

Knot Just Numbers

Mathematics and More in Andean Khipu Strings

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20 October 2021

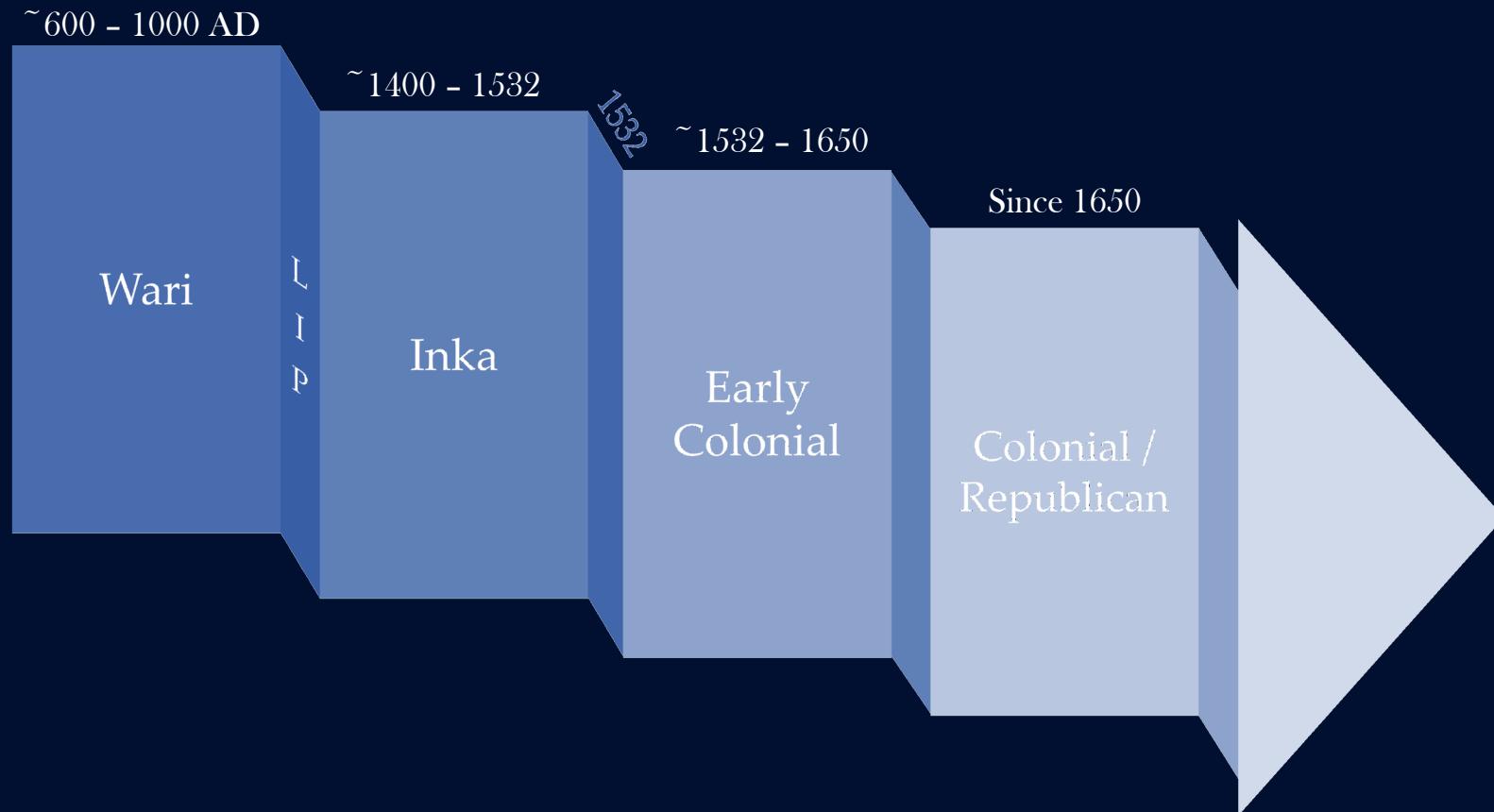


University of
St Andrews

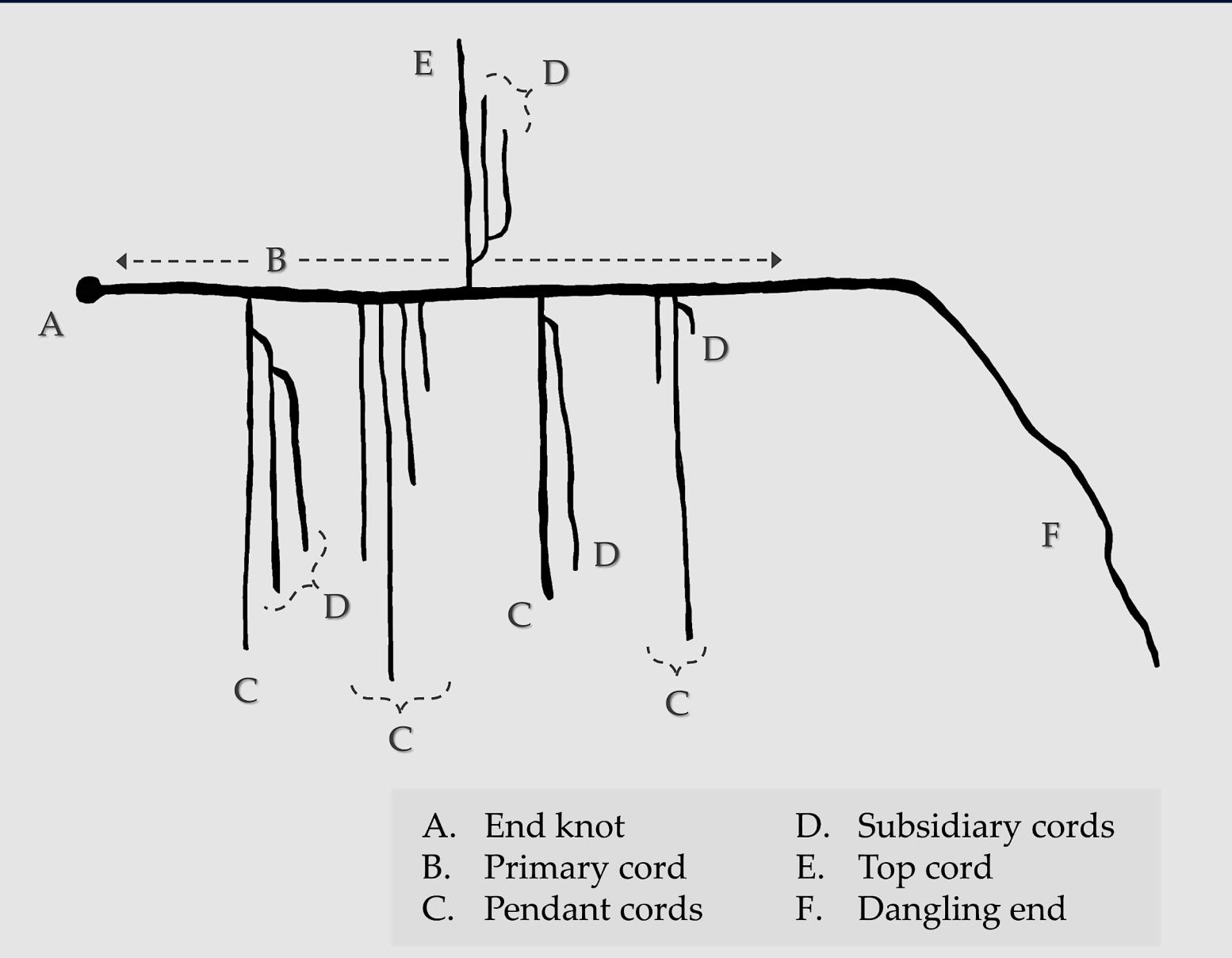


1. Images by author.

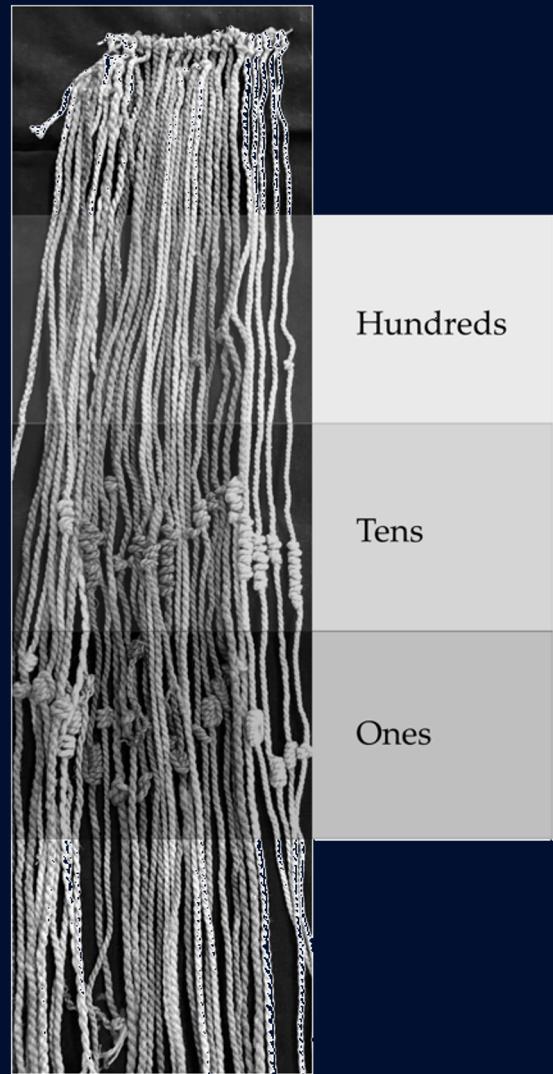
Khipu traditions



