.0769231 |
| 1980 | 10,700 | 13,718 | 7,545 | 171.474359 |
| 1981 | 11,200 | 14,359 | 8,077 | 179.4871795 |
| 1982 | 11,500 | 14,744 | 8,478 | 184.2948718 |
| 1983 | 12,100 | 15,513 | 9,114 | 193.9102564 |
| 1984 | 13,100 | 16,795 | 10,077 | 209.9358974 |
| 1985 | 13,100 | 16,795 | 10,287 | 209.9358974 |
| 1986 | 13,000 | 16,667 | 10,417 | 208.3333333 |
| 1987 | 14,000 | 17,949 | 11,442 | 224.3589744 |
| 1988 | 15,500 | 19,872 | 12,917 | 248.3974359 |
| 1989 | 16,400 | 21,026 | 13,929 | 262.8205128 |
| 1990 | 16,600 | 21,282 | 14,365 | 266.025641 |
| 1991 | 15,600 | 20,000 | 13,750 | 250 |
| 1992 | 14,900 | 19,103 | 13,372 | 238.7820513 |
| 1993 | 14,100 | 18,077 | 12,880 | 225.9615385 |
| 1994 | 14,000 | 17,949 | 13,013 | 224.3589744 |
| 1995 | 14,900 | 19,103 | 14,088 | 238.7820513 |

| | | | | |
|------|--------|--------|-------------------------------------|----------------------------------|
| 1996 | 15,100 | 19,359 | 14,519 | 241.9871795 |
| 1997 | 16,500 | 21,154 | 16,130 | 264.4230769 |
| 1998 | 17,200 | 22,051 | 17,090 | 275.6410256 |
| 1999 | 17,600 | 22,564 | 17,769 | 282.0512821 |
| 2000 | 18,100 | 23,205 | 18,564 | 290.0641026 |
| 2001 | 18,700 | 23,974 | 19,479 | 299.6794872 |
| 2002 | 18,800 | 24,103 | 19,885 | 301.2820513 |
| 2003 | 18,800 | 24,103 | 20,186 | 301.2820513 |
| 2004 | 20,000 | 25,641 | 21,795 | 320.5128205 |
| 2005 | 20,800 | 26,667 | 23,000 | 333.3333333 |
| 2006 | 20,100 | 25,769 | 22,548 | 322.1153846 |
| 2007 | 20,800 | 26,667 | 23,667 | 333.3333333 |
| 2008 | 21,300 | 27,308 | 24,577 | 341.3461538 |
| 2009 | 22,300 | 28,590 | 26,088 | 357.3717949 |
| 2010 | 23,300 | 29,872 | 27,631 | 373.3974359 |
| 2011 | 23,300 | 29,872 | 28,005 | 373.3974359 |
| 2012 | 24,300 | 31,154 | 29,596 | 389.4230769 |
| 2013 | 25,700 | 32,949 | 31,713 | 411.8589744 |
| 2014 | 26,800 | 34,359 | 33,500 | 429.4871795 |
| 2015 | 25,100 | 32,179 | 31,777 | 402.2435897 |
| | | | R_{a,i} =SUM=777,772 | D_i =SUM=15,650 |

Table 2: Annual contribution to the global annual dissipation rate of lead.

| Year | World production (t) | Net extraction (t) | Contribution to anthropogenic stocks (t) | Contribution to dissipation rate (t/year) |
|------|----------------------|--------------------|--|---|
| 1973 | 3,490,000 | 4,474,359 | | |
| 1974 | 3,490,000 | 4,474,359 | | |
| 1975 | 3,440,000 | 4,410,256 | | |
| 1976 | 3,690,000 | 4,730,769 | | |
| 1977 | 3,410,000 | 4,371,795 | | |
| 1978 | 3,460,000 | 4,435,897 | | |
| 1979 | 3,510,000 | 4,500,000 | | |
| 1980 | 3,520,000 | 4,512,821 | | |
| 1981 | 3,350,000 | 4,294,872 | | |
| 1982 | 3,450,000 | 4,423,077 | | |
| 1983 | 3,350,000 | 4,294,872 | | |
| 1984 | 3,200,000 | 4,102,564 | | |
| 1985 | 3,390,000 | 4,346,154 | | |
| 1986 | 3,240,000 | 4,153,846 | | |
| 1987 | 3,430,000 | 4,397,436 | | |

| | | | | |
|------|-----------|-----------|--|-------------------------------------|
| 1988 | 3,420,000 | 4,384,615 | 0 | 156,593 |
| 1989 | 3,400,000 | 4,358,974 | 155677.66 | 155,678 |
| 1990 | 3,370,000 | 4,320,513 | 308608.06 | 154,304 |
| 1991 | 3,260,000 | 4,179,487 | 447802.20 | 149,267 |
| 1992 | 3,200,000 | 4,102,564 | 586080.59 | 146,520 |
| 1993 | 2,900,000 | 3,717,949 | 663919.41 | 132,784 |
| 1994 | 2,800,000 | 3,589,744 | 769230.77 | 128,205 |
| 1995 | 2,710,000 | 3,474,359 | 868589.74 | 124,084 |
| 1996 | 2,920,000 | 3,743,590 | 1069597.07 | 133,700 |
| 1997 | 3,100,000 | 3,974,359 | 1277472.53 | 141,941 |
| 1998 | 3,060,000 | 3,923,077 | 1401098.90 | 140,110 |
| 1999 | 3,080,000 | 3,948,718 | 1551282.05 | 141,026 |
| 2000 | 3,200,000 | 4,102,564 | 1758241.76 | 146,520 |
| 2001 | 3,120,000 | 4,000,000 | 1857142.86 | 142,857 |
| 2002 | 2,850,000 | 3,653,846 | 1826923.08 | 130,495 |
| 2003 | 3,200,000 | 4,102,564 | 2197802.20 | 146,520 |
| 2004 | 3,150,000 | 4,038,462 | 2307692.31 | 144,231 |
| 2005 | 3,470,000 | 4,448,718 | 2701007.33 | 158,883 |
| 2006 | 3,630,000 | 4,653,846 | 2991758.24 | 166,209 |
| 2007 | 3,710,000 | 4,756,410 | 3227564.10 | 169,872 |
| 2008 | 3,880,000 | 4,974,359 | 3553113.55 | 177,656 |
| 2009 | 3,780,000 | 4,846,154 | 3634615.39 | 173,077 |
| 2010 | 4,160,000 | 5,333,333 | 4190476.19 | 190,476 |
| 2011 | 4,750,000 | 6,089,744 | 5002289.38 | 217,491 |
| 2012 | 5,080,000 | 6,512,821 | 5582417.58 | 232,601 |
| 2013 | 5,430,000 | 6,961,538 | 6215659.34 | 248,626 |
| 2014 | 5,440,000 | 6,974,359 | 6476190.48 | 249,084 |
| 2015 | 4,950,000 | 6,346,154 | 6119505.50 | 226,648 |
| | | | R_{a,i} =SUM=68,741,758 | D_i =SUM=4,625,458 |

Table 3: Annual contribution to the global annual dissipation rate of copper.

