

Computers and Color in Philately
Part 9: Natural Statistically Based Varieties of Mi47
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Introduction:

If I were to select stamps from my accumulation to represent the variations in color which appear naturally, how many such varieties would there be and how many of each type would I find?

Statistical Color Groups:

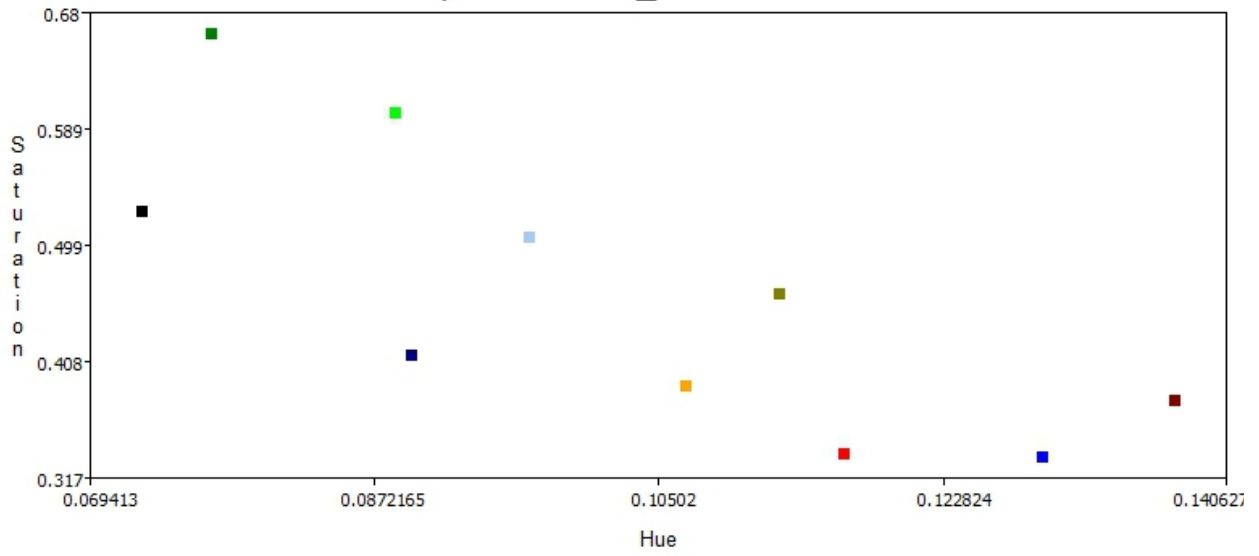
As I discussed earlier, what seems to be the best way to determine the color varieties is to extract anti-cliques. However, the cutoff similarity to decide which two stamps are to be “close” is still up to one’s discretion. By choosing the cutoff to be very close to 1, we can virtually place every stamp into its own color group; by choosing a value close to zero, we can effectively decide that all stamps have the same color. What I have decided to do is to choose a cutoff value which results in an anti-clique having a number of stamps close to the cataloged number of color varieties. There are 11 such varieties.

R Similarities		KS Similarities	
Cutoff	Nmb in Anti-Clique	Cutoff	Nmb in Anti-Clique
0.92	13	0.87	12
0.91	10	0.86	11