Canonical, or “Inka-style” khipu

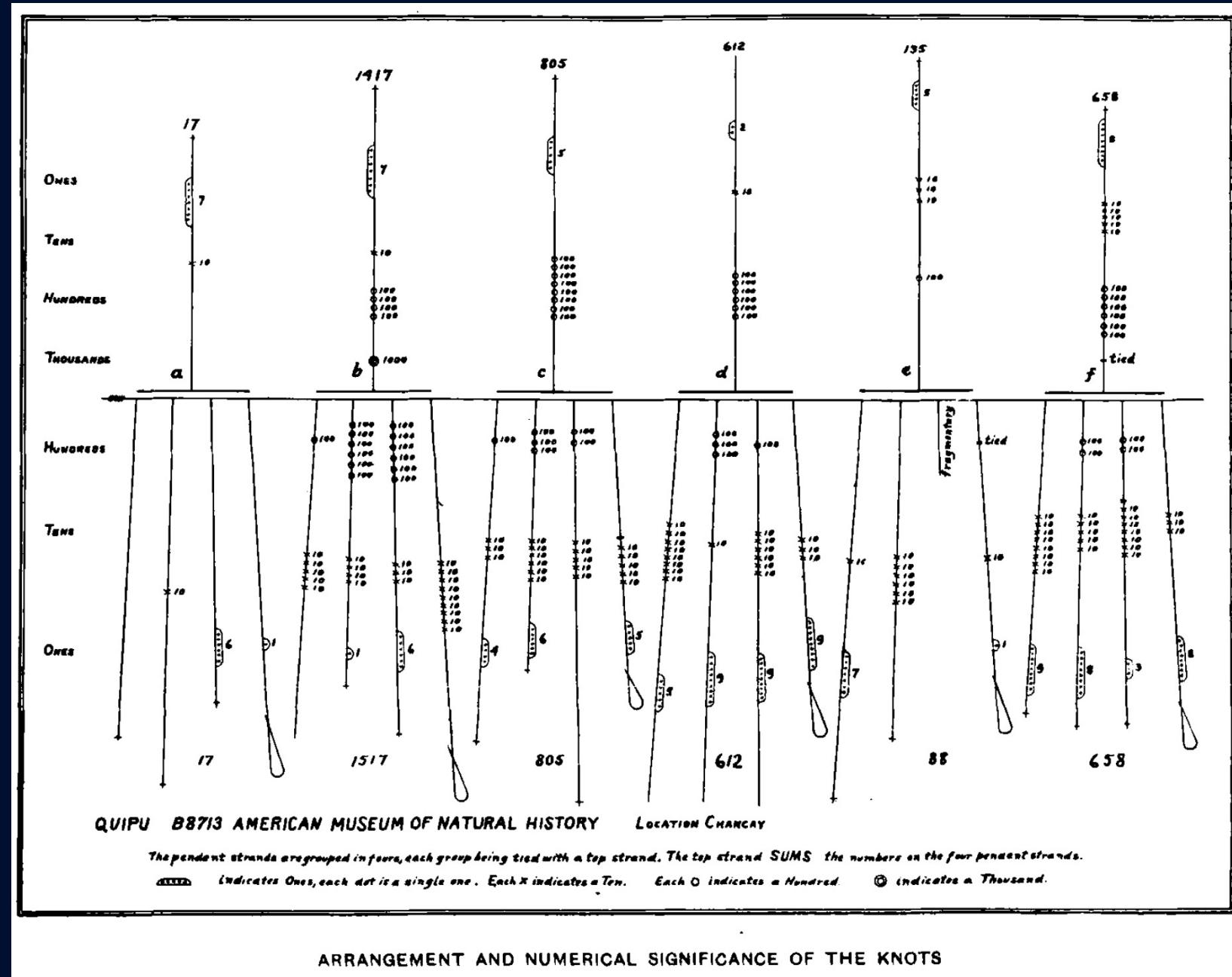


Khipu decimal hierarchy

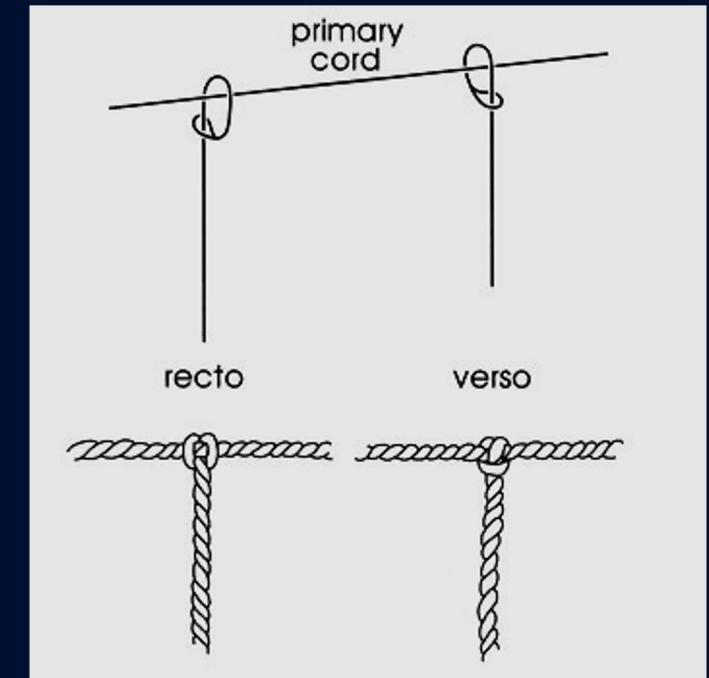
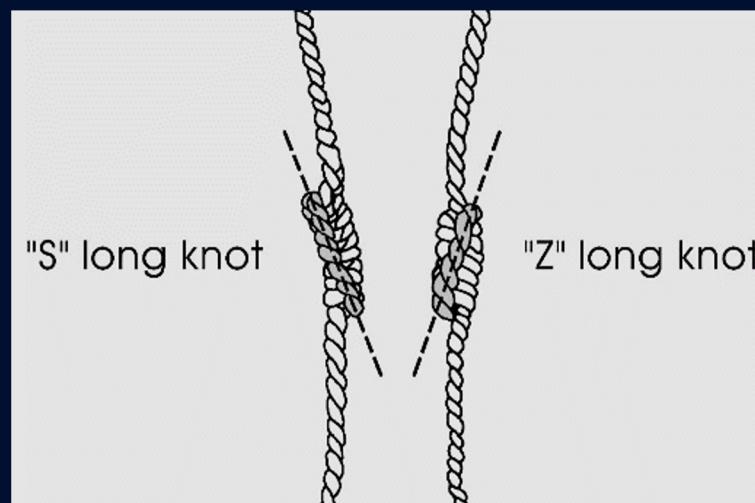
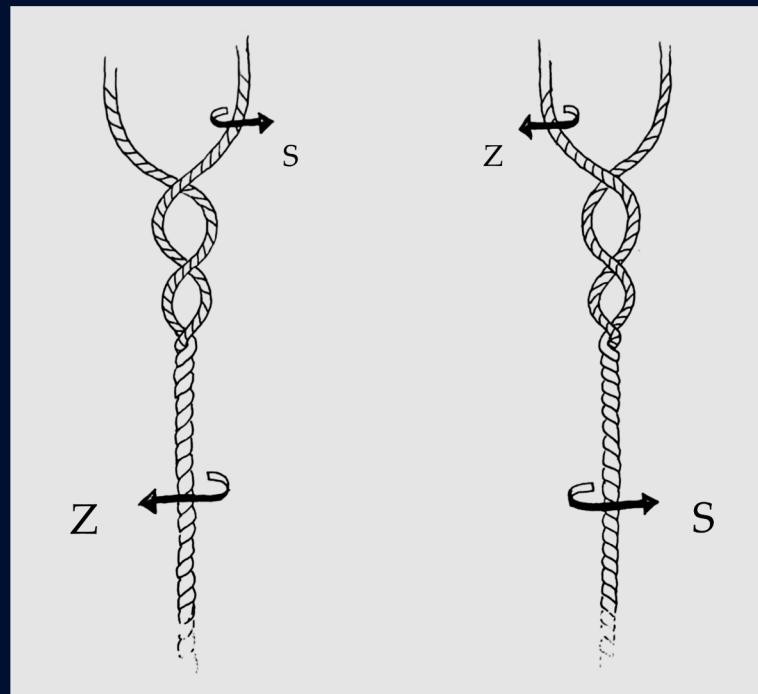


1. Image by author. Drawing by Clarissa N. Pacyna.

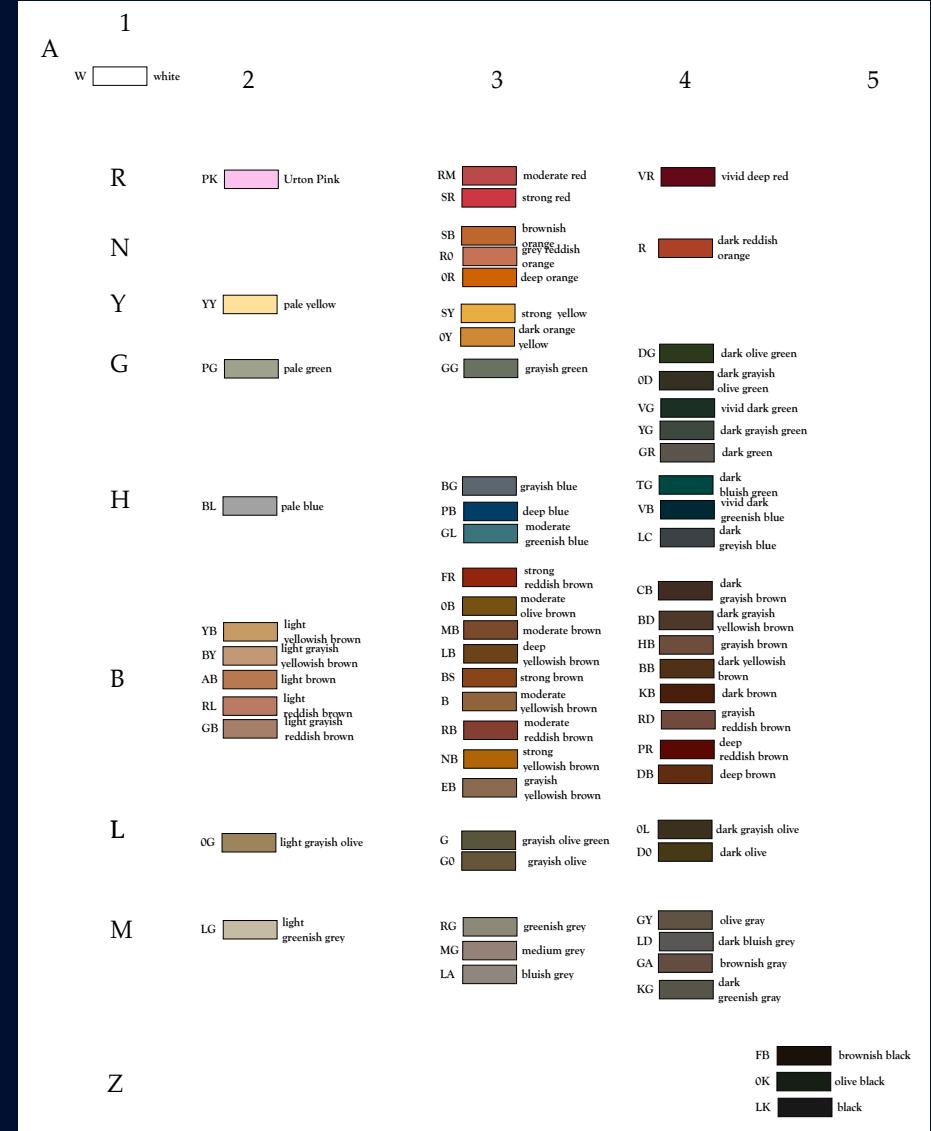
L. Leland Locke's Discovery (1912)