| Year | World production (t) | Net extratcion (t) | Contribution to anthropogenic stocks (t) | Contribution to dissipation rate (t/year) |
|------|----------------------|--------------------|--|---|
| 1911 | 890,000 | 1,011,364 | | |
| 1912 | 1,000,000 | 1,136,364 | | |
| 1913 | 996,000 | 1,131,818 | | |
| 1914 | 938,000 | 1,065,909 | | |
| 1915 | 1,060,000 | 1,204,545 | | |
| 1916 | 1,420,000 | 1,613,636 | | |
| 1917 | 1,430,000 | 1,625,000 | | |

| | | | | |
|------|-----------|-----------|-------------|-------------|
| 1918 | 1,430,000 | 1,625,000 | | |
| 1919 | 994,000 | 1,129,545 | | |
| 1920 | 959,000 | 1,089,773 | | |
| 1921 | 558,000 | 634,091 | | |
| 1922 | 884,000 | 1,004,545 | | |
| 1923 | 1,270,000 | 1,443,182 | | |
| 1924 | 1,360,000 | 1,545,455 | | |
| 1925 | 1,530,000 | 1,738,636 | | |
| 1926 | 1,510,000 | 1,715,909 | 0 | 19065.65657 |
| 1927 | 1,520,000 | 1,727,273 | 19191.91919 | 19191.91919 |
| 1928 | 1,730,000 | 1,965,909 | 43686.86869 | 21843.43434 |
| 1929 | 1,950,000 | 2,215,909 | 73863.63636 | 24621.21212 |
| 1930 | 1,610,000 | 1,829,545 | 81313.13131 | 20328.28283 |
| 1931 | 1,400,000 | 1,590,909 | 88383.83838 | 17676.76768 |
| 1932 | 909,000 | 1,032,955 | 68863.63636 | 11477.27273 |
| 1933 | 1,050,000 | 1,193,182 | 92803.0303 | 13257.57576 |
| 1934 | 1,280,000 | 1,454,545 | 129292.9293 | 16161.61616 |
| 1935 | 1,500,000 | 1,704,545 | 170454.5455 | 18939.39394 |
| 1936 | 1,720,000 | 1,954,545 | 217171.7172 | 21717.17172 |
| 1937 | 2,290,000 | 2,602,273 | 318055.5556 | 28914.14141 |
| 1938 | 1,990,000 | 2,261,364 | 301515.1515 | 25126.26263 |
| 1939 | 2,130,000 | 2,420,455 | 349621.2121 | 26893.93939 |
| 1940 | 2,400,000 | 2,727,273 | 424242.4242 | 30303.0303 |
| 1941 | 2,480,000 | 2,818,182 | 469696.9697 | 31313.13131 |
| 1942 | 2,590,000 | 2,943,182 | 523232.3232 | 32702.0202 |
| 1943 | 2,620,000 | 2,977,273 | 562373.7374 | 33080.80808 |
| 1944 | 2,460,000 | 2,795,455 | 559090.9091 | 31060.60606 |
| 1945 | 2,110,000 | 2,397,727 | 506186.8687 | 26641.41414 |
| 1946 | 1,780,000 | 2,022,727 | 449494.9495 | 22474.74747 |
| 1947 | 2,130,000 | 2,420,455 | 564772.7273 | 26893.93939 |
| 1948 | 2,210,000 | 2,511,364 | 613888.8889 | 27904.0404 |
| 1949 | 2,140,000 | 2,431,818 | 621464.6465 | 27020.20202 |
| 1950 | 2,380,000 | 2,704,545 | 721212.1212 | 30050.50505 |
| 1951 | 2,490,000 | 2,829,545 | 785984.8485 | 31439.39394 |
| 1952 | 2,570,000 | 2,920,455 | 843686.8687 | 32449.49495 |
| 1953 | 2,600,000 | 2,954,545 | 886363.6364 | 32828.28283 |
| 1954 | 2,640,000 | 3,000,000 | 933333.3333 | 33333.33333 |
| 1955 | 2,900,000 | 3,295,455 | 1061868.687 | 36616.16162 |
| 1956 | 3,200,000 | 3,636,364 | 1212121.212 | 40404.0404 |
| 1957 | 3,300,000 | 3,750,000 | 1291666.667 | 41666.66667 |
| 1958 | 3,190,000 | 3,625,000 | 1288888.889 | 40277.77778 |
| 1959 | 3,430,000 | 3,897,727 | 1429166.667 | 43308.08081 |

| | | | | |
|------|------------|------------|-------------|-------------|
| 1960 | 3,940,000 | 4,477,273 | 1691414.141 | 49747.47475 |
| 1961 | 4,090,000 | 4,647,727 | 1807449.495 | 51641.41414 |
| 1962 | 4,220,000 | 4,795,455 | 1918181.818 | 53282.82828 |
| 1963 | 4,290,000 | 4,875,000 | 2004166.667 | 54166.66667 |
| 1964 | 4,450,000 | 5,056,818 | 2135101.01 | 56186.86869 |
| 1965 | 4,660,000 | 5,295,455 | 2294696.97 | 58838.38384 |
| 1966 | 4,580,000 | 5,204,545 | 2313131.313 | 57828.28283 |
| 1967 | 4,630,000 | 5,261,364 | 2396843.434 | 58459.59596 |
| 1968 | 5,010,000 | 5,693,182 | 2656818.182 | 63257.57576 |
| 1969 | 5,520,000 | 6,272,727 | 2996969.697 | 69696.9697 |
| 1970 | 5,900,000 | 6,704,545 | 3277777.778 | 74494.94949 |
| 1971 | 5,940,000 | 6,750,000 | 3375000 | 75000 |
| 1972 | 6,540,000 | 7,431,818 | 3798484.848 | 82575.75758 |
| 1973 | 6,920,000 | 7,863,636 | 4106565.657 | 87373.73737 |
| 1974 | 7,100,000 | 8,068,182 | 4303030.303 | 89646.46465 |
| 1975 | 6,740,000 | 7,659,091 | 4169949.495 | 85101.0101 |
| 1976 | 7,260,000 | 8,250,000 | 4583333.333 | 91666.66667 |
| 1977 | 7,420,000 | 8,431,818 | 4778030.303 | 93686.86869 |
| 1978 | 7,280,000 | 8,272,727 | 4779797.98 | 91919.19192 |
| 1979 | 7,350,000 | 8,352,273 | 4918560.606 | 92803.0303 |
| 1980 | 7,200,000 | 8,181,818 | 4909090.909 | 90909.09091 |
| 1981 | 7,690,000 | 8,738,636 | 5340277.778 | 97095.9596 |
| 1982 | 7,580,000 | 8,613,636 | 5359595.96 | 95707.07071 |
| 1983 | 7,610,000 | 8,647,727 | 5476893.939 | 96085.85859 |
| 1984 | 7,810,000 | 8,875,000 | 5719444.444 | 98611.11111 |
| 1985 | 7,990,000 | 9,079,545 | 5952146.465 | 100883.8384 |
| 1986 | 7,940,000 | 9,022,727 | 6015151.515 | 100252.5253 |
| 1987 | 8,240,000 | 9,363,636 | 6346464.646 | 104040.404 |
| 1988 | 8,720,000 | 9,909,091 | 6826262.626 | 110101.0101 |
| 1989 | 9,040,000 | 10,272,727 | 7190909.091 | 114141.4141 |
| 1990 | 9,200,000 | 10,454,545 | 7434343.434 | 116161.6162 |
| 1991 | 9,330,000 | 10,602,273 | 7657196.97 | 117803.0303 |
| 1992 | 9,470,000 | 10,761,364 | 7891666.667 | 119570.7071 |
| 1993 | 9,490,000 | 10,784,091 | 8028156.566 | 119823.2323 |
| 1994 | 9,500,000 | 10,795,455 | 8156565.657 | 119949.4949 |
| 1995 | 10,000,000 | 11,363,636 | 8712121.212 | 126262.6263 |
| 1996 | 11,000,000 | 12,500,000 | 9722222.222 | 138888.8889 |
| 1997 | 11,500,000 | 13,068,182 | 10309343.43 | 145202.0202 |
| 1998 | 12,100,000 | 13,750,000 | 11000000 | 152777.7778 |
| 1999 | 12,800,000 | 14,545,455 | 11797979.8 | 161616.1616 |
| 2000 | 13,200,000 | 15,000,000 | 12333333.33 | 166666.6667 |
| 2001 | 13,700,000 | 15,568,182 | 12973484.85 | 172979.798 |