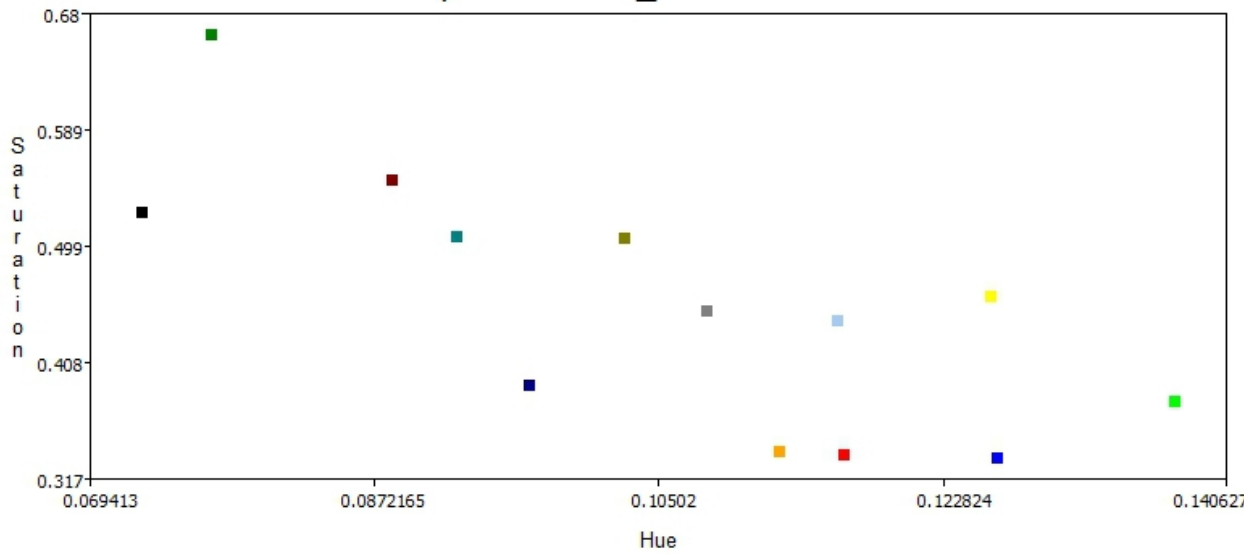
These anti-cliques were all formed by beginning with stamp number 1, including it into the anti-clique and proceeding from there.

We include plots of the included stamps on hue vs. saturation axes. The hue and saturation were determined by the above process and represent the position of the peak of the hue-saturation histogram. As we discussed above, these values seem likely to be misleading. However, close R and K-S similarities mean that the histograms are very similar and thus that their peaks should be very close. That is, that they have a close DeltaE76 similarity and the peak would yield a meaningful dominant color. This allows us to attach a "color" to each of the members of the anti-clique.

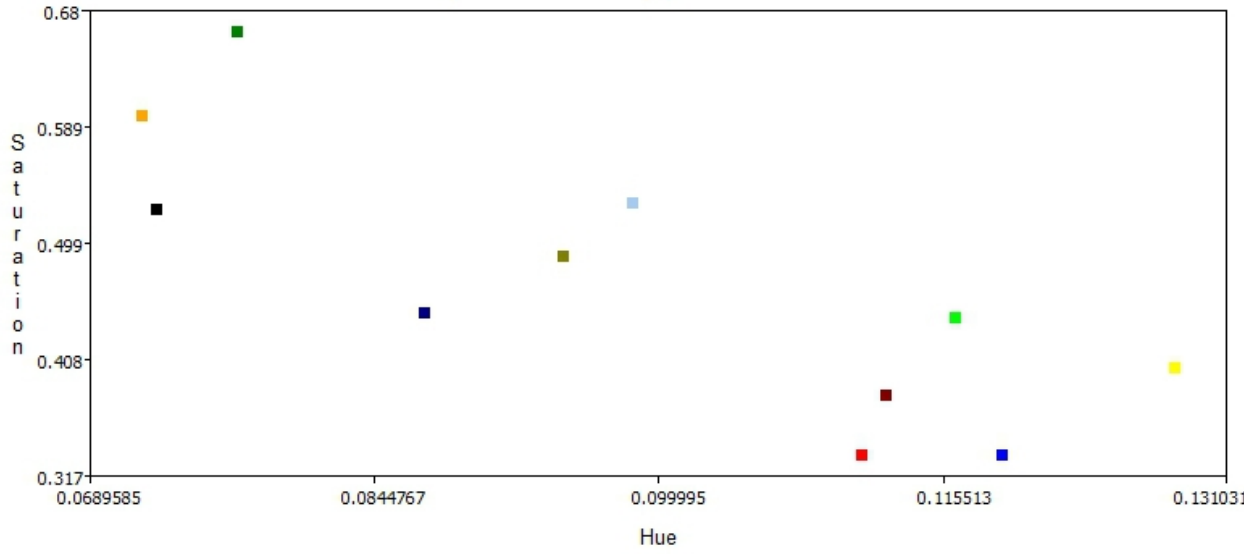
R Anti-Clique Plot Mi47_uv 1-1059 Cutoff 0.9100



