PERMUTATIONS

From Line Drawings to Three-Dimensional Forms: An Explanation
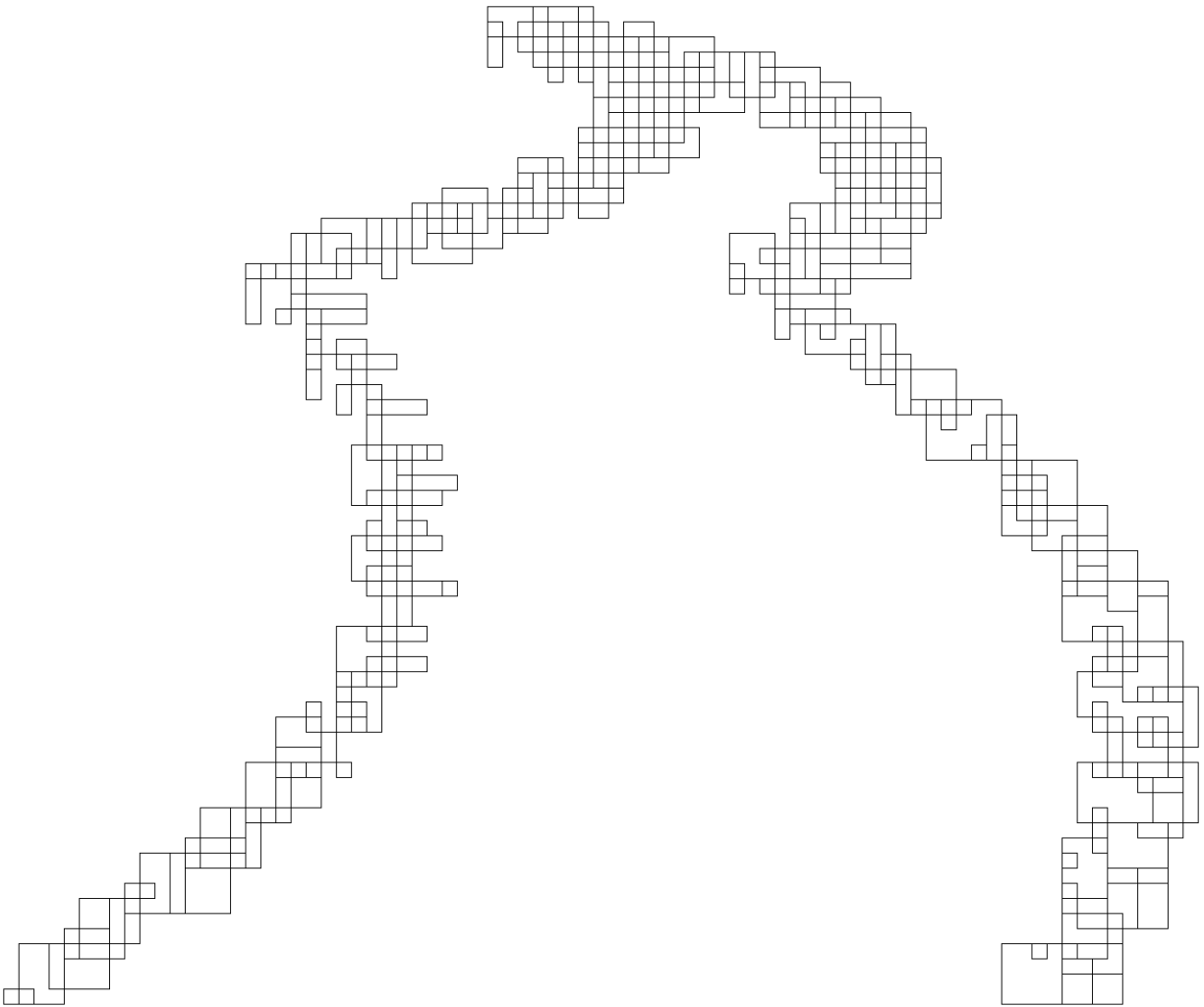
From Line Drawings to Three-Dimensional Forms: An Explanation

A simple system acts periodically and returns to the same point over and over again. For example, a pendulum moves from side to side, always returning to its starting point and then repeating. If we introduce change to the system, tiny differences generate what appears to be chaos. However, repetitive small changes within a system usually create a subtle form of order. Multiple iterations result in so many minor and nearly imperceptible changes over time that this order is often difficult to see.