| | | | | |
|------|------------|------------|---|-------------------------------------|
| 2002 | 13,600,000 | 15,454,545 | 13050505.05 | 171717.1717 |
| 2003 | 13,800,000 | 15,681,818 | 13416666.67 | 174242.4242 |
| 2004 | 14,700,000 | 16,704,545 | 14477272.73 | 185606.0606 |
| 2005 | 15,000,000 | 17,045,455 | 14962121.21 | 189393.9394 |
| 2006 | 15,100,000 | 17,159,091 | 15252525.25 | 190656.5657 |
| 2007 | 15,500,000 | 17,613,636 | 15852272.73 | 195707.0707 |
| 2008 | 15,600,000 | 17,727,273 | 16151515.15 | 196969.697 |
| 2009 | 16,100,000 | 18,295,455 | 16872474.75 | 203282.8283 |
| 2010 | 16,100,000 | 18,295,455 | 17075757.58 | 203282.8283 |
| 2011 | 16,100,000 | 18,295,455 | 17279040.4 | 203282.8283 |
| 2012 | 16,900,000 | 19,204,545 | 18351010.1 | 213383.8384 |
| 2013 | 18,300,000 | 20,795,455 | 20102272.73 | 231060.6061 |
| 2014 | 18,400,000 | 20,909,091 | 20444444.44 | 232323.2323 |
| 2015 | 19,100,000 | 21,704,545 | 21463383.84 | 241161.6162 |
| | | | R_{a,i} =SUM=491,912,172 | D_i =SUM=7,871,957 |

Table 4: Annual contribution to the global annual dissipation rate of zinc.

| Year | World production (t) | Net extraction (t) | Contribution to anthropogenic stocks (t) | Contribution to dissipation rate (t/year) |
|------|----------------------|--------------------|--|---|
| 1969 | 5,340,000 | 6,433,735 | | |
| 1970 | 5,460,000 | 6,578,313 | | |
| 1971 | 5,520,000 | 6,650,602 | | |
| 1972 | 5,440,000 | 6,554,217 | | |
| 1973 | 5,710,000 | 6,879,518 | | |
| 1974 | 5,780,000 | 6,963,855 | | |
| 1975 | 5,850,000 | 7,048,193 | | |
| 1976 | 5,690,000 | 6,855,422 | | |
| 1977 | 5,920,000 | 7,132,530 | | |
| 1978 | 5,850,000 | 7,048,193 | | |
| 1979 | 5,990,000 | 7,216,867 | | |
| 1980 | 5,950,000 | 7,168,675 | | |
| 1981 | 5,950,000 | 7,168,675 | | |
| 1982 | 6,130,000 | 7,385,542 | | |
| 1983 | 6,280,000 | 7,566,265 | | |
| 1984 | 6,520,000 | 7,855,422 | 0 | 245481.9277 |
| 1985 | 6,760,000 | 8,144,578 | 254518.0723 | 254518.0723 |
| 1986 | 6,840,000 | 8,240,964 | 515060.241 | 257530.1205 |
| 1987 | 7,190,000 | 8,662,651 | 812123.494 | 270707.8313 |
| 1988 | 6,770,000 | 8,156,627 | 1019578.313 | 254894.5783 |
| 1989 | 6,820,000 | 8,216,867 | 1283885.542 | 256777.1084 |

| | | | | |
|------|------------|------------|---|--------------------------------------|
| 1990 | 7,150,000 | 8,614,458 | 1615210.843 | 269201.8072 |
| 1991 | 7,270,000 | 8,759,036 | 1916039.157 | 273719.8795 |
| 1992 | 7,250,000 | 8,734,940 | 2183734.94 | 272966.8675 |
| 1993 | 6,910,000 | 8,325,301 | 2341490.964 | 260165.6627 |
| 1994 | 7,050,000 | 8,493,976 | 2654367.47 | 265436.747 |
| 1995 | 7,280,000 | 8,771,084 | 3015060.241 | 274096.3855 |
| 1996 | 7,480,000 | 9,012,048 | 3379518.072 | 281626.506 |
| 1997 | 7,540,000 | 9,084,337 | 3690512.048 | 283885.5422 |
| 1998 | 7,570,000 | 9,120,482 | 3990210.843 | 285015.0602 |
| 1999 | 7,960,000 | 9,590,361 | 4495481.928 | 299698.7952 |
| 2000 | 8,770,000 | 10,566,265 | 5283132.53 | 330195.7831 |
| 2001 | 8,910,000 | 10,734,940 | 5702936.747 | 335466.8675 |
| 2002 | 8,880,000 | 10,698,795 | 6018072.289 | 334337.3494 |
| 2003 | 9,520,000 | 11,469,880 | 6810240.964 | 358433.7349 |
| 2004 | 9,600,000 | 11,566,265 | 7228915.663 | 361445.7831 |
| 2005 | 10,000,000 | 12,048,193 | 7906626.506 | 376506.0241 |
| 2006 | 10,300,000 | 12,409,639 | 8531626.506 | 387801.2048 |
| 2007 | 11,100,000 | 13,373,494 | 9612198.795 | 417921.6867 |
| 2008 | 11,900,000 | 14,337,349 | 10753012.05 | 448042.1687 |
| 2009 | 11,600,000 | 13,975,904 | 10918674.7 | 436746.988 |
| 2010 | 12,300,000 | 14,819,277 | 12040662.65 | 463102.4096 |
| 2011 | 12,500,000 | 15,060,241 | 12707078.31 | 470632.5301 |
| 2012 | 12,900,000 | 15,542,169 | 13599397.59 | 485692.7711 |
| 2013 | 13,100,000 | 15,783,133 | 14303463.86 | 493222.8916 |
| 2014 | 13,300,000 | 16,024,096 | 15022590.36 | 500753.012 |
| 2015 | 12,800,000 | 15,421,687 | 14939759.04 | 481927.7108 |
| | | | R_{a,i} =SUM=194,545,181 | D_i =SUM=10,987,952 |

Table 5: Annual contribution to the global annual dissipation rate of chromium.

| Year | World production (t) | Net extraction (t) | Contribution to anthropogenic stocks (t) | Contribution to dissipation rate (t/year) |
|------|----------------------|--------------------|--|---|
| 1937 | 392,000 | 529,730 | | |
| 1938 | 362,000 | 489,189 | | |
| 1939 | 347,000 | 468,919 | | |
| 1940 | 457,000 | 617,568 | | |
| 1941 | 509,000 | 687,838 | | |
| 1942 | 637,000 | 860,811 | | |
| 1943 | 542,000 | 732,432 | | |
| 1944 | 411,000 | 555,405 | | |
| 1945 | 318,000 | 429,730 | | |