(Non?)numerical elements



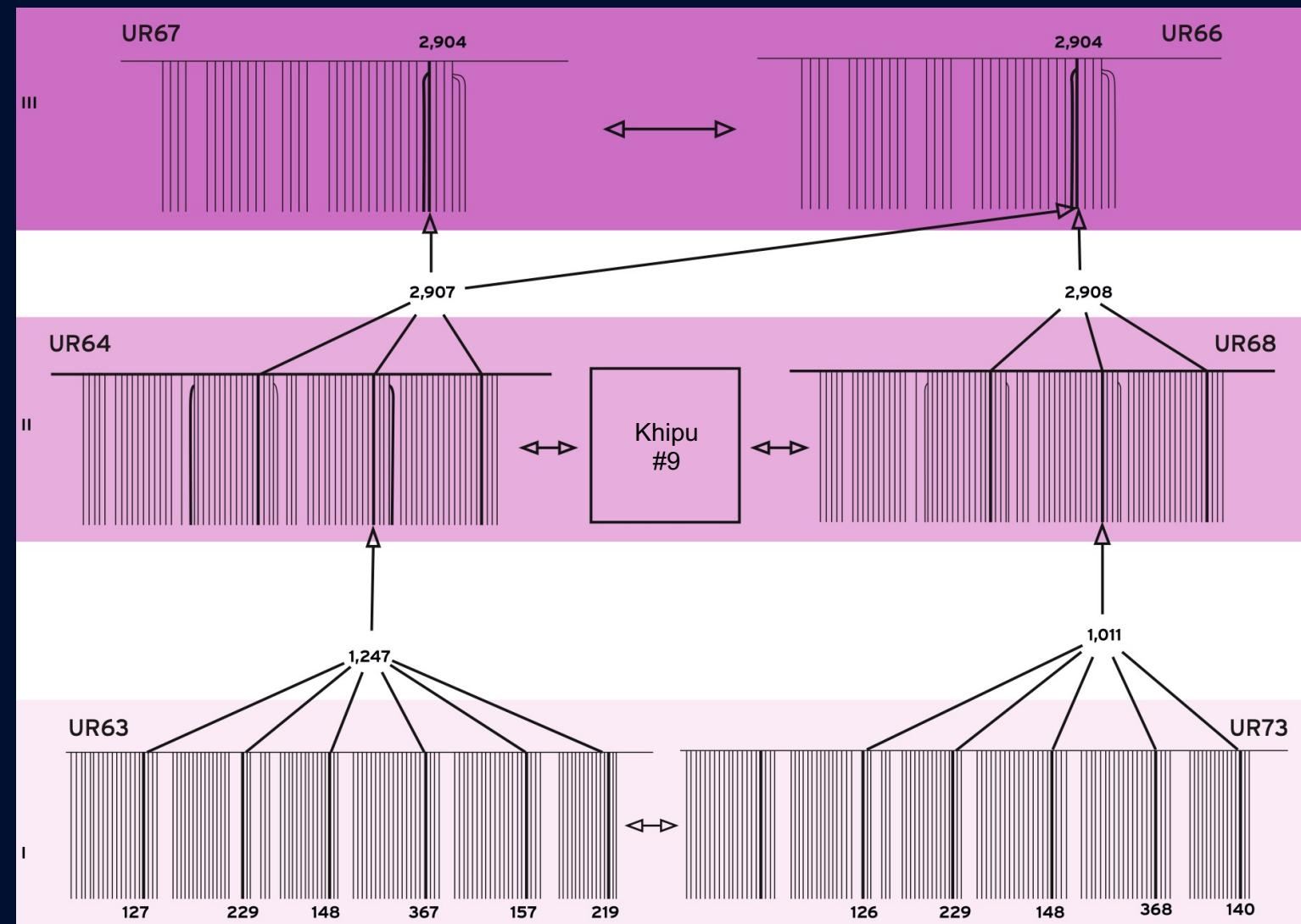
Khipu cord colours



I. Archaeological khipus



A. Vertical Summation at Puruchuco



B. Accounting Arithmetic at Inkawasi

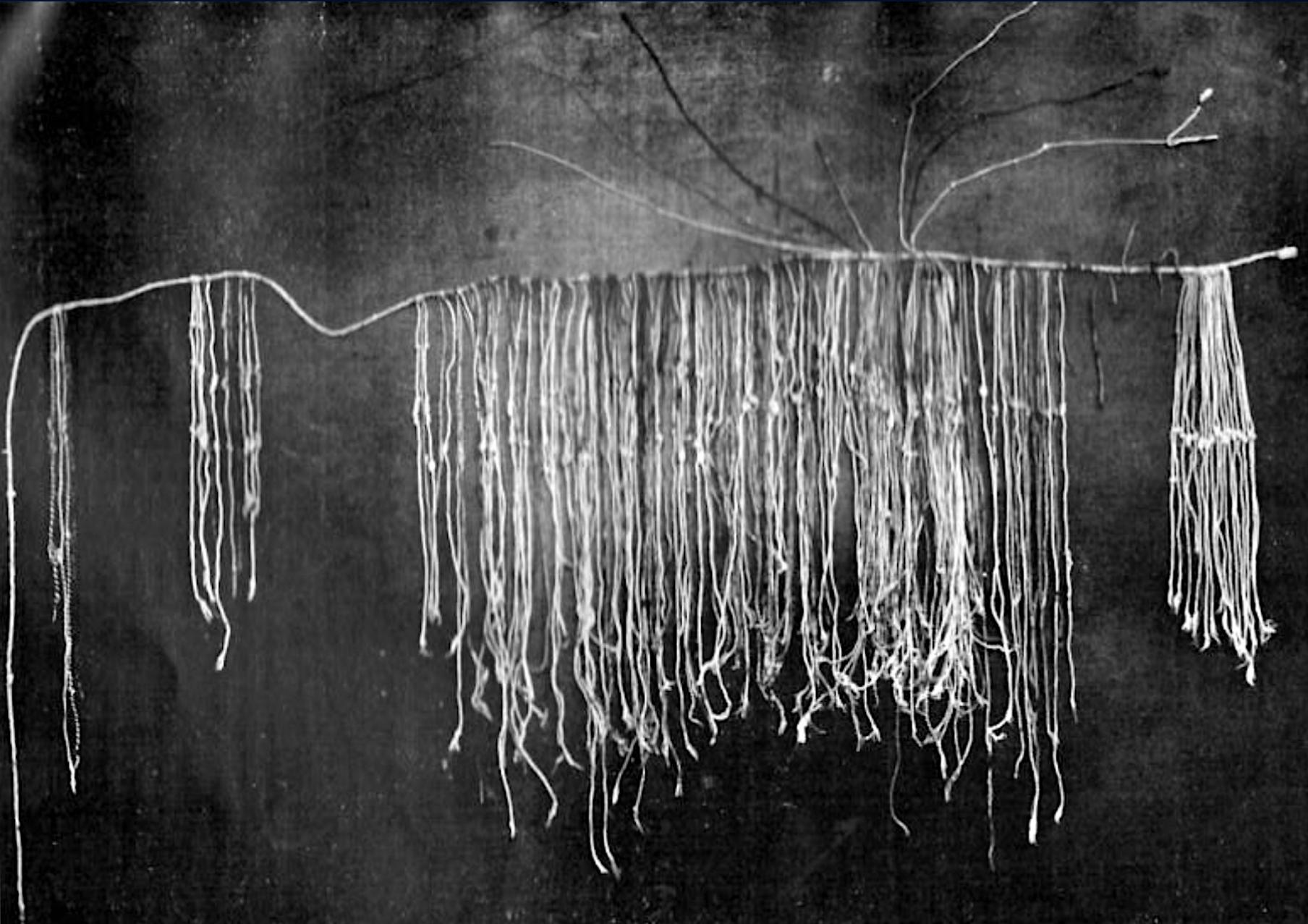


Table 4.2: Cord Color and Numerical Data from Inkawasi Khipu UR267A

Cord Number	Cord Color	Color Meaning	Number on Cord
1	W	Addition, +	106
2	AB	Subtraction, -	15
3	AB:MB	Result, =	91
7	W	Addition, +	161
8	W	Subtraction, -	15
9	AB:MB	Result, =	140 *Broken
11	W	Addition, +	206
12	W	Subtraction, -	15
13	AB:MB	Result, =	191
14	W	Addition, +	238
15	W	Subtraction, -	15
16	W	Result, =	223

II. Decontextualized khipus





1. Altieri, Radamés A. 1937. "El kipu peruano." *Revista Geográfica Americana* 4 (40): 1-14.

Marcia Ascher & Robert Ascher



Ascher Databooks (1978 & 1988)

interesting to note that also

$$P_1 + P_2 + P_3 + P_4 = \left\lceil \frac{\text{top value}}{2} \right\rceil - 6$$

rounded
down

$$P_5 + P_6 + P_7 + P_8 = \left\lfloor \frac{\text{top value}}{2} \right\rfloor + 6$$

rounded
up

Museum identification: No. F/851 (Peabody Museum, Harvard University)

Main cord: color DB-LB-G-W

\$ 6.0 cm: pendant cord (1), then space of 3.5 cm.
 9.5 cm: group of 8 pendant cords (2-9), then space of 2.5 cm.
 12.0 cm: group of 8 pendant cords (10-17), then space of 15.0 cm.
 29.0 cm: group of 8 pendant cords (18-25), then space of 1.5 cm.
 32.5 cm: group of 8 pendant cords (26-33), then space of 0.5 cm.
 35.0 cm: group of 7 pendant cords (34-40), then space of 1.0 cm.
 38.0 cm: group of 2 pendant cords (41-42), then space of 2.0 cm.
 40.5 cm: group of 8 pendant cords (43-50), then space of 5.0 cm.
 47.5 cm: group of 4 pendant cords (51-54), then space of 170 cm.
 218.0 cm: end ¢

Cord	Knots (no., type, position)	Length	Color	Value	Subsidiaries (no., position)
1	--	37.0¢	MB	0	4:5.5-6.5; 2:8.0-8.5
1s1	1s(5.5); 1E(11.5)	46.5¢	W	11	
1s2	1s(5.5); 5L(11.0)	21.0b	W	15	
1s3	--	4.0b	W	?	
1s4	2L(10.5)	48.5¢	W	2	
1s5	1s(5.5); 1E(12.0)	33.0	W	11	
1s6	1s(6.0); 9L(12.0)	34.0¢	W	19	
2	8L(16.5)	30.5¢	W	8	
3	1s(5.5); 3s(15.0); 2L(23.5)	33.0¢	W	132	1:5.0

