WAR GAMES

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P-1041

March 18, 1957

The RAND Corporation
1700 MAIN ST. • SANTA MONICA • CALIFORNIA

21 pp

SUMMARY

Several examples of war games are described and some comments made about problems and values of gaming. The games taken as examples include large and small, high level and low, detailed and aggregated ones; some use human umpiring, others make their assessments mechanically.

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The history of war games may include examples more venerable or more important, but surely no more intriguing than the campaigns that Uncle Toby and Corporal Trim fight out through the pages of that wonderful and exasperating book, Tristram Shandy. You may remember that Toby, wounded in the leg at the battle of Namur, dug up the lawn, threw up breastworks and fortifications, and indoors moved lead soldiers across the map of Belgium. Next door, the widow Wadman cast eyes on Uncle Toby and gave thought to changing her nonmarital status. Before she could begin her strategic campaign against Toby, however, she had a reconnaissance campaign to conduct, for, though she knew that Toby was wounded in the leg, she lacked the essential elements of information about the extent of Toby's disability.

On second thought, I'm afraid that this is not a fit and proper subject for the scholarly discussion that you and I should be having this morning. Let me turn then to another game, one that played an important role in the analysis of a national strategy.

Just sixteen years ago a so-called "research institute" was set up, an institute of a very peculiar kind and with peculiarly limited aims. This was the Total War Research Institute, established in Japan in October 1940. Here military services and the government joined in gaming Japan's future

actions: internal and external, military and diplomatic. In August 1941 a game was written up in which the two year period from mid-August 1941 through the middle of 1943 was gamed, was "lived through" in advance and, of course, at an accelerated pace. Players represented the Italo-German Axis, Russia, United States, England, Thailand, Netherlands, East Indies, China, Korea, Manchuria, and French Indochina. Japan was played, not as a single force, but as an uneasy coalition of Army, Navy, and Cabinet, with the military and the government disagreeing constantly—on the decision to go to war, on X-day, on civilian demands versus those of heavy industry, and so on. Disagreements arose and were settled—in the course of an afternoon, at the pace of this game—with the military group, by the way, as the more aggressive one, winning the arguments.

Measures to be taken within Japan were gamed in detail and included economic, educational, financial, and psychological factors. The game even included plans for the control of consumer goods—plans, incidentally, which were identical with those actually put into effect on December 8, 1941.

In this game, reported in August 1941, Japan goes to war with the United States in mid-December 1941, with Germany and Italy having already become involved. There is no mention of Pearl Harbor in this game, but rather the Philippine Islands were the immediate objective.

At the same time that the national games, described above, were being played, the Japanese Navy was carrying out a variety

of tactical games. Staffs of the various Japanese Fleets held frequent games, sometimes as often as twice a month, at such anchorages as Sukomo, Saeki, Kagoshima, and Kanoya. Personnel of the CinC Combined Fleet and the Naval General Staff were brought in as players and were reported to be much keener than members of other Fleet staffs.

Late in August 1941 CinC Combined Fleet ordered all Fleet Commanders and their key Staff members to Tokyo for further war games. There is a report that security measures at the War College, where the games were held, were woefully inadequate, that classes at the College continued as usual, and that "any man with a half-official air could easily have walked in." It is fascinating though footless to speculate as to whether we could have infiltrated the College with a pseudo-student or two, and what we would have done had they reported the progress of this game.

On September 2 the final and most important "games" started. Rooms were assigned to the umpires and to the "N" Team, the "A" Team, and the "E" Team. Like the players, we have little difficulty in decoding these designations into the teams of Nippon, America, and England. The players included virtually every top-notch officer in the Japanese Navy. The N-Team was headed by Admiral Yamamoto, the CinC Combined Fleet, Rear Admiral Ito, his Chief of Staff, and Captain Kurojima, the Deputy Chief of Staff. Vice Admiral Nagumo was Commander of the First Air Fleet both during the game, where he played on

the A-Team, and in late November when he sortied his task force out of the Kuriles and led it toward Pearl Harbor.