| | | | | |
|------|-----------|-----------|-------------|-------------|
| 1946 | 352,000 | 475,676 | | |
| 1947 | 521,000 | 704,054 | | |
| 1948 | 644,000 | 870,270 | | |
| 1949 | 650,000 | 878,378 | | |
| 1950 | 720,000 | 972,973 | | |
| 1951 | 823,000 | 1,112,162 | | |
| 1952 | 963,000 | 1,301,351 | 0 | 20333.61486 |
| 1953 | 1,130,000 | 1,527,027 | 23859.7973 | 23859.7973 |
| 1954 | 924,000 | 1,248,649 | 39020.27027 | 19510.13514 |
| 1955 | 1,040,000 | 1,405,405 | 65878.37838 | 21959.45946 |
| 1956 | 1,200,000 | 1,621,622 | 101351.3514 | 25337.83784 |
| 1957 | 1,370,000 | 1,851,351 | 144636.8243 | 28927.36486 |
| 1958 | 1,130,000 | 1,527,027 | 143158.7838 | 23859.7973 |
| 1959 | 1,150,000 | 1,554,054 | 169974.6622 | 24282.09459 |
| 1960 | 1,250,000 | 1,689,189 | 211148.6486 | 26393.58108 |
| 1961 | 1,220,000 | 1,648,649 | 231841.2162 | 25760.13514 |
| 1962 | 1,280,000 | 1,729,730 | 270270.2703 | 27027.02703 |
| 1963 | 1,170,000 | 1,581,081 | 271748.3108 | 24704.39189 |
| 1964 | 1,290,000 | 1,743,243 | 326858.1081 | 27238.17568 |
| 1965 | 1,490,000 | 2,013,514 | 408994.9324 | 31461.14865 |
| 1966 | 1,360,000 | 1,837,838 | 402027.027 | 28716.21622 |
| 1967 | 1,430,000 | 1,932,432 | 452913.8514 | 30194.25676 |
| 1968 | 1,560,000 | 2,108,108 | 527027.027 | 32939.18919 |
| 1969 | 1,670,000 | 2,256,757 | 599451.0135 | 35261.82432 |
| 1970 | 1,910,000 | 2,581,081 | 725929.0541 | 40329.39189 |
| 1971 | 2,000,000 | 2,702,703 | 802364.8649 | 42229.72973 |
| 1972 | 1,970,000 | 2,662,162 | 831925.6757 | 41596.28378 |
| 1973 | 2,030,000 | 2,743,243 | 900126.6892 | 42863.17568 |
| 1974 | 2,230,000 | 3,013,514 | 1035895.27 | 47086.14865 |
| 1975 | 2,530,000 | 3,418,919 | 1228673.986 | 53420.60811 |
| 1976 | 2,430,000 | 3,283,784 | 1231418.919 | 51309.12162 |
| 1977 | 2,600,000 | 3,513,514 | 1372466.216 | 54898.64865 |
| 1978 | 2,990,000 | 4,040,541 | 1641469.595 | 63133.44595 |
| 1979 | 2,590,000 | 3,500,000 | 1476562.5 | 54687.5 |
| 1980 | 2,830,000 | 3,824,324 | 1673141.892 | 59755.06757 |
| 1981 | 2,550,000 | 3,445,946 | 1561444.257 | 53842.90541 |
| 1982 | 2,390,000 | 3,229,730 | 1513935.811 | 50464.52703 |
| 1983 | 2,540,000 | 3,432,432 | 1662584.459 | 53631.75676 |
| 1984 | 2,950,000 | 3,986,486 | 1993243.243 | 62288.85135 |
| 1985 | 3,180,000 | 4,297,297 | 2215793.919 | 67145.27027 |
| 1986 | 3,530,000 | 4,770,270 | 2534206.081 | 74535.47297 |
| 1987 | 3,450,000 | 4,662,162 | 2549619.932 | 72846.28378 |

| | | | | |
|------|-----------|------------|---|-------------------------------------|
| 1988 | 3,870,000 | 5,229,730 | 2941722.973 | 81714.52703 |
| 1989 | 4,320,000 | 5,837,838 | 3375000 | 91216.21622 |
| 1990 | 3,950,000 | 5,337,838 | 3169341.216 | 83403.71622 |
| 1991 | 4,060,000 | 5,486,486 | 3343327.703 | 85726.35135 |
| 1992 | 3,420,000 | 4,621,622 | 2888513.514 | 72212.83784 |
| 1993 | 3,080,000 | 4,162,162 | 2666385.135 | 65033.78378 |
| 1994 | 3,090,000 | 4,175,676 | 2740287.162 | 65244.93243 |
| 1995 | 4,530,000 | 6,121,622 | 4112964.527 | 95650.33784 |
| 1996 | 3,660,000 | 4,945,946 | 3400337.838 | 77280.40541 |
| 1997 | 4,330,000 | 5,851,351 | 4114231.419 | 91427.36486 |
| 1998 | 4,460,000 | 6,027,027 | 4331925.676 | 94172.2973 |
| 1999 | 4,810,000 | 6,500,000 | 4773437.5 | 101562.5 |
| 2000 | 4,750,000 | 6,418,919 | 4814189.189 | 100295.6081 |
| 2001 | 3,740,000 | 5,054,054 | 3869510.135 | 78969.59459 |
| 2002 | 4,510,000 | 6,094,595 | 4761402.027 | 95228.04054 |
| 2003 | 4,770,000 | 6,445,946 | 5136613.176 | 100717.9054 |
| 2004 | 5,010,000 | 6,770,270 | 5500844.595 | 105785.473 |
| 2005 | 5,920,000 | 8,000,000 | 6625000 | 125000 |
| 2006 | 6,080,000 | 8,216,216 | 6932432.432 | 128378.3784 |
| 2007 | 6,930,000 | 9,364,865 | 8047930.743 | 146326.0135 |
| 2008 | 7,320,000 | 9,891,892 | 8655405.405 | 154560.8108 |
| 2009 | 6,010,000 | 8,121,622 | 7233319.257 | 126900.3378 |
| 2010 | 7,510,000 | 10,148,649 | 9197212.838 | 158572.6351 |
| 2011 | 8,350,000 | 11,283,784 | 10402238.18 | 176309.1216 |
| 2012 | 8,310,000 | 11,229,730 | 10527871.62 | 175464.527 |
| 2013 | 9,450,000 | 12,770,270 | 12171663.85 | 199535.473 |
| 2014 | 9,660,000 | 13,054,054 | 12646114.86 | 203969.5946 |
| 2015 | 9,360,000 | 12,648,649 | 12451013.51 | 197635.1351 |
| | | | R_{a,i} =SUM=202,171,199 | D_i =SUM=4,742,124 |

Table 6: Annual contribution to the global annual dissipation rate of nickel.

| Year | World production (t) | Net extraction (t) | Contribution to anthropogenic stocks (t) | Contribution to dissipation rate (t/year) |
|------|----------------------|--------------------|--|---|
| 1900 | 9,290 | 11,329 | 0 | 97.66610597 |
| 1901 | 11,400 | 13,902 | 119.8486123 | 119.8486123 |
| 1902 | 12,200 | 14,878 | 256.5180824 | 128.2590412 |
| 1903 | 10,200 | 12,439 | 321.6989066 | 107.2329689 |
| 1904 | 10,500 | 12,805 | 441.5475189 | 110.3868797 |
| 1905 | 15,600 | 19,024 | 820.0168209 | 164.0033642 |
| 1906 | 16,000 | 19,512 | 1009.251472 | 168.2085786 |