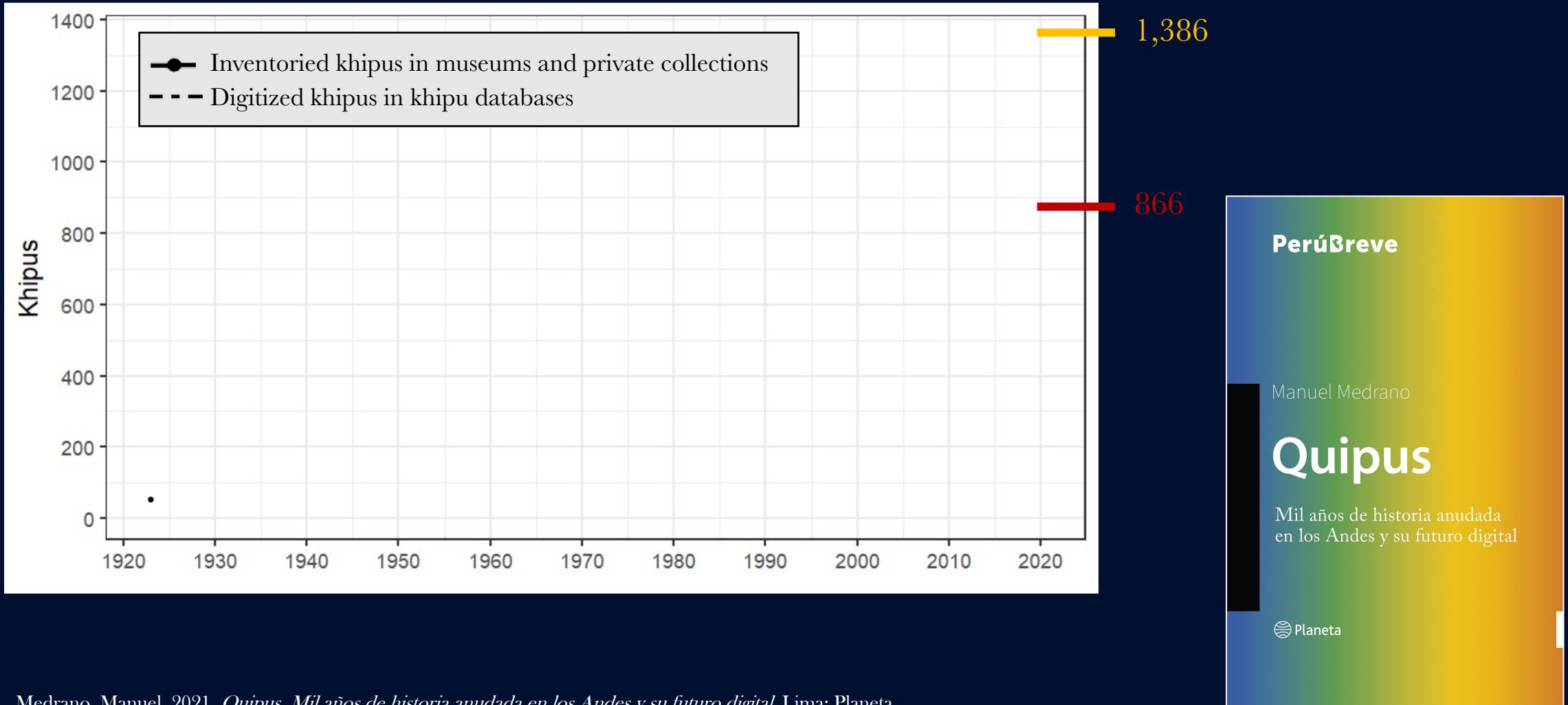
Khipu digitization


| 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 154 | 155 | 156 | 157 | 158 | 159 | 160 | 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 | 169 | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 | 180 | 181 | 182 | 183 | 184 | 185 | 186 | 187 | 188 | 189 | 190 | 191 | 192 | 193 | 194 | 195 | 196 | 197 | 198 | 199 | 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 | 208 | 209 | 210 | 211 | 212 | 213 | 214 | 215 | 216 | 217 | 218 | 219 | 220 | 221 | 222 | 223 | 224 | 225 | 226 | 227 | 228 | 229 | 230 | 231 | 232 | 233 | 234 | 235 | 236 | 237 | 238 | 239 | 240 | 241 | 242 | 243 | 244 | 245 | 246 | 247 | 248 | 249 | 250 | 251 | 252 | 253 | 254 | 255 | 256 | 257 | 258 | 259 | 260 | 261 | 262 | 263 | 264 | 265 | 266 | 267 | 268 | 269 | 270 | 271 | 272 | 273 | 274 | 275 | 276 | 277 | 278 | 279 | 280 | 281 | 282 | 283 | 284 | 285 | 286 | 287 | 288 | 289 | 290 | 291 | 292 | 293 | 294 | 295 | 296 | 297 | 298 | 299 | 300 | 301 | 302 | 303 | 304 | 305 | 306 | 307 | 308 | 309 | 310 | 311 | 312 | 313 | 314 | 315 | 316 | 317 | 318 | 319 | 320 | 321 | 322 | 323 | 324 | 325 | 326 | 327 | 328 | 329 | 330 | 331 | 332 | 333 | 334 | 335 | 336 | 337 | 338 | 339 | 340 | 341 | 342 | 343 | 344 | 345 | 346 | 347 | 348 | 349 | 350 | 351 | 352 | 353 | 354 | 355 | 356 | 357 | 358 | 359 | 360 | 361 | 362 | 363 | 364 | 365 | 366 | 367 | 368 | 369 | 370 | 371 | 372 | 373 | 374 | 375 | 376 | 377 | 378 | 379 | 380 | 381 | 382 | 383 | 384 | 385 | 386 | 387 | 388 | 389 | 390 | 391 | 392 | 393 | 394 | 395 | 396 | 397 | 398 | 399 | 400 | 401 | 402 | 403 | 404 | 405 | 406 | 407 | 408 | 409 | 410 | 411 | 412 | 413 | 414 | 415 | 416 | 417 | 418 | 419 | 420 | 421 | 422 | 423 | 424 | 425 | 426 | 427 | 428 | 429 | 430 | 431 | 432 | 433 | 434 | 435 | 436 | 437 | 438 | 439 | 440 | 441 | 442 | 443 | 444 | 445 | 446 | 447 | 448 | 449 | 450 | 451 | 452 | 453 | 454 | 455 | 456 | 457 | 458 | 459 | 460 | 461 | 462 | 463 | 464 | 465 | 466 | 467 | 468 | 469 | 470 | 471 | 472 | 473 | 474 | 475 | 476 | 477 | 478 | 479 | 480 | 481 | 482 | 483 | 484 | 485 | 486 | 487 | 488 | 489 | 490 | 491 | 492 | 493 | 494 | 495 | 496 | 497 | 498 | 499 | 500 | 501 | 502 | 503 | 504 | 505 | 506 | 507 | 508 | 509 | 510 | 511 | 512 | 513 | 514 | 515 | 516 | 517 | 518 | 519 | 520 | 521 | 522 | 523 | 524 | 525 | 526 | 527 | 528 | 529 | 530 | 531 | 532 | 533 | 534 | 535 | 536 | 537 | 538 | 539 | 540 | 541 | 542 | 543 | 544 | 545 | 546 | 547 | 548 | 549 | 550 | 551 | 552 | 553 | 554 | 555 | 556 | 557 | 558 | 559 | 560 | 561 | 562 | 563 | 564 | 565 | 566 | 567 | 568 | 569 | 570 | 571 | 572 | 573 | 574 | 575 | 576 | 577 | 578 | 579 | 580 | 581 | 582 | 583 | 584 | 585 | 586 | 587 | 588 | 589 | 590 | 591 | 592 | 593 | 594 | 595 | 596 | 597 | 598 | 599 | 600 | 601 | 602 | 603 | 604 | 605 | 606 | 607 | 608 | 609 | 610 | 611 | 612 | 613 | 614 | 615 | 616 | 617 | 618 | 619 | 620 | 621 | 622 | 623 | 624 | 625 | 626 | 627 | 628 | 629 | 630 | 631 | 632 | 633 | 634 | 635 | 636 | 637 | 638 | 639 | 640 | 641 | 642 | 643 | 644 | 645 | 646 | 647 | 648 | 649 | 650 | 651 | 652 | 653 | 654 | 655 | 656 | 657 | 658 | 659 | 660 | 661 | 662 | 663 | 664 | 665 | 666 | 667 | 668 | 669 | 670 | 671 | 672 | 673 | 674 | 675 | 676 | 677 | 678 | 679 | 680 | 681 | 682 | 683 | 684 | 685 | 686 | 687 | 688 | 689 | 690 | 691 | 692 | 693 | 694 | 695 | 696 | 697 | 698 | 699 | 700 | 701 | 702 | 703 | 704 | 705 | 706 | 707 | 708 | 709 | 710 | 711 | 712 | 713 | 714 | 715 | 716 | 717 | 718 | 719 | 720 | 721 | 722 | 723 | 724 | 725 | 726 | 727 | 728 | 729 | 730 | 731 | 732 | 733 | 734 | 735 | 736 | 737 | 738 | 739 | 740 | 741 | 742 | 743 | 744 | 745 | 746 | 747 | 748 | 749 | 750 | 751 | 752 | 753 | 754 | 755 | 756 | 757 | 758 | 759 | 760 | 761 | 762 | 763 | 764 | 765 | 766 | 767 | 768 | 769 | 770 | 771 | 772 | 773 | 774 | 775 | 776 | 777 | 778 | 779 | 780 | 781 | 782 | 783 | 784 | 785 | 786 | 787 | 788 | 789 | 790 | 791 | 792 | 793 | 794 | 795 | 796 | 797 | 798 | 799 | 800 | 801 | 802 | 803 | 804 | 805 | 806 | 807 | 808 | 809 | 810 | 811 | 812 | 813 | 814 | 815 | 816 | 817 | 818 | 819 | 820 | 821 | 822 | 823 | 824 | 825 | 826 | 827 | 828 | 829 | 830 | 831 | 832 | 833 | 834 | 835 | 836 | 837 | 838 | 839 | 840 | 841 | 842 | 843 | 844 | 845 | 846 | 847 | 848 | 849 | 850 | 851 | 852 | 853 | 854 | 855 | 856 | 857 | 858 | 859 | 860 | 861 | 862 | 863 | 864 | 865 | 866 | 867 | 868 | 869 | 870 | 871 | 872 | 873 | 874 | 875 | 876 | 877 | 878 | 879 | 880 | 881 | 882 | 883 | 884 | 885 | 886 | 887 | 888 | 889 | 890 | 891 | 892 | 893 | 894 | 895 | 896 | 897 | 898 | 899 | 900 | 901 | 902 | 903 | 904 | 905 | 906 | 907 | 908 | 909 | 910 | 911 | 912 | 913 | 914 | 915 | 916 | 917 | 918 | 919 | 920 | 921 | 922 | 923 | 924 | 925 | 926 | 927 | 928 | 929 | 930 | 931 | 932 | 933 | 934 | 935 | 936 | 937 | 938 | 939 | 940 | 941 | 942 | 943 | 944 | 945 | 946 | 947 | 948 | 949 | 950 | 951 | 952 | 953 | 954 | 955 | 956 | 957 | 958 | 959 | 960 | 961 | 962 | 963 | 964 | 965 | 966 | 967 | 968 | 969 | 970 | 971 | 972 | 973 | 974 | 975 | 976 | 977 | 978 | 979 | 980 | 981 | 982 | 983 | 984 | 985 | 986 | 987 | 988 | 989 | 990 | 991 | 992 | 993 | 994 | 995 | 996 | 997 | 998 | 999 | 1000 | 1001 | 1002 | 1003 | 1004 | 1005 | 1006 | 1007 | 1008 | 1009 | 10010 | 10011 | 10012 | 10013 | 10014 | 10015 | 10016 | 10017 | 10018 | 10019 | 10020 | 10021 | 10022 | 10023 | 10024 | 10025 | 10026 | 10027 | 10028 | 10029 | 10030 | 10031 | 10032 | 10033 | 10034 | 10035 | 10036 | 10037 | 10038 | 10039 | 10040 | 10041 | 10042 | 10043 | 10044 | 10045 | 10046 | 10047 | 10048 | 10049 | 10050 | 10051 | 10052 | 10053 | 10054 | 10055 | 10056 | 10057 | 10058 | 10059 | 10060 | 10061 | 10062 | 10063 | 10064 | 10065 | 10066 | 10067 | 10068 | 10069 | 10070 | 10071 | 10072 | 10073 | 10074 | 10075 | 10076 | 10077 | 10078 | 10079 | 10080 | 10081 | 10082 | 10083 | 10084 | 10085 | 10086 | 10087 | 10088 | 10089 | 10090 | 10091 | 10092 | 10093 | 10094 | 10095 | 10096 | 10097 | 10098 | 10099 | 100100 | 100101 | 100102 | 100103 | 100104 | 100105 | 100106 | 100107 | 100108 | 100109 | 100110 | 100111 | 100112 | 100113 | 100114 | 100115 | 100116 | 100117 | 100118 | 100119 | 100120 | 100121 | 100122 | 100123 | 100124 | 100125 | 100126 | 100127 | 100128 | 100129 | 100130 | 100131 | 100132 | 100133 | 100134 | 100135 | 100136 | 100137 | 100138 | 100139 | 100140 | 100141 | 100142 | 100143 | 100144 | 100145 | 100146 | 100147 | 100148 | 100149 | 100150 | 100151 | 100152 | 100153 | 100154 | 100155 | 100156 | 100157 | 100158 | 100159 | 100160 | 100161 | 100162 | 100163 | 100164 | 100165 | 100166 | 100167 | 100168 | 100169 | 100170 | 100171 | 100172 | 100173 | 100174 | 100175 | 100176 | 100177 | 100178 | 100179 | 100180 | 100181 | 100182 | 100183 | 100184 | 100185 | 100186 | 100187 | 100188 | 100189 | 100190 | 100191 | 100192 | 100193 | 100194 | 100195 | 100196 | 100197 | 100198 | 100199 | 100200 | 100201 | 100202 | 100203 | 100204 | 100205 | 100206 | 100207 | 100208 | 100209 | 100210 | 100211 | 100212 | 100213 | 100214 | 100215 | 100216 | 100217 | 100218 | 100219 | 100220 | 100221 | 100222 | 100223 | 100224 | 100225 | 100226 | 100227 | 100228 | 100229 | 100230 | 100231 | 100232 | 100233 | 100234 | 100235 | 100236 | 100237 | 100238 | 100239 | 100240 | 100241 | 100242 | 100243 | 100244 | 100245 | 100246 | 100247 | 100248 | 100249 | 100250 | 100251 | 100252 | 100253 | 100254 | 100255 | 100256 | 100257 | 100258 | 100259 | 100260 | 100261 | 100262 | 100263 |<th
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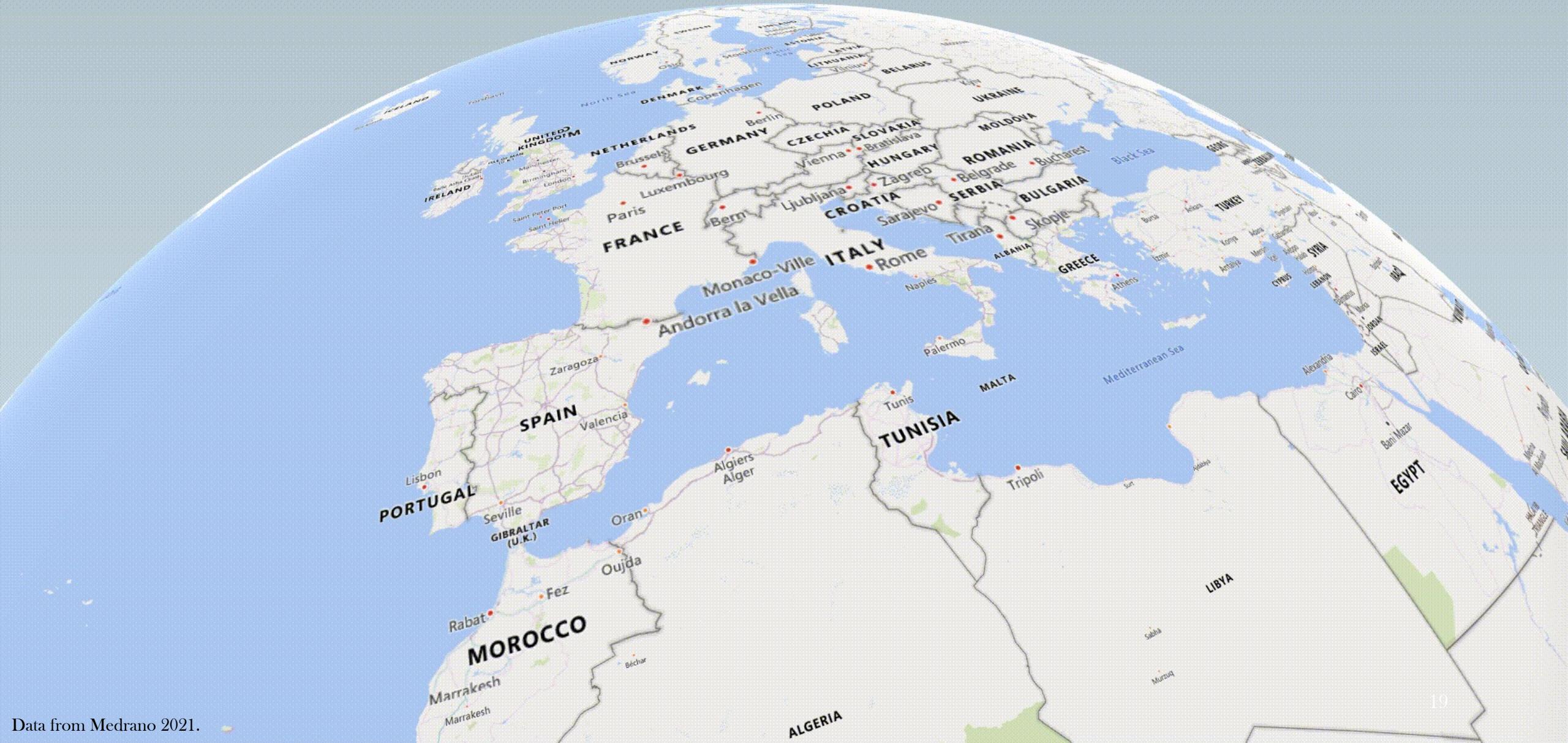


