Issac Asimov

A Problem of Numbers

This is the first mystery story I ever sold to EQMM. *I had received one or two rejections from the magazine, but I had shrugged them off. After all, I was a science fiction writer, not a mystery writer. However, by 1969, I had written enough mysteries of one sort or another to feel like a mystery writer, too.*

In November of that year, I was going through the magazine and read one of their "First Stories." EQMM *routinely had one or two stories representing the first sale of a particular author and they were usually pretty good, too.*

And I said in exasperation, "Well, if they can *sell a story to* EQMM, *then I can, too, or what's the use of being Asimov?" So I sat down without delay and wrote a story and had it in the mail within an hour of having walked to the typewriter.*

The story was accepted and a year after it appeared the magazine asked me for another one and I wrote my first Black Widower and was off and running.

Professor Neddring looked mildly at his graduate student. The young man sat there at ease; his hair was a little on the reddish side, his eyes were keen but calm, and his hands rested in the pockets of his lab coat. Altogether a promising specimen, the professor thought.

He had known for some time that the boy was interested in his daughter. What was more to the point, he had known for some time his daughter was interested in the boy.

The professor said, "Let's get this straight, Hal. You've come to me for my approval before you propose to my daughter?"

Hal Kemp said, "That's right, sir."

"Granted that I'm not up on the latest fads of youth—but surely this can't be the new 'in' thing." The professor thrust his hands into his lab coat pockets and leaned back in his chair. "Surely, young people aren't taking to asking permission these days? Don't tell me you'll give up my daughter if I turn you down?"

"No, not if she'll still have me, and I think she will. But it would be pleasant—"

"—if you had my approval. Why?"

Hal said, "For very practical reasons. I don't have my doctor's degree yet and I don't want it said that I'm dating your daughter to help me get it. If you think I am, say so, and maybe I'll wait till after I get my degree. Or maybe I won't and take my chances that your disapproval will make it that much harder for me to get my degree."

"So, for the sake of your doctorate, you think it would be nice if we were friends about your marriage to Janice."

"To be honest, yes, Professor."

There was silence between them. Professor Neddring thought about the matter

with a certain creakiness. His research work for some years now had dealt with the coordination complexes of chromium and there was a definite difficulty in thinking with some precision about anything as imprecise as affection and marriage.

He rubbed his smooth cheek—at the age of fifty he was too old for the various beard styles affected by the younger members of the department—and said, "Well, Hal, if you want a decision from me I'll have to base it on something, and the only way I know how to judge people is by their reasoning powers. My daughter judges you in her way, but I'll have to judge you in mine."

"Certainly," said Hal.

"Then let me put it this way." The professor leaned forward, scribbled something on a piece of paper, and said, "Tell me what this says, and you will have my blessing."

Hal picked up the paper. What was written on it was a series of numbers:

$$69663717263376833047$$

He said, "A cryptogram?"

"You can call it that."

Hal frowned slightly. "You mean you want me to solve a cryptogram and if I do, then you'll approve the marriage?"

"Yes."

"And if I don't, then you won't approve the marriage?"

"It may sound trivial, I admit, but this is my criterion. You can always marry without my approval. Janice is of age."

Hal shook his head. "I'd still rather have your approval. How much time do I have?"

"None. Tell me what it says now. Reason it out."

"*Now?*"

The professor nodded.

Hal Kemp shifted in his chair and stared at the row of numbers in his hand. "Do I figure it out in my head? Or can I use pencil and paper?"

"Just do it. Talk. Let me hear how you think. Who knows? If I like the way you think, I may give my approval even if you don't solve it."

Hal said, "Well, all right. It's a challenge. In the first place, I'll make an assumption. I'll assume you're an honorable man and would not set me a problem that you knew in advance I couldn't solve. Therefore this is a cryptogram which, to the best of your judgment, is one I can solve sitting in this chair and almost on the spur of the moment. Which in turn means that it involves something I know well."

"That sounds reasonable," agreed the professor.

But Hal wasn't listening. He continued, deliberately, "I know the alphabet well, of course, so this could be an ordinary substitution cipher—numbers for letters. Presumably, it would have to have some subtlety if it were, or it would be too easy. But I'm an amateur at that sort of thing and unless I can see at once some peculiar pattern in the numbers that gives the whole thing meaning, I'd be lost. I notice there are five 6's and five 3's and not a single 5—but that means nothing to me. So I'll abandon the possibility of a generalized cipher and move on to our own specialized field."