| | | | | |
|------|---------|---------|-------------|-------------|
| 1907 | 16,300 | 19,878 | 1199.537426 | 171.3624895 |
| 1908 | 14,900 | 18,171 | 1253.153911 | 156.6442389 |
| 1909 | 17,000 | 20,732 | 1608.494533 | 178.7216148 |
| 1910 | 23,100 | 28,171 | 2428.511354 | 242.8511354 |
| 1911 | 25,200 | 30,732 | 2914.213625 | 264.9285114 |
| 1912 | 27,900 | 34,024 | 3519.764508 | 293.313709 |
| 1913 | 32,200 | 39,268 | 4400.756939 | 338.5197645 |
| 1914 | 30,000 | 36,585 | 4415.475189 | 315.3910849 |
| 1915 | 39,100 | 47,683 | 6165.895711 | 411.059714 |
| 1916 | 45,500 | 55,488 | 7653.490328 | 478.3431455 |
| 1917 | 46,200 | 56,341 | 8256.938604 | 485.7022708 |
| 1918 | 47,600 | 58,049 | 9007.569386 | 500.4205214 |
| 1919 | 23,100 | 28,171 | 4614.171573 | 242.8511354 |
| 1920 | 35,700 | 43,537 | 7506.307822 | 375.3153911 |
| 1921 | 10,400 | 12,683 | 2296.047098 | 109.3355761 |
| 1922 | 11,800 | 14,390 | 2729.184188 | 124.0538267 |
| 1923 | 31,100 | 37,927 | 7519.974769 | 326.9554247 |
| 1924 | 35,300 | 43,049 | 8906.644239 | 371.1101766 |
| 1925 | 37,100 | 45,244 | 9750.841043 | 390.0336417 |
| 1926 | 33,900 | 41,341 | 9266.190076 | 356.391926 |
| 1927 | 34,500 | 42,073 | 9792.893188 | 362.6997477 |
| 1928 | 50,300 | 61,341 | 14806.56013 | 528.8057191 |
| 1929 | 56,300 | 68,659 | 17164.63415 | 591.8839361 |
| 1930 | 54,200 | 66,098 | 17094.1968 | 569.8065601 |
| 1931 | 36,300 | 44,268 | 11830.3196 | 381.6232128 |
| 1932 | 21,800 | 26,585 | 7333.894029 | 229.1841884 |
| 1933 | 46,300 | 56,463 | 16062.86796 | 486.7535744 |
| 1934 | 71,600 | 87,317 | 25592.93524 | 752.7333894 |
| 1935 | 77,400 | 94,390 | 28479.81497 | 813.7089992 |
| 1936 | 93,400 | 113,902 | 35349.0328 | 981.9175778 |
| 1937 | 120,000 | 146,341 | 46677.88057 | 1261.56434 |
| 1938 | 115,000 | 140,244 | 45941.96804 | 1208.999159 |
| 1939 | 122,000 | 148,780 | 50021.02607 | 1282.590412 |
| 1940 | 140,000 | 170,732 | 58873.00252 | 1471.825063 |
| 1941 | 162,000 | 197,561 | 69827.58621 | 1703.111859 |
| 1942 | 158,000 | 192,683 | 69764.50799 | 1661.059714 |
| 1943 | 167,000 | 203,659 | 75494.1127 | 1755.67704 |
| 1944 | 157,000 | 191,463 | 72624.05383 | 1650.546678 |
| 1945 | 145,000 | 176,829 | 68597.56098 | 1524.390244 |
| 1946 | 123,000 | 150,000 | 59482.75862 | 1293.103448 |
| 1947 | 140,000 | 170,732 | 69175.77796 | 1471.825063 |
| 1948 | 151,000 | 184,146 | 76198.48612 | 1587.468461 |

| | | | | |
|------|---------|-----------|-------------|-------------|
| 1949 | 146,000 | 178,049 | 75210.26072 | 1534.90328 |
| 1950 | 145,000 | 176,829 | 76219.5122 | 1524.390244 |
| 1951 | 132,000 | 160,976 | 70773.75946 | 1387.720774 |
| 1952 | 146,000 | 178,049 | 79814.97056 | 1534.90328 |
| 1953 | 198,000 | 241,463 | 110323.8015 | 2081.581161 |
| 1954 | 216,000 | 263,415 | 122624.0538 | 2270.815812 |
| 1955 | 239,000 | 291,463 | 138193.8604 | 2512.615643 |
| 1956 | 259,000 | 315,854 | 152481.0765 | 2722.876367 |
| 1957 | 286,000 | 348,780 | 171383.5156 | 3006.728343 |
| 1958 | 224,000 | 273,171 | 136585.3659 | 2354.920101 |
| 1959 | 285,000 | 347,561 | 176776.7031 | 2996.215307 |
| 1960 | 320,000 | 390,244 | 201850.2944 | 3364.171573 |
| 1961 | 361,000 | 440,244 | 231507.5694 | 3795.206056 |
| 1962 | 357,000 | 435,366 | 232695.5425 | 3753.153911 |
| 1963 | 339,000 | 413,415 | 224526.9134 | 3563.91926 |
| 1964 | 371,000 | 452,439 | 249621.5307 | 3900.336417 |
| 1965 | 425,000 | 518,293 | 290422.6241 | 4468.04037 |
| 1966 | 412,000 | 502,439 | 285870.4794 | 4331.3709 |
| 1967 | 449,000 | 547,561 | 316263.6669 | 4720.353238 |
| 1968 | 497,000 | 606,098 | 355298.5702 | 5224.978974 |
| 1969 | 487,000 | 593,902 | 353269.5542 | 5119.848612 |
| 1970 | 628,000 | 765,854 | 462153.0698 | 6602.186712 |
| 1971 | 637,000 | 776,829 | 475473.0866 | 6696.804037 |
| 1972 | 611,000 | 745,122 | 462489.487 | 6423.465097 |
| 1973 | 710,000 | 865,854 | 544890.6644 | 7464.255677 |
| 1974 | 770,000 | 939,024 | 599032.8007 | 8095.037847 |
| 1975 | 802,000 | 978,049 | 632359.1253 | 8431.455004 |
| 1976 | 792,000 | 965,854 | 632800.6728 | 8326.324643 |
| 1977 | 828,000 | 1,009,756 | 670269.1337 | 8704.793944 |
| 1978 | 658,000 | 802,439 | 539571.0681 | 6917.577796 |
| 1979 | 686,000 | 836,585 | 569743.4819 | 7211.942809 |
| 1980 | 779,000 | 950,000 | 655172.4138 | 8189.655172 |
| 1981 | 726,000 | 885,366 | 618229.6047 | 7632.464256 |
| 1982 | 621,000 | 757,317 | 535344.8276 | 6528.595458 |
| 1983 | 673,000 | 820,732 | 587247.6871 | 7075.273339 |
| 1984 | 773,000 | 942,683 | 682632.4643 | 8126.576955 |
| 1985 | 813,000 | 991,463 | 726503.3642 | 8547.098402 |
| 1986 | 852,000 | 1,039,024 | 770311.1859 | 8957.106812 |
| 1987 | 891,000 | 1,086,585 | 814939.0244 | 9367.115223 |
| 1988 | 952,000 | 1,160,976 | 880740.1177 | 10008.41043 |
| 1989 | 987,000 | 1,203,659 | 923496.6358 | 10376.36669 |
| 1990 | 974,000 | 1,187,805 | 921572.7502 | 10239.69722 |

| | | | | |
|------|-----------|-----------|--|-----------------------------------|
| 1991 | 1,010,000 | 1,231,707 | 966253.1539 | 10618.16653 |
| 1992 | 1,010,000 | 1,231,707 | 976871.3204 | 10618.16653 |
| 1993 | 928,000 | 1,131,707 | 907317.0732 | 9756.097561 |
| 1994 | 932,000 | 1,136,585 | 921026.0723 | 9798.149706 |
| 1995 | 1,040,000 | 1,268,293 | 1038687.973 | 10933.55761 |
| 1996 | 1,060,000 | 1,292,683 | 1069806.56 | 11143.81833 |
| 1997 | 1,140,000 | 1,390,244 | 1162531.539 | 11984.86123 |
| 1998 | 1,180,000 | 1,439,024 | 1215727.502 | 12405.38267 |
| 1999 | 1,170,000 | 1,426,829 | 1217724.979 | 12300.25231 |
| 2000 | 1,290,000 | 1,573,171 | 1356181.665 | 13561.81665 |
| 2001 | 1,350,000 | 1,646,341 | 1433452.481 | 14192.59882 |
| 2002 | 1,350,000 | 1,646,341 | 1447645.08 | 14192.59882 |
| 2003 | 1,370,000 | 1,670,732 | 1483494.533 | 14402.85955 |
| 2004 | 1,350,000 | 1,646,341 | 1476030.278 | 14192.59882 |
| 2005 | 1,460,000 | 1,780,488 | 1611648.444 | 15349.0328 |
| 2006 | 1,570,000 | 1,914,634 | 1749579.479 | 16505.46678 |
| 2007 | 1,740,000 | 2,121,951 | 1957317.073 | 18292.68293 |
| 2008 | 1,630,000 | 1,987,805 | 1850714.886 | 17136.24895 |
| 2009 | 1,410,000 | 1,719,512 | 1615748.528 | 14823.38099 |
| 2010 | 1,710,000 | 2,085,366 | 1977502.103 | 17977.29184 |
| 2011 | 2,340,000 | 2,853,659 | 2730656.013 | 24600.50463 |
| 2012 | 2,570,000 | 3,134,146 | 3026072.33 | 27018.50294 |
| 2013 | 2,790,000 | 3,402,439 | 3314444.912 | 29331.3709 |
| 2014 | 2,350,000 | 2,865,854 | 2816442.389 | 24705.63499 |
| 2015 | 2,280,000 | 2,780,488 | 2756518.082 | 23969.72246 |
| | | | R_{a,i} =SUM=60,890,649 | D_i =SUM=666,502 |