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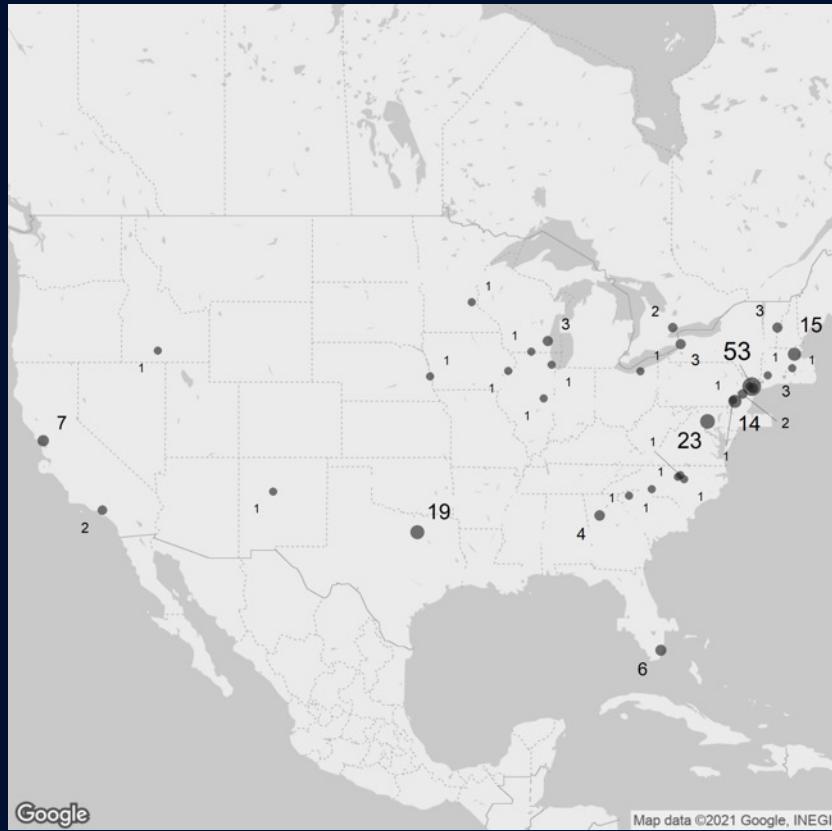
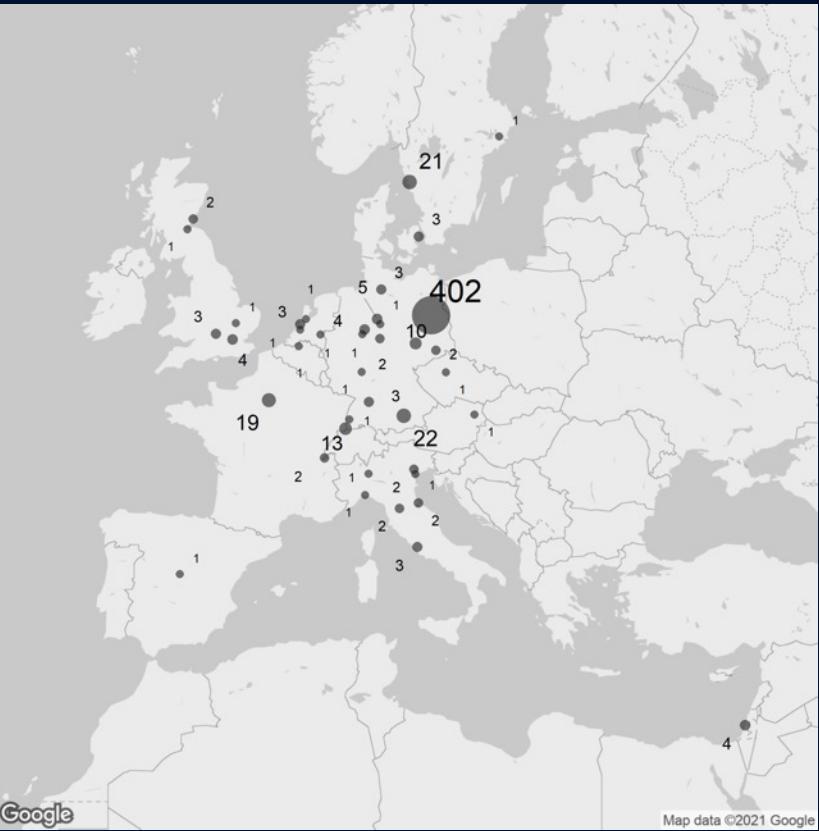
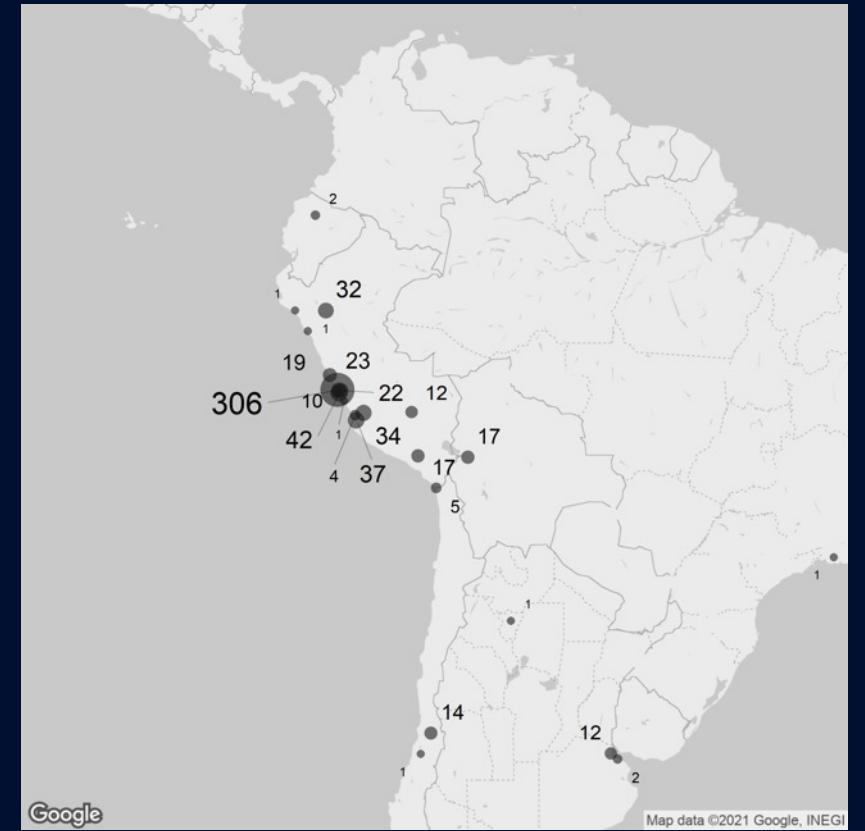
Khipu cataloguing



