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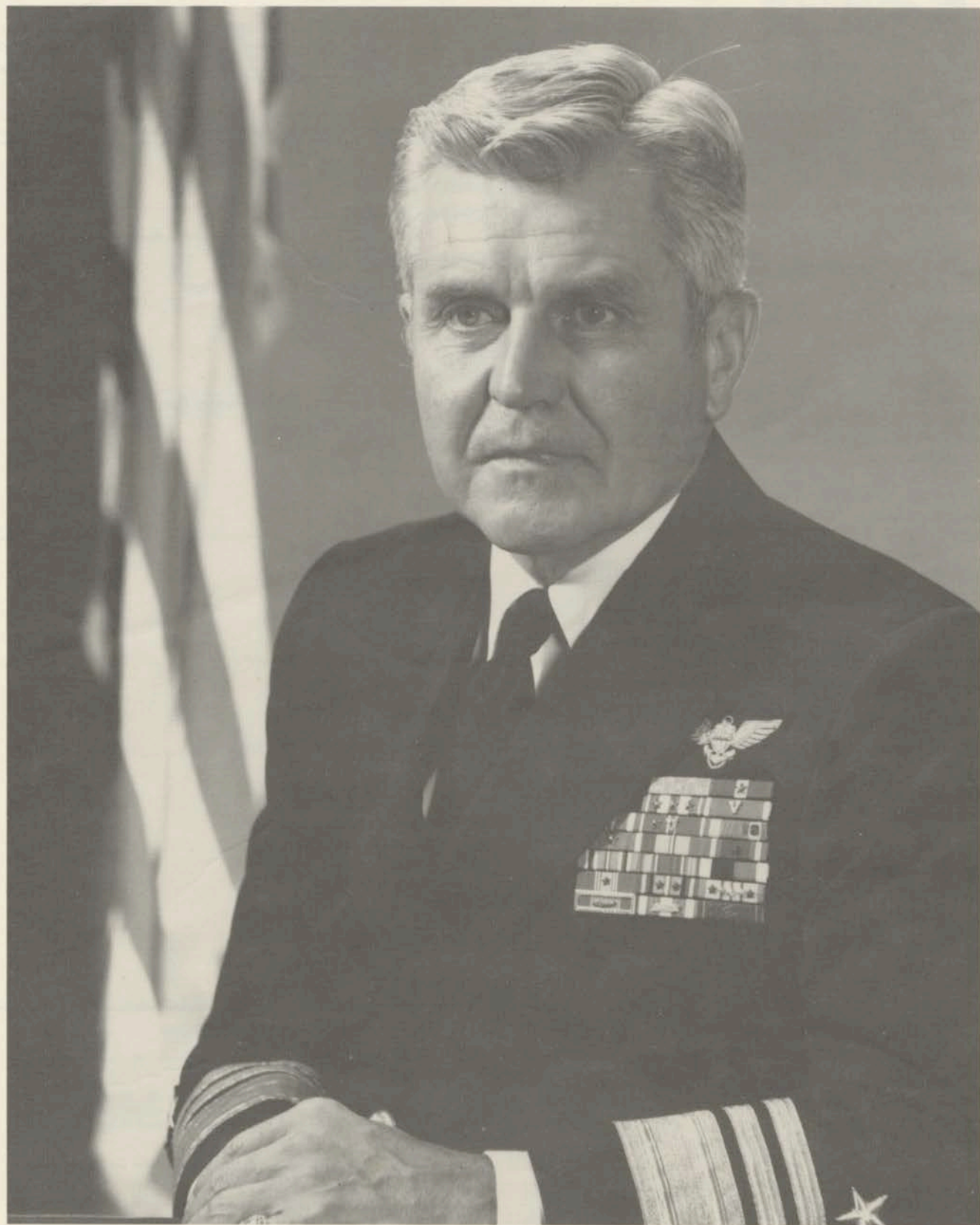
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Vice Admiral James B. Stockdale, USN (Ret)

from MILITARY COLLECTOR
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THE TAP CODE

by
James B. Stockdale

I'm going to write about communications theory in the context of a prison camp in which everybody lives in solitary confinement, a solitary confinement in silence, a solitary confinement in which the use of torture is considered just punishment for those who break that silence to communicate with their fellows. Our Vietnam enemies gave us two ways to go on this. We could lie low and not communicate and go to seed over the years of silence and solitude. Or we could communicate as a matter of military duty and take our lumps. Those near me and I were clearly in the second camp. The problem became how to communicate stealthily.

