Salmon penne and the Salmon of Doubt

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1 Dedication

This is dedicated to the late and truly great Douglas Adams whose writing has given so much pleasure to so many.

2 Exposition

It starts quite innocently with a bottle of wine, a plate of salmon penne in a Stockholm restaurant and a copy of "The Salmon of Doubt" by Douglas Adams. Whilst eating the meal with my nose buried in the book and drinking wine, I eventually noticed that each forkful was mostly salmon and hardly any penne, (this is the pasta which comes as big tubes, obliquely cut at each end and approximately 2-3 cm. long). In the true spirit of entirely pointless analysis, this is why ...

Assume without loss of generality that food comes in uniform pieces of radius R and is uniformly tasty. Assume also that you are eating this food with a fork of length L and width W and in spite of the quantity of wine you have drunk, you are able to keep this fork perfectly horizontal at all times until the food is inside the mouth and safe from gravity. Any food picked up by the fork will fall off unless its centre of gravity lies within the rectangle of area LW bounded by the fork. Assume further that food is not dragged off the fork by other food anxious to be eaten first. This is particularly pertinent to Japan where food tends to be a little more lively.

If we define the total swept area as being the area swept out by placing a circle of radius R anywhere with its centre on the fork, then the probability P that the food will fall off the fork is given by dividing the total swept area minus the area of the fork, all divided by the total swept area, giving

$$P = \frac{\pi R^2 + 2LR + (L + 2R)W - LW}{\pi R^2 + 2LR + (L + 2R)W} \tag{1}$$

Simplifying, we get

$$P = \frac{\pi R^2 + 2LR + 2RW}{\pi R^2 + 2LR + (L + 2R)W} \tag{2}$$

For simplicity, we will further assume a thin fork so that W $\ll$ L. We then get

$$P \simeq \frac{\pi R^2 + 2LR}{\pi R^2 + 2LR + LW} \tag{3}$$

Note that this has the right behaviour. When R is very large, the probability of falling off is nearly 1 and when R is very small, the probability is nearly 0.

We can now make some important inferences. Let us consider the case for small pieces of salmon typically of the size R = L/10 eaten with a fork where W = L/5. Then

$$P_{salmon} \simeq \frac{\pi \frac{L^2}{100} + \frac{L^2}{5}}{\pi \frac{L^2}{100} + \frac{L^2}{5} + \frac{L^2}{5}} \tag{4}$$

This gives approximately 0.5 independently of the value of L. However, for penne pasta assuming the orientation is random, R is about 10 times bigger, giving

$$P_{penne} \simeq \frac{\pi L^2 + \frac{L^2}{5}}{\pi L^2 + \frac{L^2}{5} + \frac{L^2}{5}} \tag{5}$$

which is around 0.94 independently on the value of L.

3 Conclusions

- There is about twice the chance of shovelling salmon into your mouth than penne pasta.
- If you wish to pursue a diet, just eat penne pasta and set yourself a time limit. The chance of shovelling enough to hit the hips is fairly small. If you drink wine at the same time, you may also have difficulty hitting the pasta which may help.
- If you make the salmon pieces very small, you can afford to serve very small amounts of pasta as the salmon will be long gone before the pasta is finished. If you make the forks small enough, you could serve effectively nothing and there would still be food on the plate at the end of the meal. This is called *nouvelle cuisine*.

The importance of mathematics in pursuing important phenomena such as this should not be underestimated.

Oh hello nurse, is it time for my medicine again ? So soon ...