Table 7: Annual contribution to the global annual dissipation rate of iron.

| Year | World production (t) | Net extraction (t) | Contribution to anthropogenic stocks (t) | Contribution to dissipation rate (t/year) |
|------|----------------------|--------------------|--|---|
| 1900 | | | | |
| 1901 | | | | |
| 1902 | | | | |
| 1903 | | | | |
| 1904 | 95,500,000 | 115,060,241 | 56484118.29 | 523001.0953 |
| 1905 | 116,000,000 | 139,759,036 | 69244249.73 | 635268.3461 |
| 1906 | 100,000,000 | 120,481,928 | 60240963.86 | 547645.126 |
| 1907 | 135,000,000 | 162,650,602 | 82064622.12 | 739320.92 |
| 1908 | 109,000,000 | 131,325,301 | 66856516.98 | 596933.1873 |
| 1909 | 126,000,000 | 151,807,229 | 77973713.03 | 690032.8587 |

| | | | | |
|------|-------------|-------------|-------------|-------------|
| 1910 | 142,000,000 | 171,084,337 | 88652792.99 | 777656.0789 |
| 1911 | 133,000,000 | 160,240,964 | 83762322.02 | 728368.0175 |
| 1912 | 151,000,000 | 181,927,711 | 95925520.26 | 826944.1402 |
| 1913 | 177,000,000 | 213,253,012 | 113411829.1 | 969331.8729 |
| 1914 | 118,000,000 | 142,168,675 | 76254107.34 | 646221.2486 |
| 1915 | 116,000,000 | 139,759,036 | 75596933.19 | 635268.3461 |
| 1916 | 139,000,000 | 167,469,880 | 91347207.01 | 761226.7251 |
| 1917 | 142,000,000 | 171,084,337 | 94096385.54 | 777656.0789 |
| 1918 | 127,000,000 | 153,012,048 | 84852135.82 | 695509.31 |
| 1919 | 110,000,000 | 132,530,120 | 74096385.54 | 602409.6386 |
| 1920 | 124,000,000 | 149,397,590 | 84205914.57 | 679079.9562 |
| 1921 | 73,000,000 | 87,951,807 | 49972617.74 | 399780.9419 |
| 1922 | 104,000,000 | 125,301,205 | 71763417.31 | 569550.931 |
| 1923 | 136,000,000 | 163,855,422 | 94589266.16 | 744797.3713 |
| 1924 | 130,000,000 | 156,626,506 | 91128148.96 | 711938.6637 |
| 1925 | 151,000,000 | 181,927,711 | 106675794.1 | 826944.1402 |
| 1926 | 155,000,000 | 186,746,988 | 110350492.9 | 848849.9452 |
| 1927 | 171,000,000 | 206,024,096 | 122677984.7 | 936473.1654 |
| 1928 | 174,000,000 | 209,638,554 | 125783132.5 | 952902.5192 |
| 1929 | 201,000,000 | 242,168,675 | 146401971.5 | 1100766.703 |
| 1930 | 179,000,000 | 215,662,651 | 131358159.9 | 980284.7755 |
| 1931 | 119,000,000 | 143,373,494 | 87979189.49 | 651697.6999 |
| 1932 | 76,200,000 | 91,807,229 | 56753559.69 | 417305.586 |
| 1933 | 91,200,000 | 109,879,518 | 68424972.62 | 499452.3549 |
| 1934 | 120,000,000 | 144,578,313 | 90690032.86 | 657174.1512 |
| 1935 | 138,000,000 | 166,265,060 | 105049288.1 | 755750.2738 |
| 1936 | 170,000,000 | 204,819,277 | 130339540 | 930996.7141 |
| 1937 | 212,000,000 | 255,421,687 | 163702081.1 | 1161007.667 |
| 1938 | 162,000,000 | 195,180,723 | 125980284.8 | 887185.1041 |
| 1939 | 200,000,000 | 240,963,855 | 156626506 | 1095290.252 |
| 1940 | 212,000,000 | 255,421,687 | 167185104.1 | 1161007.667 |
| 1941 | 233,000,000 | 280,722,892 | 185021905.8 | 1276013.143 |
| 1942 | 235,000,000 | 283,132,530 | 187897042.7 | 1286966.046 |
| 1943 | 227,000,000 | 273,493,976 | 182743702.1 | 1243154.436 |
| 1944 | 199,000,000 | 239,759,036 | 161292442.5 | 1089813.801 |
| 1945 | 159,000,000 | 191,566,265 | 129742606.8 | 870755.7503 |
| 1946 | 154,000,000 | 185,542,169 | 126506024.1 | 843373.494 |
| 1947 | 184,000,000 | 221,686,747 | 152157721.8 | 1007667.032 |
| 1948 | 211,000,000 | 254,216,867 | 175640744.8 | 1155531.216 |
| 1949 | 223,000,000 | 268,674,699 | 186851040.5 | 1221248.631 |
| 1950 | 250,000,000 | 301,204,819 | 210843373.5 | 1369112.815 |
| 1951 | 294,000,000 | 354,216,867 | 249561883.9 | 1610076.67 |

| | | | | |
|------|-------------|---------------|-------------|-------------|
| 1952 | 298,000,000 | 359,036,145 | 254589266.2 | 1631982.475 |
| 1953 | 331,000,000 | 398,795,181 | 284594742.6 | 1812705.367 |
| 1954 | 301,000,000 | 362,650,602 | 260449069 | 1648411.829 |
| 1955 | 364,000,000 | 438,554,217 | 316955093.1 | 1993428.258 |
| 1956 | 389,000,000 | 468,674,699 | 340854326.4 | 2130339.54 |
| 1957 | 423,000,000 | 509,638,554 | 372962760.1 | 2316538.883 |
| 1958 | 397,000,000 | 478,313,253 | 352212486.3 | 2174151.15 |
| 1959 | 432,000,000 | 520,481,928 | 385629791.9 | 2365826.944 |
| 1960 | 514,000,000 | 619,277,108 | 461642935.4 | 2814895.947 |
| 1961 | 495,000,000 | 596,385,542 | 447289156.6 | 2710843.373 |
| 1962 | 499,000,000 | 601,204,819 | 453636363.6 | 2732749.179 |
| 1963 | 510,000,000 | 614,457,831 | 466429353.8 | 2792990.142 |
| 1964 | 573,000,000 | 690,361,446 | 527185104.1 | 3138006.572 |
| 1965 | 611,000,000 | 736,144,578 | 565492880.6 | 3346111.72 |
| 1966 | 626,000,000 | 754,216,867 | 582803943 | 3428258.488 |
| 1967 | 616,000,000 | 742,168,675 | 576867469.9 | 3373493.976 |
| 1968 | 668,000,000 | 804,819,277 | 629222343.9 | 3658269.441 |
| 1969 | 701,000,000 | 844,578,313 | 664145673.6 | 3838992.333 |
| 1970 | 757,000,000 | 912,048,193 | 721347207 | 4145673.604 |
| 1971 | 767,000,000 | 924,096,386 | 735076670.3 | 4200438.116 |
| 1972 | 757,000,000 | 912,048,193 | 729638554.2 | 4145673.604 |
| 1973 | 832,000,000 | 1,002,409,639 | 806484118.3 | 4556407.448 |
| 1974 | 881,000,000 | 1,061,445,783 | 858806133.6 | 4824753.56 |
| 1975 | 888,000,000 | 1,069,879,518 | 870492880.6 | 4863088.719 |
| 1976 | 886,000,000 | 1,067,469,880 | 873384446.9 | 4852135.816 |
| 1977 | 844,000,000 | 1,016,867,470 | 836604600.2 | 4622124.863 |
| 1978 | 833,000,000 | 1,003,614,458 | 830262869.7 | 4561883.899 |
| 1979 | 898,000,000 | 1,081,927,711 | 899967141.3 | 4917853.231 |
| 1980 | 884,000,000 | 1,065,060,241 | 890777656.1 | 4841182.913 |
| 1981 | 843,000,000 | 1,015,662,651 | 854079956.2 | 4616648.412 |
| 1982 | 783,000,000 | 943,373,494 | 797579408.5 | 4288061.336 |
| 1983 | 728,000,000 | 877,108,434 | 745542168.7 | 3986856.517 |
| 1984 | 823,000,000 | 991,566,265 | 847338444.7 | 4507119.387 |
| 1985 | 845,000,000 | 1,018,072,289 | 874616648.4 | 4627601.314 |
| 1986 | 855,000,000 | 1,030,120,482 | 889649507.1 | 4682365.827 |
| 1987 | 869,000,000 | 1,046,987,952 | 908975903.6 | 4759036.145 |
| 1988 | 967,000,000 | 1,165,060,241 | 1016779847 | 5295728.368 |
| 1989 | 999,000,000 | 1,203,614,458 | 1055898138 | 5470974.808 |
| 1990 | 982,000,000 | 1,183,132,530 | 1043307777 | 5377875.137 |
| 1991 | 956,000,000 | 1,151,807,229 | 1020920044 | 5235487.404 |
| 1992 | 930,000,000 | 1,120,481,928 | 998247535.6 | 5093099.671 |
| 1993 | 953,000,000 | 1,148,192,771 | 1028154436 | 5219058.05 |