In these early days of September the teams studied two general problems: first, the details of a surprise raid on Pearl Harbor and, second, a carefully worked-out schedule for occupying Malaya, Burma, the Dutch East Indies, the Philippines, the Solomons, and the Central Pacific Islands, including (ultimately) Hawaii.

At the beginning of this climactic game a document was printed and distributed among the players—some 50 copies being made—which set forth a working basis for the games. This document was to form the basis for the historic Combined Fleet OpOrder No. 1 issued from Admiral Yamamoto's Flagship Nagato on November 1. This is the OpOrder that opens with the sentence "The Japanese Empire will declare war on the United States, Great Britain, and the Netherlands," and that includes the code for "No warships in Pearl Harbor" as "The cherry blossoms are in all their glory." Unfortunately for us, when this OpOrder was carried out, the cherry blossoms were not in all their glory.

It is clear that the Fleet and the Institute of Total War Research took their games seriously. Whether the games, in turn, led the players to wise answers is a question I must leave to you, an exercise for the reader, as the textbooks say.

The examples we have just been discussing could be called high level war games. Here a single service or several services participating together attempt to test the validity of plans or to test the nation's military posture. But we shall find it profitable to talk both about high level and low level games, both about joint and unilateral games, both about global exercises and ones of more limited scope.

All of our games share one obvious feature. Unlike a field exercise in which real soldiers march and real aircraft fly, the forces of our war games are purely paper ones. This, however, does not necessarily imply, as is sometimes argued, that our paper wars are more unrealistic than field exercises.

An infantry column stopped by a sign on dry land saying "This is a river" may be able, sometimes, to continue its march by displaying a sign bearing the words "We are swimming." Again, in one maneuver I watched, the Blue forces attempted to make surprise attacks by paratroop drops. The defending commander, however, got intelligence of the impending drop—in fact, the local inhabitants were selling bleacher seats to the show. Again, a maneuver whose purpose is both to test plans and procedures as well as to exercise staff and units is usually forced to make some compromises as it reaches out toward both objectives. An air base that has been bombed out may continue to mount sorties, for example, in order to train the base personnel. In fact, nothing is quite so annoying to a squadron as being declared dead on the first day of a maneuver. I am

being unfair to maneuvers, of course. Maneuvers and paper exercises serve different purposes, and different lessons are to be learned from each. However, the maneuver planner must take care that he does not gain realism in all the small details only to lose it through some major assumption.

We have not settled the question of the realism of a war game. This is a problem that will plague us again and again, a problem that runs far deeper than the superficial aspects of rich detail or enormous complexity. We can easily design a war game to be as detailed, as complicated as you like, and sometimes the temptation to do so is hard to resist. Such a game can be impressive, indeed. As Pooh-Bah said,

> "Merely corroborative detail, intended to give artistic verisimilitude to an otherwise bald and unconvincing narrative."

We must be careful, however, that our detail and complexity are compatible both with our knowledge of the real world and with the purposes of the game. Otherwise we run the risk of specifying a number in the third decimal place when we are ignorant of whether the number is positive or negative. Those of you who have played highly detailed games know how impressive they can be, but you may also know that in them it is easy to overlook the fact that the key results are often determined by a small handful of key assumptions.

Let us look now at some further examples of war games. These are all two-sided exercises (or many-sided, in the case

of the Japanese games). These are paper wars with Red and Blue both present and both relatively free to devise plans and execute tactics. These are paper maneuvers in which both friendly and aggressor forces take the field and work out their common destiny subject only to the limitations imposed by force structures, by terrain, by weather, and by acts of God and the game director.

In our next example we look at an unpretentious game, compared with the Japanese exercises. This is no high level joint war game but it is one of interest.

Seventy-five years ago Major Livermore of the U.S. Army Corps of Engineers published a book called "The American Kriegsspiel, a game for practicing the art of war upon a topographical map." This war game, which was played by the Volunteer Militia of Rhode Island and other states in the years following the Civil War, was built around a model of ground warfare which is astonishing both for its level of detail and for its degree of sophistication.