Inventoried Khipus (Europe) 1920

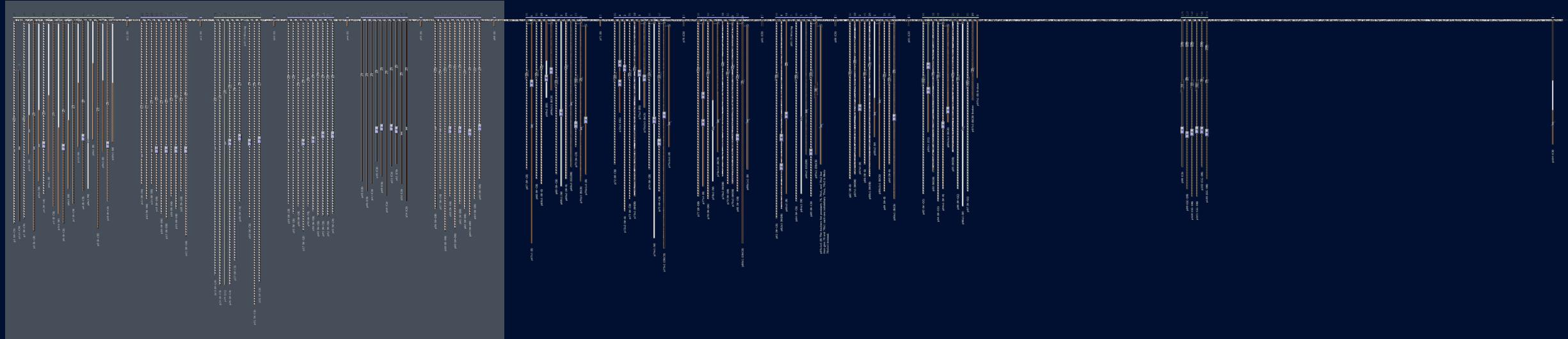


Khipu locations and quantities



1. Data from Medrano 2021.

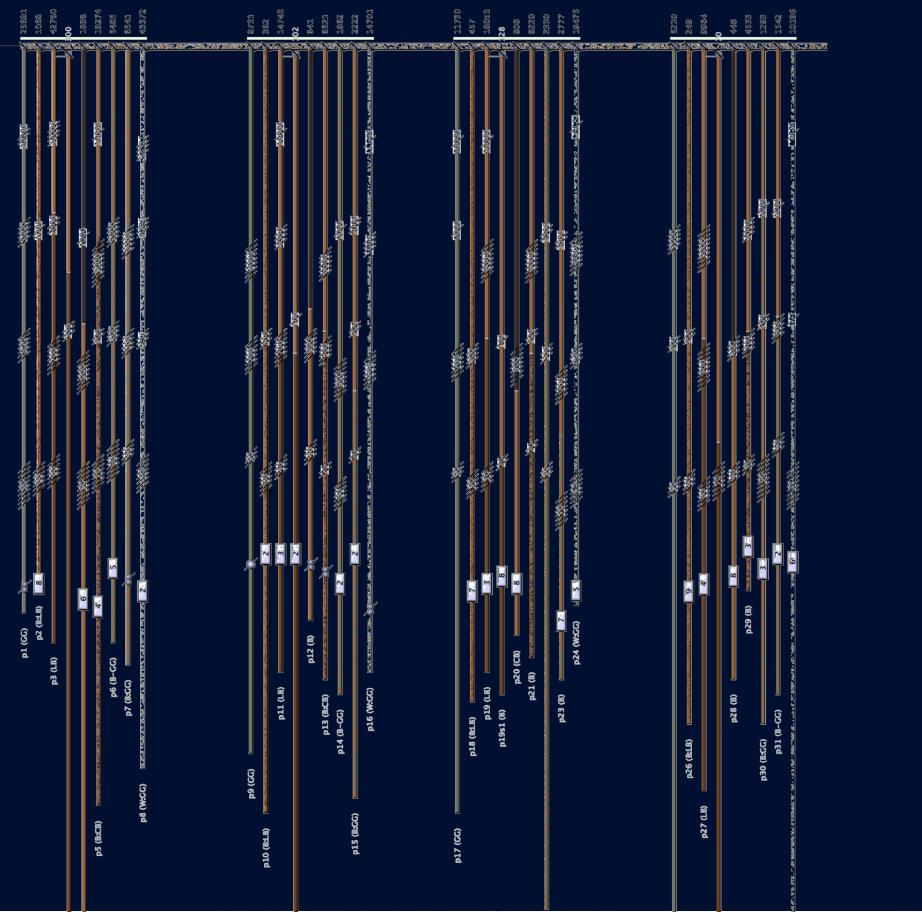
A. Ascher mathematical relations



- Repetition of only four values in highlighted section: 11, 12, 20, 21.
- Sum of 60 cords in highlighted section = 1,000.
- Sum by cord index produces following fractional parts of 1,000 (each within ± 1):
 $\{1/8, 3/25, 1/8, 1/14, 1/9, 2/25, 1/9, 1/14, 1/9, 1/14\}$.

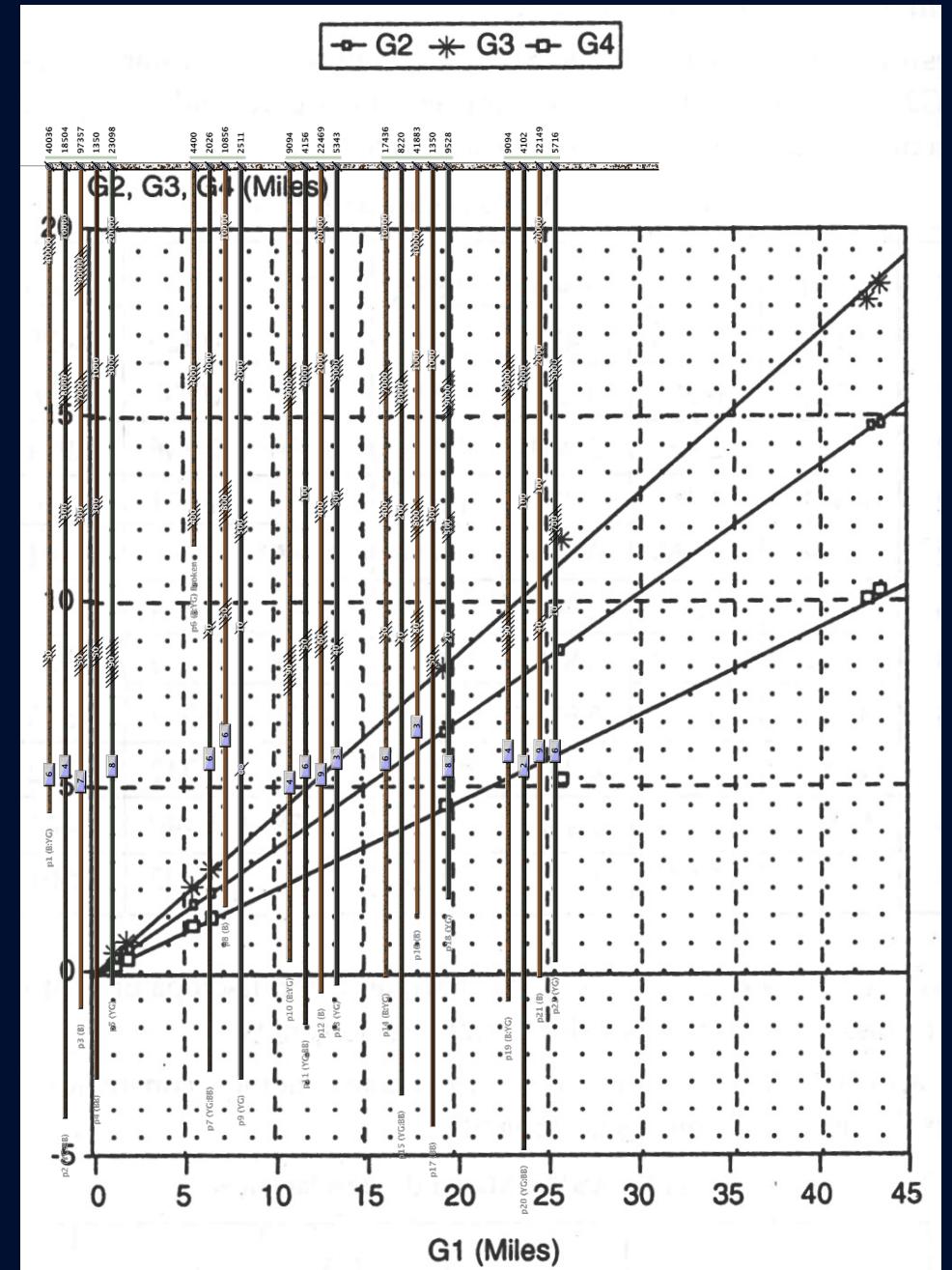
B. Pereyra's “geometric” khipus

AS120



G1	25691	1068	42760	1896	19274	5485	6541	43372
G2	8731	362	14743	641	6521	1862	2222	14701
G3	1730	457	18053	808	8220	2330	2777	18475
G4	5230	249	9964	448	4533	1293	1542	10196

AS143
(excerpt)



1. Diagrams by Ashok Khosla (see <https://www.khipufieldguide.com/>). Table and graph from Pereyra Sánchez 1996.

C. Comparisons with written sources



memoria y de los que lo han escrito en su defecto y suscribido
 consta que se han escrito en su nombre en la memoria de su nombre
 y de su apellido
 11798 y undios acuerda
 Hacer y mandar que se haga lo siguiente
 11551 fome gato y recalcitrante comiendo
 11339 fome gato y burlando
 11204 fome gato y recalcitrante devorando
 11267 fome gato devorando
 1111 fome gato y recalcitrante devorando
 113 fome gato burlando devorando
 1152 fome gato devorando
 11357 y mas devorando
 1121 obediencia de la tierra
 116 con devoción de la tierra
 1110 que no es
 119 calvario
 11015 galimatias
 117967 que los
 11528 yendo
 115967 que los
 11538 que la que los de fronta
 11575 piezas de gol
 1129 que nadie me responda y me dio de golpe
 1134 que no es y plomo
 11495 que no es
 119 me buscan en el
 111170 poneza al que gatos
 11910 que no es
 1186 La quimis
 119 que no es
 11479 dices y ca en ellos y plomo
 1116 que no es obediencia
 1177 oficio demonio de
 1161167
 110100 mío tu

Khipu transcriptions

- ### 1. Image by author.