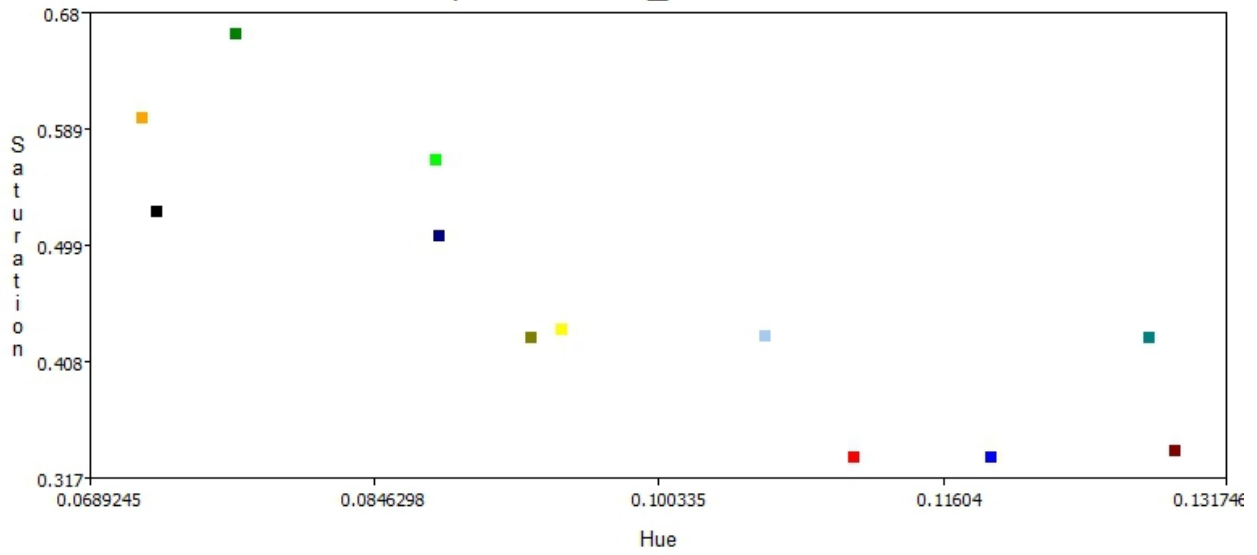
R Anti-Clique Plot Mi47_uv 1-1059 Cutoff 0.9200



KS Anti-Clique Plot Mi47_uv 1-1059 Cutoff 0.8600



KS Anti-Clique Plot Mi47_uv 1-1059 Cutoff 0.8700



We show now the uv images of the stamps in each of the anti-cliques.

R Anti-Clique, Cutoff 0.91:

Stamps: 1(1889), 4(1889), 10(1890), 36(1890), 81(1891), 222(1892), 465(1894), 584(1895), 587(1895), 909(1898)



R Anti-Clique, Cutoff 0.92:

Stamps: 1(1889), 10(1890), 17(1890), 36(1890), 81(1891), 227(1892), 467(1894), 470(1894), 583(1895), 663(1895), 784(1896), 827(1896), 1052(MINT)



KS Anti-Clique, Cutoff 0.86:

Stamps: 1(1889), 7(1889), 10(1890), 79(1891), 139(1891), 467(1894), 550(1894), 571(1894), 593(1895), 785(1896), 863(1897)



KS Anti-Clique, Cutoff 0.87:

Stamps: 1(1889), 7(1889), 10(1890), 77(1891), 139(1891), 441(1894), 571(1894), 585(1895), 588(1895), 782(1896), 979(1899), 993(1899)



The presence of stamp 1 in the Anti-Clique seemed to me to be troublesome; I suspected that it was the cause of there appearing in the anti-clique 3 stamps from 1889-90 which were all of bright red-orange. I decided that the stamps of 1889-1890 required some closer examination. I first restricted myself to the stamps of 1889 and began by including stamp 7. I decided to use the two similarities

for the R and KS measures that had produced 13 colors for the R Similarity and 11 for the KS Similarity. That is, 0.92 for R and 0.86 for KS.

R Anti-Clique for 1889, Cutoff 0.92: Stamps: 2, 6, 7:



If we were to try to associate these stamps with the published varieties, it would be reasonable to interpret them to be of types aa, aa and a respectively.