The American Kriegsspiel was developed from its Prussian counterpart, the latter having been introduced into this country about 1865. The interactions of the elements, from the effect of musketry fire to the effects of the velocity of a cavalry charge, were spelled out quantitatively, the rules were formalized, and the umpire's functions could be limited to the determination of random numbers for those cases in which the rules prescribed probability distributions rather than single planning factors.

Major Livermore described the game as follows: "The Kriegsspiel is played upon a topographical plan, with small blocks representing the troops, which are proportional to the scale of the map.... When the position of the blocks indicates that the hostile troops are within sight and range of each other, they may be supposed to open fire, if the players desire it, and in this case it becomes the umpire's duty to decide the result upon the basis of experience. The rules of the game explain to him how to estimate the loss from this fire; for example, it may have been found that in similar circumstances the number of killed and wounded has varied from ten to twenty; by throwing a common die he decides whether to assign a greater or less result to the case in view."

And now—an example of a planning factor used in the American Kriegsspiel; from it you will see that the player found himself dealing with a tremendous amount of fine detail.

"If one company of infantry, comprising 64 men armed with breech-loading rifled muskets, is deployed as skirmishers lying down and firing at the rate of about six rounds in a minute, at another line directly in front of it and distant about 500 yards lying down in an open plain, at intervals of two and a half yards or three paces, in a line at right angles to the line of fire, and firing upon the first with about equal effect; and if the company first mentioned is composed of soldiers of average ability belonging to the offensive party, perfectly fresh in the fight, but long enough upon

the ground to have formed a fair conception of the distance, it may be inferred that it will inflict a loss in killed and wounded, at the average rate of not less than .90 men in a minute, as shown by the scale for infantry fire on the firing board."

And now all these factors in the description of the infantrymen may be changed: "If their position is not lying down in the open plain, but mounted on horseback, 12 per cent; if standing, 80 per cent; if kneeling, 90 per cent; if they are firing from behind a log, an embankment, or a window sill, which not only shelters them from hostile fire but affords a suitable rest for the pieces, their fire may be taken at 120 per cent of the standard."

And so on. A player could even dispatch a cavalry charge and take into account the aversion of the horses to tread upon prone infantrymen.

Now the thing that is of interest to us in this game is not the breech-loading rifled muskets firing at six rounds per minute. It is rather that so long ago a war game was designed to be played in either of two quite different ways. The game could be played with an umpire and his experienced military judgment would then provide the assessment, the link between the tactics chosen by Red and by Blue and the results of the engagement as measured by movement and attrition of forces. Or, alternatively, the game could be played without an umpire, his judgment being replaced by—or rather put in

the form of—an extensive collection of rules and planning factors. Some of these planning factors were fixed numbers, others were in the form of probability distributions—the toss of a coin or roll of dice being used to choose between alternative possibilities. We can refer to this, for convenience, as mechanical umpiring, but it is clear that the process is not purely mechanical.

Experience and judgment and intuition are here but they have been used to set up the rules and factors of the game. Now this cannot be done completely and satisfactorily, of course. Nevertheless, there are games of more modern vintage in which this mechanized umpiring produces results of some value.

For our next example, let us look at a game that some of you may have played, one that is used as a teaching device in one of the schools in this theater. Here six hours are spent playing a tactical air-ground war game that was developed by Air Force Colonel Jesse Peaslee, now on a tour of duty at RAND.

Colonel Peaslee's game is played by staffs of perhaps fifteen players on each side, Red and Blue. The number of players, though, depends only on the size of the class and you and I could play the game, one man on a side; in fact, it would go a little faster that way. Like the American Kriegsspiel, this is a game with mechanized umpiring—only rules, planning factors, and a pair of dice are needed to assess the outcome of each move.

If you were to play Colonel Peaslee's game you would find yourself at one end of a game board. The board looks like a map of Red and Blue terrain with the main line of resistance dividing the two halves. On each side there are three zones: the combat zone, combat reserve zone, and strategic reserve zone, in order of increasing distance from the battle line. Each zone is divided into a left, a central, and a right-hand sector. On these nine squares you would find a map of a road and rail network and this presents various interdiction targets—bridges, cities, and so on. Your forces include combat units—though we shall not specify whether these are Army Corps or divisions or battalions or what. You also have bases with tactical aircraft and a limited stockpile of atomic weapons. Your problem is to allocate from day to day your resources of atomic weapons and conventional sorties to the targets of enemy troops, interdiction targets, and airfields, this in the face of the enemy's actions against you. In addition, you move your ground troops into the combat zone, supporting them by your logistics network, and exposing them to atomic fire, in an attempt to defeat the enemy forces.