Tabular representation of Huanca khipu transcription (1561)

CUADRO IV. Basado en el *khipu*-memorial de los señores de Hatun Xauxa, presentado a la audiencia, Ciudad de Los Reyes, 1561

	I				II				III				IV				V				VI				VII				VIII				IX				X				XI				XII			
	Varones	Mujeres	Ovejas de la tierra	Corderos para la tierra	Ovejas, ovinos, pascas, ranchecitos	Vestidos, lana, cuñibí	Vestidos, lana, cuñibí	Prendas	Ovejas (hembra)	Quinua (hembra)	Papas (hembra)	Mais (hembra)	Mais (ranchecito)	Quinua (ranchecito)	Papas (ranchecito)	Ajorquitas	Ojeras de ovejas	Ojeras (ranchecito)	Sobreaguas grandes	Aderezos de ovejas	Cáñedras, ollas, tijeras	Chandiles, porongos, escudillas	Cáñedras (ranchecito)	Porongos (ranchecito)	Gallinas de Castilla	Huevos	Perdices	Leyda vaciada (cargas)	Cebolla (cargas)	Hierbas (cargas)	Paja (cargas)	Chiches (cinturas)	Todo fruta (cinturas)	Sil blanca (fibra)	Pescado (cintillo de una libra)	Carpadores, a la salida	Yacuantes a la salida	Onciones a la salida	Cordenes a la salida	Huevas de aves, punto de comienzo	Quinua para el camino	Papas (hembra) para el camino						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43					
a) F. Pizarro, "en los tambo" de Xauxa, 1538	589	437	1,275	12,045	29,231	19	2	2,216	12,406	124	1,249	21,563	2,336	2,414		185 pares	3,659		56	1,316	1,231	11,285			1,240	200,071	30,404	48,989	321,354	1,322	12,404	311	110	4,755	62	62	a) F. Pizarro, "en los tambo" de Xauxa, 1538											
b) Tesorero Riquelme, con los que se quedaron, Xauxa, 1538-1534					642	132	corderos	4	2	7,582	171	371				76		4	745	1,253						1,366	28,076	8,665	12,112	6,145	2,118	12,841			b) Tesorero Riquelme, con los que se quedaron, Xauxa, 1538-1534													
c) F. Pizarro regresa del Cuzco. Antes de la campaña contra Quisquis, recibió "su comida"					880			7		3,249	201	470				72			1,228							261	30,110		9,487	10,111	1,033	1,214			c) F. Pizarro regresa del Cuzco. Antes de la campaña contra Quisquis, recibió "su comida"													
d) Para la campaña contra Quicu Yapanqui, dieron					200	61	corderos	12	6	2,802*	202*					92		6	1,002	620						116	24,014	1,213	8,915	10,123	1,005	1,500	1,202	120	6	602	d) Para la campaña contra Quicu Yapanqui, dieron											
e) Quiqu Yapanqui se llevó					60			60	..	10																											e) Quiqu Yapanqui se llevó											
f) Alonso de Alvarado recibió, 1537					563	2																															f) Alonso de Alvarado recibió, 1537											
g) F. Pizarro hacia el Cuzco, después del sitio de Lima, 1538					266	armados		10																												g) F. Pizarro hacia el Cuzco, después del sitio de Lima, 1538												
h) Alonso de Mercadillo, va preso, camino a Lima, 1539					315	64	54			4	2																								h) Alonso de Mercadillo, va preso, camino a Lima, 1539													
i) Dieron a Mauzelas, su encomendero, 1541								10	1																											i) Dieron a Mauzelas, su encomendero, 1541												
j) Pedro Alvarez Holguín, quien ibase junta con Vaca de Castro					326		118	17		23	2		1,458	20	61																		j) Pedro Alvarez Holguín, quien ibase junta con Vaca de Castro															
k) Almagro el Mozo saqueó, " quemó muchas cosas"					524	cargadas	692						12,902	13,045	corderos	271			75 de lana		288	126	573															k) Almagro el Mozo saqueó, " quemó muchas cosas"										
l) Vaca de Castro al Cuzco, 1542																																					l) Vaca de Castro al Cuzco, 1542											
m) Pedro Puelles camino a Huánuco					224		81			4	1		3,762	17	267																		m) Pedro Puelles camino a Huánuco															
n) Vaca de Castro regresa del Cuzco																																					n) Vaca de Castro regresa del Cuzco											
o) Gonzalo Pizarro se llevó					351																															o) Gonzalo Pizarro se llevó												
p) Juan de Acosta, canina al Cuzco, se llevó					124	232																													p) Juan de Acosta, canina al Cuzco, se llevó													
q) Gómez de Caravantes, en encomendero					278																															q) Gómez de Caravantes, en encomendero												
r) El Presidente Gasca, con el ejército real en Xauxa, 1548					173	8	141	puercos	22	3		6,616	165	167					3,093	18	370	en seis depósitos quemados																r) El Presidente Gasca, con el ejército real en Xauxa, 1548										

* La transcripción ubica estas cantidades fuera de su lugar.
† Las líneas II y III son casi idénticas. □ Error del escribano. △ del khipu kamayoq.

Digitization of khipu transcriptions

Textos Andinos

hallastes. en / ¹³⁹ deshazerle la gente que allá tenía y después / ¹⁴⁰ venistes. a la provincia Jauja. donde yo estaua con / ¹⁴¹ vuestras armas. y cuaulllos. a metros debaxo. del / ¹⁴² estandarte real que yo allí tenía. como / ¹⁴³ leal vasallo y seruidor de su magestad y benistes / ¹⁴⁴ en mi acompañamiento contra el dicho Gonçalo Piçarro / ¹⁴⁵ sirviendo en la dicha guerra. en todo lo que os fue / ¹⁴⁶ mandado. por los oficiales d'ella. hasta el / ¹⁴⁷ valle de Xaquixaguana. qu'es quatro leguas de / ¹⁴⁸ esta ciudad. del Cuzco dond'el dicho Gonçalo Piçarro y / ¹⁴⁹ sus capitanes. estauan con la gente de gue- / ¹⁵⁰ rra. que tenía puesto. en campo. y en horden [fol. 58 r.] / ¹⁵¹ para dar batalla. al estandarte real. y allí se la dio / ¹⁵² en nueve de abril d'este presente año donde fue vencido / ¹⁵³ él y sus capitanes presos y muertos. y la gente / ¹⁵⁴ que tenía desbaratada. y estos reynos re- / ¹⁵⁵ duzidos al seruiço de su magestad. en la qual empresa. andubis- / ¹⁵⁶ tes. y batalla os hallastes. como bueno y leal va- / ¹⁵⁷ sallo. de su magestad. con vuestras armas y cuaullo y te- / ¹⁵⁸ niendo respeto a los dichos seruiços. y a los muchos / ¹⁵⁹ gastos que en ello se os recrecieron y que / ¹⁶⁰ soy persona. de mucha honra y calidad. y que / ¹⁶¹ tenéys boluntad. de permanescer en esta tierra en / ¹⁶² alguna. enmienda y gratificación de los susodichos / ¹⁶³ seruiços. en nombre de su magestad y por virtud. de sus rea- / ¹⁶⁴ les poderes y comisiones que para ello tengo / ¹⁶⁵ que an sido publicados. y por su notoriedad. no / ¹⁶⁶ van aquí ynsertos. os confirmo y si neçesa- / ¹⁶⁷ rio es. de nuevo os enciendo y deposito. el / ¹⁶⁸ pueblo que se llama. Copacaguana. con el caçique / ¹⁶⁹ d'ella qu'es vn orejón que se llama. Condemaya / ¹⁷⁰ con quattro principales. que mandan la gente / ¹⁷¹ del dicho caçique que se llama. vno Chisquicone / ¹⁷² que es canche y otro que se llama. Huyna. que es / ¹⁷³ cana. otro que se llama. Pingo. qu'es collao. y otro. / ¹⁷⁴ que se llama Pasca. con todos los demás prin- / ¹⁷⁵ çipales. pueblos e yndios sujetos al dicho ca- / ¹⁷⁶ çique. y pueblo de Copacaguana. y en todos ellos / ¹⁷⁷ número de sieteçientos yndios de seruiço. y vi- / ¹⁷⁸ sitación. syn biejos y biudas. con todos. en esta / ¹⁷⁹ manera: =

El dicho pueblo principal de Copacagua- / ¹⁸⁰ na. quatrocientos y nueve yndios. de seruicio. y visy- / ¹⁸¹ tação y ciento y sesenta biudas y biejos y en [fol. 58 v.] / ¹⁸² otro poblezuelo qu'está junto. y subjeto al dicho pueblo de / ¹⁸³ Copacaguana treze yndios. de seruicio. y seys uiejos y / ¹⁸⁴ biudas. y otro pueblo que se llama Ynusayo qu'es- / ¹⁸⁵ tá poblado. de mitimaes. y es subjeto al dicho pueblo / ¹⁸⁶ de Copacaguana. con ciento y veinte yndios / ¹⁸⁷ de seruicio.

Martti Pärssinen & Jukka Kiviharju—

y setenta viejos y biudas. y otro poble- / ¹⁸⁸ zuelo que están ciertos depósitos qu'está / ¹⁸⁹ entre el pueblo. de Copacaguana y Yunguyo con / ¹⁹⁰ quarenta yndios de seruiçio. y diez y siete viejos / ¹⁹¹ y biudas y en ciertos pescadores. qu'están / ¹⁹² media legua. del pueblo. de Copacaguana / ¹⁹³ que se llama Ca-chachuni con diez y siete yndios de / ¹⁹⁴ seruiçio. y nueue biudas. y viejos. y en otro pueblo / ¹⁹⁵ que se llama Tiquina. de la vna parte. de la laguna / ¹⁹⁶ de Titicaca. y de la otra quarenta y dos yndios / ¹⁹⁷ y esto no se os quenta en este número / ¹⁹⁸ porqu'estos están allí dedicados. para bar- / ¹⁹⁹ queros. del estrecho que alli haze la laguna / ²⁰⁰ y son sujetos. a los pueblos. de Copacaguana / ²⁰¹ y más vn poblezuelo que se llama Carigua / ²⁰² qu'es sujeto al dicho pueblo principal de / ²⁰³ Copacaguana. con treynta yndios. de seruiçio / ²⁰⁴ y veinte biejos. y biudas. y más otro poble- / ²⁰⁵ zuelo. que se llama Lupa con veinte yndios / ²⁰⁶ de seruiçio. y beynte y ocho uiejos y biudas. y más o- / ²⁰⁷ tro poblezuelo. que se llama Coaquipa. con ve- / ²⁰⁸ ynte y dos yndios. de servicio. y onze biejos. y biu- / ²⁰⁹ das. y más otro poblezuelo que se llama / ²¹⁰ Touoca. con diez e nueue yndios. de seruiçio. y / ²¹¹ nueve viejos. y biudas. y más otro poblezuelo / ²¹² que se llama Tumacache. son syete yndios de / ²¹³ seruiçio. y quattro viejos y biudas. que son los dichos [fol. 59 r.] / ²¹⁴ sietecientos yndios. de seruiçio. y de visita- / ²¹⁵ çión. sin los viejos. y biudas. según que los / ²¹⁶ visitó. el capitán Grauiel de Rojas. todos / ²¹⁷ los cuales dichos yndios. son mitimaes / ²¹⁸ puestos allí por los señores. del Cuzco. / ²¹⁹ para el seruiçio de la casa del sol. qu'ellos te- / ²²⁰ {te}nían dentro en la laguna de Titicaca. to- / ²²¹ dos los cuales. yndios os dio y. encomendó. el / ²²² dicho lienciado Vaca de Castro. gouernador que / ²²³ fue d'estos dichos reynos. y ni más ni menos qu'él / ²²⁴ os los encomendó y dio. os lo confirmo y en- / ²²⁵ comiendo. para que os syruáys d'ellos. ni más / ²²⁶ ni menos. que os avéys seruido. después del tiempo / ²²⁷ de la dicha encomienda hasta agora conforme / ²²⁸ a las hordenanças de su magestad. y con que dexéys a / ²²⁹ los caçiques. sus mugeres e hijos e yndios / ²³⁰ de seruiçio. y con que los dotrinéys y hágays do- / ²³¹ trinar. en las cosas de nuestra santa fe católica / ²³² como su magestad lo tiene mandado y si no lo hiziére- / ²³³ des y oviere algún descuydo. cargue sobre vuestra / ²³⁴ conciencia. y no sobre la de su magestad. ni mía que en / ²³⁵ su real nonbre. os los encie-mendo. y os los en- / ²³⁶ cargo. y mando. y que a ellos y a los demás. yndios / ²³⁷ los tratéys bien y procuréys. su conserua- / ²³⁸ çión. pidiéndoles tributos