KS Anti-Clique for 1889, Cutoff 0.87: Stamps: 1, 6, 7:



It is just as reasonable to interpret these as of types a, aa and a.

Since I do not have a signed copy of type aa, I am not sure what a color variety expertiser would say.

For further consideration, I decided to consider the stamps of 1889-1890 together. Again, we start with stamp 7. We would expect to see 4 color varieties: a, aa, b and ba. I will group the remaining years according to the permissible color varieties for those years as indicated by the Michel catalog. I will use the same cutoffs that we used above. We will continue to use these cutoffs until we specifically mention otherwise.

R Anti-Clique for 1889-90, Cutoff 0.92:

Stamps: 1(1889), 7(1889), 17(1890), 26(1890), 29(1890), 32(1890), 60(1890):





KS Anti-Clique for 1889-90, Cutoff 0.87:

Stamps: 1(1889), 7(1889), 10(1890):, 14(1890), 22(1890),
46(1890):, 54(1890), 57(1890):



R Anti-Clique for 1891-92, Cutoff 0.92:

Stamps: 62(1891), 139(1891), 147(1892), 166(1892), 226(1892)



KS Anti-Clique for 1891-92, Cutoff 0.87:

Stamps: 62(1891), 139(1891), 176(1892), 137(1891), 151(1892)



R Anti-Clique for 1893-94, Cutoff 0.92:

Stamps: 271(1893), 296(1893), 471(1894),
518(1894), 571(1894)



KS Anti-Clique for 1893-94, Cutoff 0.87:

Stamps: 271(1893), 307(1893), 430(1894), 465(1894), 467(1894),
571(1894)



R Anti-Clique for 1895-98, Cutoff 0.92:

Stamps: 576(1895), 591(1895), 827(1896), 857(1896), 917(1898),
927(1898), 928(1898)



KS Anti-Clique for 1895-98, Cutoff 0.87:

Stamps: 576(1895), 583(1895), 591(1895), 609(1895), 784(1896),
915(1898), 928(1898)



Note: the stamp 928 may really be of 1890 rather than 1898. We will compare it with the stamps of 1890 later.

R Anti-Clique for 1899-1900, Cutoff 0.92:

Stamps: 963(1899), 984((1899), 993(1899), 996(1899), 1001(1899), 1015(1899)



KS Anti-Clique for 1899-1900, Cutoff 0.87:

Stamps: 963(1899), 973(1899), 976(1899), 993(1899), 1018(1899), 1044(1900)



Now let's look into the similarities of stamp 928 with the stamps of 1889.

Stamp of 1889	R Similarity to stamp 928	KS Similarity to stamp 928
1	0.9246	0.8149
2	0.9383	0.9534
3	0.9951	0.9792
4	0.9864	0.9434
5	0.9219	0.7909
6	0.8623	0.7144
7	0.9355	0.8914
8	0.9262	0.7898

Visually compare stamp 928 with the closest stamp from 1889 - stamp 3.

Stamp 928



Stamp 3



On the basis of these similarities I think we can conclude that stamp 928 is either a late usage of a stamp from 1889 or that the cancel really reads the year 1890. My supposition would be that it actually reads the year 1890.

We will now compare it to the likely stamps cancelled 1890. There are 6 stamps with high similarities.

Stamp of 1889	R Similarity to stamp 928	KS Similarity to stamp 928
11	0.9920	0.9357
12	0.9914	0.9630
14	0.9817	0.9422
15	0.9949	0.9828
17	0.9977	0.9871
59	0.9919	0.9443

Visually compare stamp 928 with the closest stamp from 1890 - stamp 17.

Stamp 928



Stamp 17



So, we should temporarily remove stamp 928 from the calculation of the anti-cliques from the years 1895-1898 and re-compute them. However, I have decided that this would take too much of my time right now and I encourage the reader to take on this task.

We now look at the R Anti-Cliques which we computed above, and for each of the time periods we extract the stamps of that period which are closest (highest similarity) to the anti-clique stamp. We shall display up to the first 3 of the stamps other than the color-defining stamp in the order of decreasing similarity. As before, we use the cutoff of 0.9200 for the R Anti-Cliques.