| | | | | |
|------|---------------|---------------|--|---------------------------------------|
| 1994 | 982,000,000 | 1,183,132,530 | 1064819277 | 5377875.137 |
| 1995 | 1,020,000,000 | 1,228,915,663 | 1111610077 | 5585980.285 |
| 1996 | 1,020,000,000 | 1,228,915,663 | 1117196057 | 5585980.285 |
| 1997 | 1,040,000,000 | 1,253,012,048 | 1144797371 | 5695509.31 |
| 1998 | 1,050,000,000 | 1,265,060,241 | 1161555312 | 5750273.823 |
| 1999 | 1,020,000,000 | 1,228,915,663 | 1133953998 | 5585980.285 |
| 2000 | 969,000,000 | 1,167,469,880 | 1082562979 | 5306681.271 |
| 2001 | 937,000,000 | 1,128,915,663 | 1051944140 | 5131434.83 |
| 2002 | 982,000,000 | 1,183,132,530 | 1107842278 | 5377875.137 |
| 2003 | 1,080,000,000 | 1,301,204,819 | 1224315444 | 5914567.36 |
| 2004 | 1,200,000,000 | 1,445,783,133 | 1366922234 | 6571741.512 |
| 2005 | 1,320,000,000 | 1,590,361,446 | 1510843373 | 7228915.663 |
| 2006 | 1,470,000,000 | 1,771,084,337 | 1690580504 | 8050383.352 |
| 2007 | 1,680,000,000 | 2,024,096,386 | 1941292442 | 9200438.116 |
| 2008 | 1,730,000,000 | 2,084,337,349 | 2008543264 | 9474260.679 |
| 2009 | 1,710,000,000 | 2,060,240,964 | 1994687842 | 9364731.654 |
| 2010 | 1,870,000,000 | 2,253,012,048 | 2191566265 | 10240963.86 |
| 2011 | 2,030,000,000 | 2,445,783,133 | 2390197152 | 11117196.06 |
| 2012 | 2,070,000,000 | 2,493,975,904 | 2448630887 | 11336254.11 |
| 2013 | 2,230,000,000 | 2,686,746,988 | 2650109529 | 12212486.31 |
| 2014 | 2,330,000,000 | 2,807,228,916 | 2781708653 | 12760131.43 |
| 2015 | 2,280,000,000 | 2,746,987,952 | 2734501643 | 12486308.87 |
| | | | R_{a,i} =SUM=71,513,831,325 | D_i =SUM=378,049,836 |

Table 8: Annual contribution to the global annual dissipation rate of aluminum.

| Year | World production (t) | Net extraction (t) | Contribution to anthropogenic stocks (t) | Contribution to dissipation rate (t/year) |
|------|----------------------|--------------------|--|---|
| 1900 | 6,800 | 8,831 | 3604.558707 | 45.05698383 |
| 1901 | 6,800 | 8,831 | 3649.61569 | 45.05698383 |
| 1902 | 7,900 | 10,260 | 4292.340313 | 52.34561357 |
| 1903 | 8,500 | 11,039 | 4674.662073 | 56.32122979 |
| 1904 | 10,000 | 12,987 | 5565.862709 | 66.26027034 |
| 1905 | 13,000 | 16,883 | 7321.759873 | 86.13835144 |
| 1906 | 17,000 | 22,078 | 9687.251524 | 112.6424596 |
| 1907 | 22,000 | 28,571 | 12682.21574 | 145.7725948 |
| 1908 | 17,000 | 22,078 | 9912.536443 | 112.6424596 |
| 1909 | 30,000 | 38,961 | 17691.49218 | 198.780811 |
| 1910 | 45,000 | 58,442 | 26835.40949 | 298.1712165 |
| 1911 | 46,000 | 59,740 | 27736.54917 | 304.7972436 |
| 1912 | 58,000 | 75,325 | 35356.48025 | 384.309568 |

| | | | | |
|------|-----------|-----------|-------------|-------------|
| 1913 | 65,000 | 84,416 | 40054.33342 | 430.6917572 |
| 1914 | 69,000 | 89,610 | 42976.41134 | 457.1958654 |
| 1915 | 78,000 | 101,299 | 49098.86032 | 516.8301087 |
| 1916 | 106,000 | 137,662 | 67426.4511 | 702.3588656 |
| 1917 | 123,000 | 159,740 | 79055.12854 | 815.0013252 |
| 1918 | 128,000 | 166,234 | 83116.88312 | 848.1314604 |
| 1919 | 121,000 | 157,143 | 79373.17784 | 801.7492711 |
| 1920 | 125,000 | 162,338 | 82825.33793 | 828.2533793 |
| 1921 | 70,000 | 90,909 | 46846.01113 | 463.8218924 |
| 1922 | 87,000 | 112,987 | 58799.3639 | 576.464352 |
| 1923 | 141,000 | 183,117 | 96229.79062 | 934.2698118 |
| 1924 | 168,000 | 218,182 | 115769.9443 | 1113.172542 |
| 1925 | 178,000 | 231,169 | 123840.4453 | 1179.432812 |
| 1926 | 195,000 | 253,247 | 136959.9788 | 1292.075272 |
| 1927 | 220,000 | 285,714 | 155976.6764 | 1457.725948 |
| 1928 | 258,000 | 335,065 | 184627.6173 | 1709.514975 |
| 1929 | 280,000 | 363,636 | 202226.3451 | 1855.28757 |
| 1930 | 272,000 | 353,247 | 198250.7289 | 1802.279353 |
| 1931 | 220,000 | 285,714 | 161807.5802 | 1457.725948 |
| 1932 | 153,000 | 198,701 | 113543.5993 | 1013.782136 |
| 1933 | 142,000 | 184,416 | 106321.2298 | 940.8958389 |
| 1934 | 170,000 | 220,779 | 128412.4039 | 1126.424596 |
| 1935 | 259,000 | 336,364 | 197356.2152 | 1716.141002 |
| 1936 | 360,000 | 467,532 | 276702.8889 | 2385.369732 |
| 1937 | 482,000 | 625,974 | 373668.1686 | 3193.74503 |
| 1938 | 579,000 | 751,948 | 452703.419 | 3836.469653 |
| 1939 | 720,000 | 935,065 | 567717.9963 | 4770.739465 |
| 1940 | 787,000 | 1,022,078 | 625761.9931 | 5214.683276 |
| 1941 | 1,040,000 | 1,350,649 | 833819.242 | 6891.068116 |
| 1942 | 1,400,000 | 1,818,182 | 1131725.417 | 9276.437848 |
| 1943 | 1,950,000 | 2,532,468 | 1589252.584 | 12920.75272 |
| 1944 | 1,690,000 | 2,194,805 | 1388550.225 | 11197.98569 |
| 1945 | 870,000 | 1,129,870 | 720580.44 | 5764.64352 |
| 1946 | 790,000 | 1,025,974 | 659554.731 | 5234.561357 |
| 1947 | 1,080,000 | 1,402,597 | 908825.868 | 7156.109197 |
| 1948 | 1,270,000 | 1,649,351 | 1077126.955 | 8415.054333 |
| 1949 | 1,310,000 | 1,701,299 | 1119732.309 | 8680.095415 |
| 1950 | 1,490,000 | 1,935,065 | 1283461.437 | 9872.780281 |
| 1951 | 1,800,000 | 2,337,662 | 1562417.175 | 11926.84866 |
| 1952 | 2,060,000 | 2,675,325 | 1801749.271 | 13649.61569 |
| 1953 | 2,470,000 | 3,207,792 | 2176716.141 | 16366.28677 |
| 1954 | 2,810,000 | 3,649,351 | 2494964.219 | 18619.13597 |