As a start, of course, you tap on walls, stealthily. The Morse code is no good; it soon becomes obvious that you cannot cope with the limitations of a bitonal system. It's just not practical; you've got to have a reliable, repetitive beat. How do you build a monotonal system? There are many ways, but I believe the most efficient is a method devised back in the day of the American Civil War: drop the letter "K" out of the alphabet (you can always use a "C" where you would use a "K"), and with the resultant 25 letter alphabet, set up a five by five matrix, a line across the top "A", "B", "C", "D", "E", and assign beats such as 1-1 for an "A", 1-2 for a "B", 1-3 for a "C", 1-4 for a "D", 1-5 for an "E". On the second line, using the same convention, put five more letters down: 2-1 for "F", 2-2 for "G", and so forth. It follows that the most inefficient letter to transmit is "Z", 5-5. That is about as efficient as you're going to get with one tone and 25 letters.

So far, and throughout, it's all common sense, all human mind. So also for operating signals. You don't need many. I'm sure if I put any number of communications engineers in a cubicle and gave them a contract to devise a system of operating signals they would produce a complicated and cumbersome cross-indexed monstrosity. We devised operating signals under pressure, under threat of pain, with a real appreciation for safety and efficiency. We found that the only OP signals you need are four: The first is one that says "no", "danger", "stop", or any connotation of the

negative. For this you should use any "one" signal — a single thump, the single noise, the single flash, a single wave. The second necessary operational signal should say "yes", "go", "concur", "executive", "good". For this we used two of anything — the next most efficient signal. The third necessary signal is "repeat" and that was three for us. Fourth is "wait" — four beats or four what-have-you, in our method. In seven and a half years of communicating almost solely by some application of the 5x5 matrix, I never experienced, nor did anyone of the 400 that I know, experience a need for another operating signal.

One quickly realizes that the need to protect the channel is paramount. If you had been in isolation for a period of months, maybe years, as I had been, and get back and suddenly establish contact, you learn to be cautious about rushing into conversation. You learn to slow down and first, agree with your partner about danger signals, second, agree on a cover story if you're caught, and third, you need to decide on a backup comm system. Taking the trouble in that first few minutes of contact to say what happens "when we lose this net" has saved me more than once. You might simply specify a bent wire that indicates a hiding place for a note or an alternate callup procedure; simplicity will get you by, but to ignore the need to establish fallback procedures first can mean months of comm interruption.

You're probably wondering: "How do you learn this monotonal code with its matrix alphabet without prior knowledge?" That's a good question. It turns out to be more of a theoretical than a practical problem. Sometimes you can stick notes in bowls of rice scheduled to be served, sometimes you can whisper under doors. One of my friends knew the matrix format when he came into the cell block for the first time. He explained that he saw it while forced to lie on the floor in the torture room. The matrix was diagramed on the bottom of a table with the admonition, "All prisoners learn this code."