He thought again and went on, "Your specialized field, Professor, is inorganic

chemistry and that, certainly, is what mine is going to be. And to any chemist, numbers immediately suggest atomic numbers. Every chemical element has its own number and there are one hundred and four elements known today; so the numbers involved would be 1 to 104.

"You haven't indicated how the numbers are divided up. There are the one-digit atomic numbers from 1 to 9; the two-digit ones from 10 to 99; and the three-digit ones from 100 to 104. This is all obvious, Professor, but you wanted to hear my reasoning, so I'm giving it to you in full.

"We can forget the three-digit atomic numbers, since in them a 1 is always followed by a 0 and the single 1 in your cryptogram is followed by a 7. Since you've given me twenty digits altogether, it is at least possible that only two-digit atomic numbers are involved—ten of them. There might be nine two-digit ones and two one-digit ones, but I doubt it. Even the presence of two one-digit atomic numbers could result in hundreds of different combinations of places in this list and that would surely make things too difficult for an instant or even a quick solution. It seems certain to me, then, that I am dealing with ten two-digit numbers, and we can therefore turn the message into: 69, 66, 37, 17, 26, 33, 76, 83, 30, 47.

"These numbers seem to mean nothing in themselves, but if they are atomic numbers then why not convert all of them into the names of the elements they represent? The names might be meaningful. That's not so easy offhand because I haven't memorized the list of elements in order of their atomic numbers. May I look them up in a table?"

The professor was listening with interest. "I didn't look up anything when I prepared the cryptogram."

"All right, then. Let's see," said Hal slowly. "Some are obvious. I know that 17 is chlorine, 26 is iron, 83 is bismuth, 30 is zinc. As for 76, that's somewhere near gold, which is 79; that would mean platinum, osmium, iridium. I'd say it means osmium. The other two are rare earth elements and I can never get those straight. Let's see—let's see—All right. I think I have them."

He wrote rapidly and said, "The list of the ten elements in your list is thulium, dysprosium, rubidium, chlorine, iron, arsenic, osmium, bismuth, zinc, and silver. Is that right?—No, don't answer."

He studied the list intently. "I see no connections among those elements, nothing that seems to give me any hint. Let's pass on then and ask if there is anything besides the atomic number that is so characteristic of elements that it would spring to any chemist's mind at once. Obviously, it would be the chemical symbol—the one-letter or two-letter abbreviation for each element that becomes second nature to any chemist. In this case the list of chemical symbols is"—he wrote again—"Tm, Dy, Rb, CI, Fe, As, Os, Bi, Zn, Ag.

"These might form a word or sentence, but they don't, do they? So it would have to be a little more subtle than that. If you make an acrostic out of it and read just the first letters, that doesn't help, either. So if we try the next most obvious step and read the second letters of each symbol in order, we come out with 'my blessing.' I presume that's the solution, Professor."

"It is," said Professor Neddring gravely. "You reasoned it out with precision and you have my permission, for what that's worth, to propose to my daughter."

Hal rose, turned to leave, hesitated, then turned back. He said, "On the other hand, I don't like to take credit that's not mine. The reasoning I used may have been

precise, but I offered it to you only because I wanted you to hear me reason logically. Actually, I knew the answer before I began, so in a way I cheated and I've got to admit that."

"Oh? How so?"

"Well, I know you think well of me and I guessed you would want me to come up with a solution and that you wouldn't be above giving me a hint. When you handed the cryptogram to me, you said, Tell me what this says, and you will have my blessing.' I guessed that you might mean that literally. 'My blessing' has ten letters and you handed me twenty digits. So I broke it down into ten pairs at once.

"Then, too, I told you I hadn't memorized the list of elements. The few elements I did remember were enough to show me that the second letters of the symbols were spelling out 'my blessing,' so I worked out the others from among those few that had the proper second letters in their symbols. Do I still make it?"

Professor Neddring finally smiled. He said, "Now, my boy, you really make it. Any competent scientist can think logically. The great ones use intuition."