“A el dicho Vrtum
Sánchez le
dieron... dozientas
y veinte pieças de
ropa de avasca e
trescientas e cinco
fanegas de chuño”

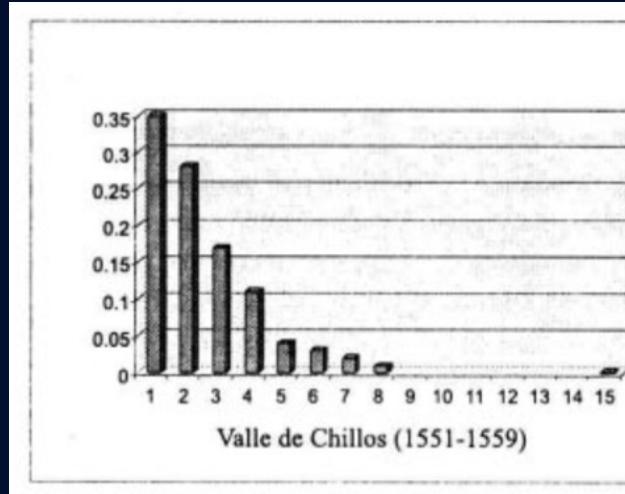


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<w lemma="vrtum" pos="PROPN" token_orig="Vrtum" doc_id="52">Vrtum</w>
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...
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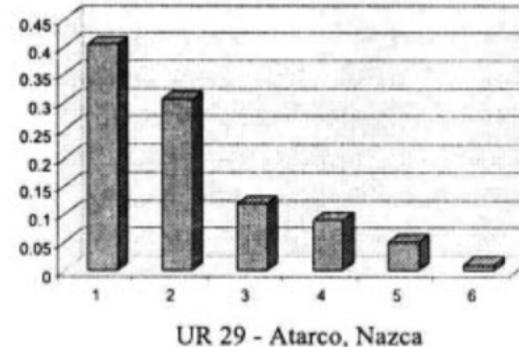
Khipu transcription locations and quantities



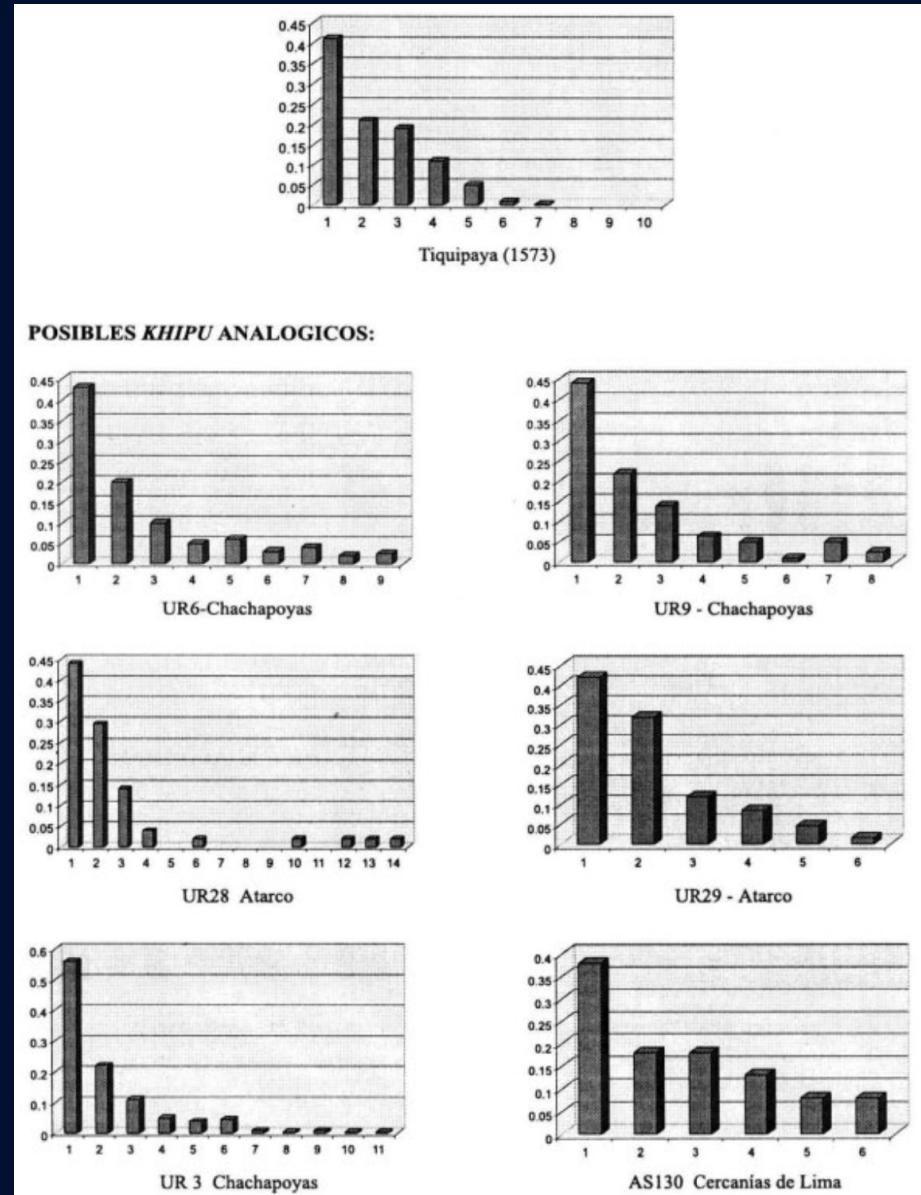
Brezine's census matching



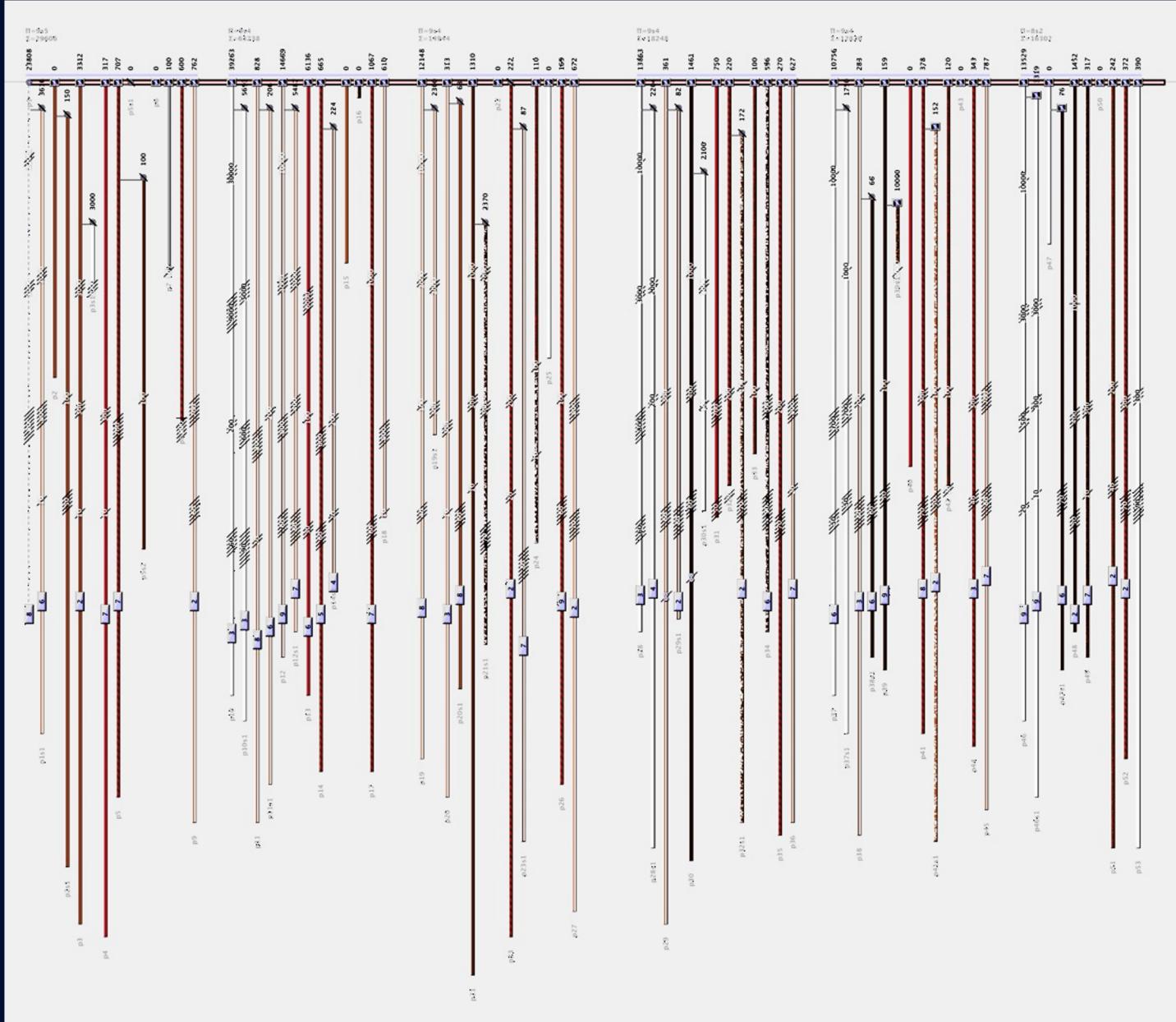
POSSIBLE KHIPU ANALOGICO



UR 29 - Atarco, Nazca



Looking forward



¹. Image by Alexander Brust. Diagram by Ashok Khosla (see kipufieldguide.com).

(Some) unanswered questions

- Did khipus record fractions? If so, how?
- What were the largest numbers recorded on khipus?
- What is the role of redundancy in khipu construction?