In the more common case, the "teacher" must wait until the new prisoner has overcome his initial fear of working the wall by brushing it or thumping it. (He will have been threatened with going through the torture cycle again if he breaks silence.) He must decide to take a chance and hope that it's not a guard trying to trick him into violating the camp "rules" of absolute silence. For some to overcome such apprehension takes months, for some, days, and for a very few, hours. Experienced men found that for the most sluggish "student", it's best to commence by tapping 26 times on the wall. In a matter of hours or minutes or days or maybe longer, depending upon who it is, the guy on the other side realizes that you're talking about an alphabet. He eventually makes some kind of recognition signal of his own design. He lets you know he understands that another human is using an alphabet. That's the start. Communication is fundamentally the connection of one brain to another and they are sensitive instruments. I stress throughout: Don't sell your brain short. It can do better than the artificial intelligence designers think it can. Once the novice knows that you're talking about an alphabet, it's a good assumption that "A" is probably 1 and 26 is probably "Z". If this understanding is slow to develop, one way that's been used is to send your partner an 8 and then pause and then a 9. Eventually his mind lights up — 8, 9; "H", "I" — "Hi!" Now you're in business — an inefficient business, but a corner has been turned in this brain to brain relationship. Now you can start the laborious days and hours of trying to describe the regular communications system by this very primitive code.

How do you call them up? How do you roger? What's the procedure? We borrowed from a very American rhythm pattern for a callup signal: the "shave and a haircut". When an American hears "shave and a haircut", even if he's never thought of a code, he almost automatically lunges to the wall and supplies his "two bits". We rogered with a 2, a "yes" as an affirmative signal after each word was copied or understood. (Of course some of the words are long and you can tap them off early once you're ready to "buy" on the basis of what you've heard.) A very primitive form of encryption thus develops from the "early tap off". The interloper who does not know your language and doesn't know what has occurred between your two minds and how well you understand one another can't intercept. Abbreviations foul him up even

more, and abbreviation patterns can change over time with any two partners. A man who is granted a contract to come up with an abbreviation table would probably give you something that would have to be changed almost entirely after the first month of use. But abbreviations hammered out in the field are solid. For example, frequently you had to use the word "think" (TK); I could go on and give you hundreds more. They grew up in different camps with substantial variations. As people were mixed and new tappers came on the other wall, it amounted to a system of dialects. Yet we became accustomed to one another's dialects easily. If we didn't understand their abbreviation, we wouldn't give them the "2" until they'd spelled it out.

What I have described here is a jam free system that can't be countered. First of all, you've got the discrete signature of your partner, you've got his style. (For instance no two people give the old Steve Canyon flamboyant "Roger, Roger" exactly the same way. The personality comes out. You recognize your friend by the way he expresses the "Roger, Roger" — by the speed, the touch, whether he means "yes", "OK", "concur", or "good", or "WILCO", or "Oh yeah?" or "yes sir" or whatever.) I understand that the Soviets back up all of their telemetry nets with a key. I certainly understand why.

This matrix system lent itself to other applications, like a visual flash system. Also, every time a detailed man would sweep the courtyard he would be sending out a regular newspaper. Snickers would be heard in the cell block and the guard would become rattled. Every time we swept our toilet buckets out we were acting as town criers. We even developed a vocal tap code. I give credit to my classmate Jerry Denton for that. Ones or twos were made with coughs or sniffs. The number three was a throat clear, the number four was a hawk and number five was either an exaggerated sneeze or a spit, depending on the conditions.

For official traffic, the senior ranking officer insisted that all members memorize the message. That was our law. (Nothing was written down, of course.)

We thus became acquainted with the storage capacity of our minds — how many words we could memorize, etc. Of course it laid a big weight on the message composer because he had to put things out in a logical pattern so that a reasonable man could memorize them handily.