I was curious to see these patterns develop so I created a simple system in my mind that was composed of four points (1,1,1,1). I then considered a system of number sets that would include all of the possible whole number combinations of four numbers (1,2,3,4). From a starting point, each number represents a movement, first up, then to the right, then down, and finally to the left. For the number set 1,1,1,1, the point would move up one unit, to the right one unit, down one unit, and to the left one unit, eventually making its way back to its starting position:
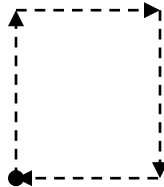
If I made a slight change to the set of numbers, then the point would end in a different location. For example, the end point of number set 1,1,1,2 would be one unit over from the original number set:
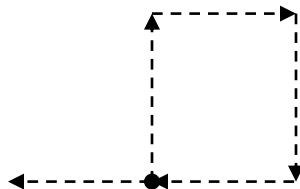
As I continued to consider my number system, I realized that some sets of numbers, such as 4,4,4,4 or 2,3,2,3, would not change the end point because their ratios are proportionally equal. Ultimately, I created the following defined number set system:

1111	1311	2111	2311	3111	3311	4111	4311
1112	1312	2112	2312	3112	3312	4112	4312
1113	1313	2113	2313	3113	3313	4113	4313
1114	1314	2114	2314	3114	3314	4114	4314
1121	1321	2121	2321	3121	3321	4121	4321
1122	1322	2122	2322	3122	3322	4122	4322
1123	1323	2123	2323	3123	3323	4123	4323
1124	1324	2124	2324	3124	3324	4124	4324
1131	1331	2131	2331	3131	3331	4131	4331
1132	1332	2132	2332	3132	3332	4132	4332
1133	1333	2133	2333	3133	3333	4133	4333
1134	1334	2134	2334	3134	3334	4134	4334
1141	1341	2141	2341	3141	3341	4141	4341
1142	1342	2142	2342	3142	3342	4142	4342
1143	1343	2143	2343	3143	3343	4143	4343
1144	1344	2144	2344	3144	3344	4144	4344
1211	1411	2211	2411	3211	3411	4211	4411
1212	1412	2212	2412	3212	3412	4212	4412
1213	1413	2213	2413	3213	3413	4213	4413
1214	1414	2214	2414	3214	3414	4214	4414
1221	1421	2221	2421	3221	3421	4221	4421
1222	1422	2222	2422	3222	3422	4222	4422
1223	1423	2223	2423	3223	3423	4223	4423
1224	1424	2224	2424	3224	3424	4224	4424
1231	1431	2231	2431	3231	3431	4231	4431
1232	1432	2232	2432	3232	3432	4232	4432
1233	1433	2233	2433	3233	3433	4233	4433
1234	1434	2234	2434	3234	3434	4234	4434
1241	1441	2241	2441	3241	3441	4241	4441
1242	1442	2242	2442	3242	3442	4242	4442
1243	1443	2243	2443	3243	3443	4243	4443
1244	1444	2244	2444	3244	3444	4244	4444

For my first number drawing, I began with the set 1,1,1,1 and moved the end point according to those numbers. Then I moved down the column to the next number set and, using the end point of the previous number set as my new starting point, I moved the point through the second number set. I continued to move the point through every set of numbers in the system. Using this system, I created my first complete number drawing. I was amazed to discover that when I got to the end of the drawing, I found myself back at my original starting point. It was then I realized that within this odd and rather chaotic looking image there was an underlying order. This discovery was both exciting and intriguing.

Next, I wondered what would happen if I changed the order of the number sets slightly. For my second number drawing, I moved through the numbers horizontally rather than vertically. This produced a different although not completely unfamiliar drawing. I concluded that by making changes in the order of the number sets and moving the point around, I could create numerous images. Even slight changes in the order of the number sets made completely new, but sometimes similar, images.

As I continued to vary the order of number sets within the system, I decided to set rules making changes to the number sets themselves, rather than just the order. For example, I could create a drawing with a rule that replaced each "1" with a "2." Thus, 1,3,1,3 would become 2,3,2,3, even though it did not replace the already existing 2,3,2,3. As I continued creating new rules, it seemed that the number of images I could create might be infinite.

Throughout my drawings, even slight changes in the order or rules made unique images. No one image was exactly the same as any other image, even though many images contained parts of or similarities to other images. In fact, the pattern I created in my first drawing is reflected repeatedly, but somewhat

differently, in many other drawings. In many cases, this pattern is only an echo of the first number drawing, but it is still apparent. As with my first number drawing, I often finished a new drawing at its starting point. Within each drawing, I discovered patterns underneath the image's apparent random outcome. This was when I knew that chaos and order are not only universally balanced, but are inseparable. You cannot have one without the other.

After creating the number drawings, I wondered if the power of the drawings could be translated to three-dimensional images. Could I create a deeper representation of the qualities of change? If so, how could I express what was important to me? I decided to use varying materials and techniques in order to bring life to these forms. The process I have used to create these objects is as important to me as the drawings themselves. First I had to decide if a drawing would translate well to another form. Many images that did not interest me in two dimensions were fascinating, and far more powerful, in three dimensions. As drawings, most of these images curl back on themselves, sometimes repeatedly. In two dimensions, these overlapping layers are not apparent. However, in a three-dimensional form, their patterns and structure become fully developed. Conversely, many drawing do not work well as three-dimensional forms because they are so spread out that they are uninteresting.

Once I determined which drawings would translate well to three dimensions, I had to decide how to express each image. Often I relied on nature's own order to help me create new representations of the original drawing. In the end, I went from a structured and ordered number system to the apparent disorder in my original number drawings and finally back to the universal chaos anchored by underlying order in my final forms and completed drawings.

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Kitty Gordon
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