| | | | | |
|------|------------|------------|-------------|-------------|
| 1955 | 3,140,000 | 4,077,922 | 2808772.86 | 20805.72489 |
| 1956 | 3,370,000 | 4,376,623 | 3036840.71 | 22329.71111 |
| 1957 | 3,370,000 | 4,376,623 | 3059170.421 | 22329.71111 |
| 1958 | 3,510,000 | 4,558,442 | 3209514.975 | 23257.35489 |
| 1959 | 4,060,000 | 5,272,727 | 3739332.096 | 26901.66976 |
| 1960 | 4,490,000 | 5,831,169 | 4165120.594 | 29750.86138 |
| 1961 | 4,700,000 | 6,103,896 | 4391068.116 | 31142.32706 |
| 1962 | 5,060,000 | 6,571,429 | 4760932.945 | 33527.69679 |
| 1963 | 5,320,000 | 6,909,091 | 5040816.327 | 35250.46382 |
| 1964 | 5,940,000 | 7,714,286 | 5667638.484 | 39358.60058 |
| 1965 | 6,310,000 | 8,194,805 | 6062483.435 | 41810.23059 |
| 1966 | 6,880,000 | 8,935,065 | 6655711.635 | 45587.066 |
| 1967 | 7,570,000 | 9,831,169 | 7373376.623 | 50159.02465 |
| 1968 | 8,020,000 | 10,415,584 | 7864829.049 | 53140.73681 |
| 1969 | 8,970,000 | 11,649,351 | 8855883.912 | 59435.4625 |
| 1970 | 9,650,000 | 12,532,468 | 9591174.132 | 63941.16088 |
| 1971 | 10,300,000 | 13,376,623 | 10305459.85 | 68248.07845 |
| 1972 | 11,000,000 | 14,285,714 | 11078717.2 | 72886.29738 |
| 1973 | 12,100,000 | 15,714,286 | 12266763.85 | 80174.92711 |
| 1974 | 13,200,000 | 17,142,857 | 13469387.76 | 87463.55685 |
| 1975 | 12,100,000 | 15,714,286 | 12427113.7 | 80174.92711 |
| 1976 | 12,600,000 | 16,363,636 | 13024118.74 | 83487.94063 |
| 1977 | 13,800,000 | 17,922,078 | 14355950.17 | 91439.17307 |
| 1978 | 14,100,000 | 18,311,688 | 14761463.03 | 93426.98118 |
| 1979 | 14,600,000 | 18,961,039 | 15381659.16 | 96739.9947 |
| 1980 | 15,400,000 | 20,000,000 | 16326530.61 | 102040.8163 |
| 1981 | 15,100,000 | 19,610,390 | 16108534.32 | 100053.0082 |
| 1982 | 13,400,000 | 17,402,597 | 14383779.49 | 88788.76226 |
| 1983 | 13,900,000 | 18,051,948 | 15012589.45 | 92101.77578 |
| 1984 | 15,700,000 | 20,389,610 | 17060694.41 | 104028.6244 |
| 1985 | 15,400,000 | 20,000,000 | 16836734.69 | 102040.8163 |
| 1986 | 15,400,000 | 20,000,000 | 16938775.51 | 102040.8163 |
| 1987 | 16,500,000 | 21,428,571 | 18258017.49 | 109329.4461 |
| 1988 | 18,500,000 | 24,025,974 | 20593692.02 | 122581.5001 |
| 1989 | 19,000,000 | 24,675,325 | 21276172.81 | 125894.5136 |
| 1990 | 19,300,000 | 25,064,935 | 21739994.7 | 127882.3218 |
| 1991 | 19,700,000 | 25,584,416 | 22321097.27 | 130532.7326 |
| 1992 | 19,500,000 | 25,324,675 | 22223694.67 | 129207.5272 |
| 1993 | 19,800,000 | 25,714,286 | 22696793 | 131195.3353 |
| 1994 | 19,200,000 | 24,935,065 | 22136231.12 | 127219.7191 |
| 1995 | 19,700,000 | 25,584,416 | 22843228.2 | 130532.7326 |
| 1996 | 20,800,000 | 27,012,987 | 24256559.77 | 137821.3623 |

| | | | | |
|------|------------|------------|---|-------------------------------------|
| 1997 | 21,700,000 | 28,181,818 | 25449907.24 | 143784.7866 |
| 1998 | 22,600,000 | 29,350,649 | 26655181.55 | 149748.211 |
| 1999 | 23,600,000 | 30,649,351 | 27990988.6 | 156374.238 |
| 2000 | 24,300,000 | 31,558,442 | 28982242.25 | 161012.4569 |
| 2001 | 24,300,000 | 31,558,442 | 29143254.7 | 161012.4569 |
| 2002 | 26,100,000 | 33,896,104 | 31474953.62 | 172939.3056 |
| 2003 | 28,000,000 | 36,363,636 | 33951762.52 | 185528.757 |
| 2004 | 29,900,000 | 38,831,169 | 36453750.33 | 198118.2083 |
| 2005 | 31,900,000 | 41,428,571 | 39103498.54 | 211370.2624 |
| 2006 | 33,900,000 | 44,025,974 | 41779750.86 | 224622.3165 |
| 2007 | 37,900,000 | 49,220,779 | 46960641.4 | 251126.4246 |
| 2008 | 39,700,000 | 51,558,442 | 49454015.37 | 263053.2733 |
| 2009 | 37,200,000 | 48,311,688 | 46586270.87 | 246488.2057 |
| 2010 | 41,800,000 | 54,285,714 | 52623906.71 | 276967.93 |
| 2011 | 46,800,000 | 60,779,221 | 59228730.45 | 310098.0652 |
| 2012 | 49,200,000 | 63,896,104 | 62592101.78 | 326000.5301 |
| 2013 | 51,900,000 | 67,402,597 | 66370924.99 | 343890.8031 |
| 2014 | 54,000,000 | 70,129,870 | 69414259.21 | 357805.4598 |
| 2015 | 57,500,000 | 74,675,325 | 74294328.12 | 380996.5545 |
| | | | R_{a,i} =SUM=1,406,641,824 | D_i =SUM=8,028,320 |