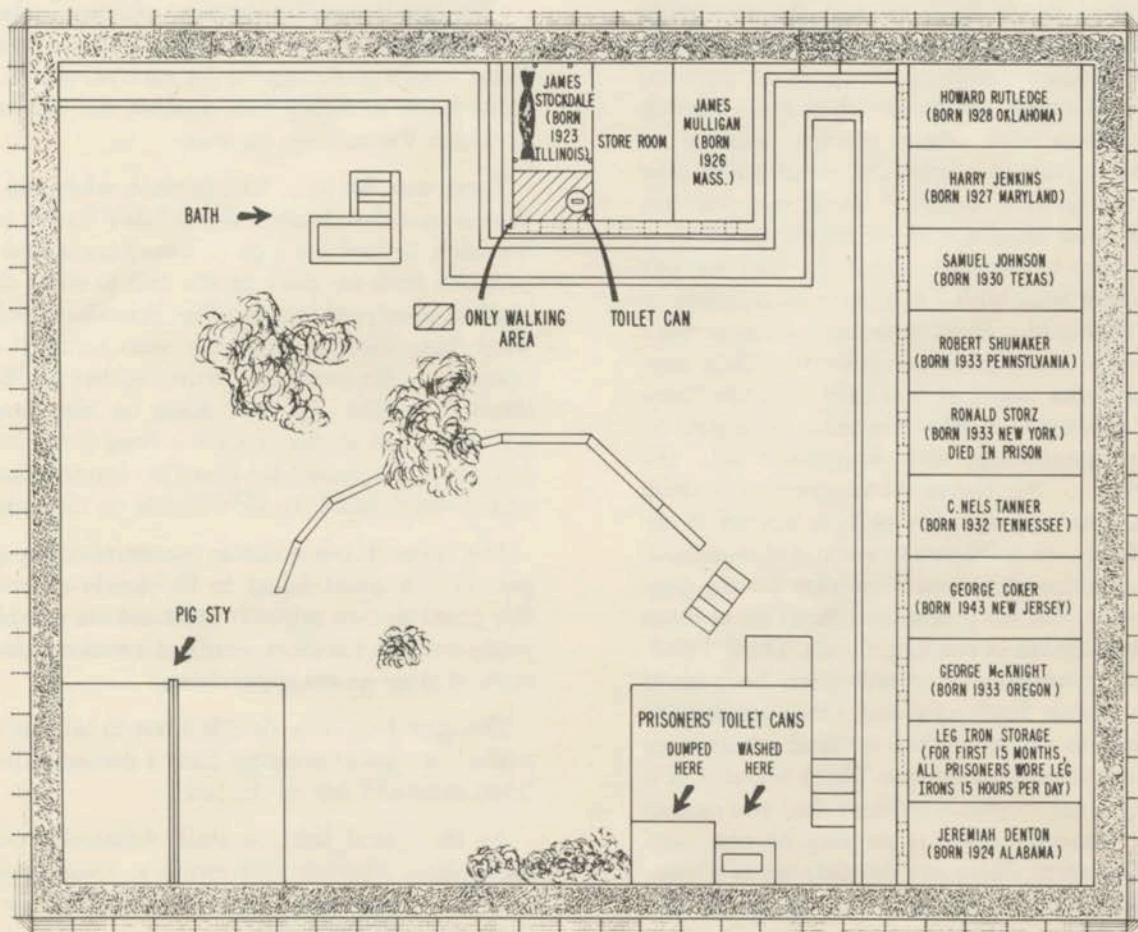
I can remember one afternoon in the little prison called Alcatraz where several of us spent a couple of years, where I as the senior officer had been sending out a long series of messages concerning how we were going to combat what we called the "Fink Release Program". (This was one you people at home were supposed to think was a benevolent early release program, whereas it actually amounted to buying your way out by becoming a propaganda tool.) It was a complicated subject. I sent out six 50 word groups, flashing them on call across to Nels Tanner. (I had to flash them because my cell was across the courtyard.) After receiving each group, Nels would have to leave his place under the door where he had seen my finger, go to the wall and tap it out in both directions and come back under the door. It would take a couple of hours or more to get a 300 word message (com-

posed well enough that they would all memorize it) out to everybody. I remember just before being put in irons for the night (as we were every afternoon at 4 p.m.), Nels was saying goodnight, (GN), under the door, as he always said to me. He added that he had handled about 5000 words that day — that's a lot of traffic.

All of this was happening in a little place like Alcatraz where 11 of us, each in a tiny cell, were supposedly being thwarted in our comm attempts by two armed guards, each constantly patrolling, listening, trying to find if there were any unauthorized sounds about. This went on for years.