1889:

R Anti-Clique for 1889, Cutoff 0.92: Stamps(3 colors): 2, 6, 7:

Stamp 2 (3 matches): 2, 4, 3



Stamp 6 (4 matches): 6, 8, 5, 1



Stamp 7 (1 match): 7



1889-1890:

R Anti-Clique for 1889-90, Cutoff 0.92: Stamps(7 colors): 1, 7, 17, 26, 29, 32, 60:

Stamp 1 (5 matches): 1, 13, 5, 8



Stamp 7 (5 matches): 7, 50, 51, 9



Stamp 17 (12 matches): 17, 3, 11, 15



Stamp 26 (8 matches): 26, 19, 16, 21



Stamp 29 (17 matches): 29, 56, 40, 43



Stamp 32 (11 matches): 32, 30, 35, 36



Stamp 60 (3 matches): 60, 24, 44



1891-1892:

R Anti-Clique for 1891-92, Cutoff 0.92: Stamps(5 colors): 62, 139, 147, 166, 226

Stamp 62 (91 matches): 62, 76,, 220, 173



Stamp 139 (3 matches): 139, 81, 267



Stamp 147 (22 matches): 147, 199, 138, 80



Stamp 166 (51 matches): 166, 163, 247, 167



Stamp 226 (42 matches): 226, 253, 213, 169



1893-1894:

R Anti-Clique for 1893-94, Cutoff 0.92: Stamps (5 colors): 271, 296, 471, 518, 571

Stamp 271 (24 matches): 271, 416, 422, 417



Stamp 296 (80 matches): 296, 481, 457, 478



Stamp 471 (86 matches): 471, 463, 289, 348



Stamp 518 (98 matches): 518, 378, 519, 318



Stamp 571 (17 matches): 571, 411, 340, 342



1895-1898:

R Anti-Clique for 1895-98, Cutoff 0.92: Stamps (7 colors): 576, 591, 827, 857, 917, 927, 928

Stamp 576 (9 matches): 576, 578, 582, 580



Stamp 591 (61 matches): 591, 595, 750, 700



Stamp 827 (86 matches): 827, 757, 860, 828



Stamp 857 (97 matches): 857, 795, 608, 782



Stamp 917 (111 matches): 917, 873, 734, 858



Stamp 927 (1 match): 927



Stamp 928 (22 matches): 928, 618, 602, 605 (Recall that 928 is misplaced.)



1899-1900:

R Anti-Clique for 1899-1900, Cutoff 0.92: Stamps (6 colors): 963, 984, 993, 996, 1001, 1015

Stamp 963 (19 matches): 963, 964, 1042, 982



Stamp 984 (32 matches): 984, 978, 1033, 991



Stamp 993 (5 matches): 993, 969, 985, 965



Stamp 996 (10 matches): 996, 988, 1029, 992



Stamp 1001 (7 matches): 1001, 1026, 966, 1035



Stamp 1015 (10 matches): 1015, 1016, 980, 1020



Finally, we shall look at the R Anti-Clique determined by the entire collection of stamps and a sample of the matched stamps (i.e., stamps of the same "color").

R Anti-Clique, All Stamps, Cutoff 0.92: (13 colors): 1, 10, 17, 36, 81, 227, 467, 470, 583, 663, 784, 827, 1052

Stamp 1 (5 matches): 1, 13, 5, 8



Stamp 10 (3 matches): 10, 9, 7



Stamp 17 (38 matches): 17, 928, 3, 11 (Recall 928 is mislabelled.)



Stamp 36 (155 matches): 36, 30, 186, 245



Stamp 81 (4 matches): 81, 267, 139, 1047



Stamp 227 (64 matches): 227, 198, 53, 222



Stamp 467 (173 matches): 467, 491, 471, 144



Stamp 470 (103 matches): 470, 457, 475, 490



Stamp 583 (34 matches): 583, 161, 75, 79



Stamp 663 (198 matches): 663, 423, 643, 599



Stamp 784 (173 matches): 784, 621, 972, 884



Stamp 827 (58 matches): 827, 757, 860, 828



Stamp 1052 (51 matches): 1052, 951, 956, 888