Cryptography got more sophisticated as we handled classified information. We had date-time-groups, we would "slide" the alphabet, we used a matrix to develop a script that really looked like

ALCATRAZ PRISON, HANOI, NORTH VIETNAM, From Oct. '67 to Dec. '69
Home for Eleven Americans who "Incited other Criminals to Oppose the Camp Authority"



chicken tracks, rotating the axes depending on the day and the date. What I'm saying is that if you take about five good commonsensical manipulations with some versatility such as a rotating axis, a slide, a convention for each day, and put them in series, you can come up with a code that cannot be broken. When I got home, I challenged the DIA to break a sample that was written out to demonstrate to them the strength of our system and they couldn't do it. There were just too many variables. Your minds can come up with combinations in 30 minutes that computers can never break.

Why did I say that we as communicators, you and I, when immersed in the technical world, don't give enough benefit to the human mind? First of all, we complicate matters by always looking for a perfect system. A perfect system serves an idiot; it's bound to be too complex. I think there's a lot of wisdom in old Admiral Gorshkov's maxim that: "The best is the enemy of the good enough." Second, I believe that an overblown communication capacity gives our military commanders bad habits. You've got to think through the possibility of a communications black out, and it's difficult when our officers are brought up in an environment of total communications. I had more trouble in Hanoi, even with senior officers, wasting so much time trying to speculate about what they thought Washington would think of our policies. They had been conditioned by good communications for years to be ill at ease when they weren't able to touch base with headquarters. Imagine it; we were sitting in a position where we knew more about how to run a prison organization than anybody else in the world at that time, and our "conditioned" officers were uncomfortable in relying on their own spontaneity and intuition. I told the Midshipmen at the Naval Academy that I think there is a greater possibility of their having to depend on their own initiative in an "out of communications" situation than was necessary for my generation, what with the probable difficulties of radio wave transmissions in nuclear clouds. Third, I badmouth the communications profession because it seems to ignore Shelling's and other strategists' admonitions to not forget the tactical advantages of being out of communication. Think about it. If it is patently clear to your adversary that you cannot receive a message, there is no way he can send you an ultimatum. There are advantages to a commander when his troops know he cannot be contacted. They cannot ask for relief.

What I'm saying is that, contrary to the Naval Academy motto which breaks out of the Latin to read, "From knowledge, seapower", often, in many circumstances, real strength and power lie in ignorance.

Vice Admiral James B. Stockdale, USN (Ret), is a naval aviator who was shot down and spent 7½ years in Vietnamese prisons. He received the Medal of Honor for continuing to fight and inspiring others to do the same while undergoing humiliation and torture at the hands of his captors. Until September 1979 he was president of the Naval War College. He is now commandant of The Citadel. This article is taken from an address by Admiral Stockdale to the Armed Forces Communications-Electronics Association.

George C. Wilson in the *Washington Post* for 9 April 1978 described how Admiral Stockdale searched while at the Naval War College for "some way to teach Navy officers how to withstand the tortures, the threats, the beatings and the fears . . . For him it was the classical philosophy learned in a graduate course at Stanford, rather than anything taught at Annapolis (or survival school), that came back to fortify him against the cruelties of his North Vietnamese captors.

There was the time, for example, when the North Vietnamese handcuffed Stockdale's hands behind his back, locked his legs in heavy irons and dragged him from his dark prison cell to sit in the unshaded courtyard where other prisoners could see what happened to anybody who refused to cooperate . . . He remained sitting in that position for three days. The sun beat down on him. Since he had not been in the sun for a long time, he soon felt weak. He yelled for *Bao Cao* (guard), and the guard struck him from side to side on the face.

The indomitable prisoner communication system provided a great boost to Stockdale's morale at this point as two prisoner dishwashers established voice contact for short words of encouragement in spite of close guard supervision.

The guard on duty decided not to let him sleep, and at one point accused him of dozing, punching (him) right and left on the jaw.

As the guard left the stall, Admiral Stockdale remembers hearing with pride a towel snapping out (in prison code) the letters GBUJS for God Bless You Jim Stockdale."