Factors intended to represent weather and intelligence of enemy targets put in an appearance. Complete interdiction is not possible. Furthermore, interdiction targets recuperate in time from attacks by conventional weapons. Reserve forces, both tactical aircraft and ground troops, enter the theater during the campaign.

Now the value of the game, I think, is not that it predicts the future nor that it allows the testing of a war plan. The value of the game—and this is a value to be treasured—is that the players are taught to consider carefully all their resources—ground, air, atomic. The player who comes to the game with a passionate interest in one of his several missions to the exclusion of all others, will soon find that a clever opponent has him pinned.

The game we have been discussing is used as a teaching device and as a teaching device a war game has unparalleled effectiveness, for the player teaches himself and persuades himself in a manner more convincing than any lecture can possibly be. That is, a war game teaches both intellectually and emotionally—it is an experience that one lives through. You and I should not be talking about a war game—we should be playing one. On the other hand, we pay a price for this heightened effectiveness, and part of the price is that the game may persuade us equally convincingly of things that are not true in the real world. The lessons learned may not all be valid ones. But this simply means that when we play a game we must not suspend our common sense and good judgment.

This game has proved useful in other ways. It is a most effective way of drawing members of the class into discussion and of stimulating useful comment. It shares with all games the quality of concreteness. That is, when I discuss doctrine

or strategy or tactics or operations or whatever, it is very easy for me to take refuge in a mass of words and high-class platitudes--witness my talk this morning. It is possible for me to conceal ignorance or bias by hiding these in vague language. But there is no such thing as vague play in a war game.

Another type of war game--and one favored by writers of science fiction--is the game played on a high-speed computer. In such a game, the opposing commanders might, for example, sit at their control panels and play out a tactical air war, turning knobs to indicate their allocation of aircraft and weapons to various targets.

Now in a game like this you and I could sit down and fight through a thirty-day campaign in a matter of minutes. This means that we can afford to play the game many times under many conditions, varying the assumptions used and exploring many tactics. You are not certain just what effectiveness, in numerical terms, to ascribe to close support sorties. Then we can try several estimates of this factor; we can play the game many times using each of these estimates. This will not tell us what the correct estimate is; it will tell us whether or not this factor is a critical one in influencing the results. That is, this procedure will tell us what areas of the problem are crucial and need further study, how large certain factors must be before they have an important influence, which factors are unimportant, and so on.

It is important for us to remember that there is nothing magic about a computing machine—whether the machine is a slide rule, or an analog computer, or a high-speed digital computer. In any case, the machine merely serves to speed up the process by which we discover the implications of our assumptions, our estimates, our planning factors. Regardless of the machinery used, it is to the assumptions that we must turn when we ask for an explanation of the results of the game.

Such a computer game may be a useful tool for rapid exploration of a problem and to point out those areas that need closer and more detailed scrutiny. A game of this sort has been used in conjunction with a field exercise, the computer game being used to recommend force allocations and to predict the result of free maneuver play. Some time ago I watched and studied a large NATO air exercise. Some of the lessons learned there could have been learned far more rapidly from a two-sided paper war game. The full exercise would still have been necessary, but it would have profited from a prior paper exercise.

For my last example let me take a game that has been used at the national policy-making level. Unfortunately, the operations and results of such games are hedged about with tight security restrictions—the reports bear, in fact, the security classification BBRSC, which stands for "Burn Before Reading and Shoot the Courier." Fortunately, we can find an

excellent description of the purpose and results of a recent high-level joint war game in a recent issue of Fortune:

> "The U.S. air-nuclear capability versus the Soviet is periodically re-assessed by an elaborate war game lasting several months. Such an exercise was held last year, envisaging the situation up to 1958. It was run by a retired officer of high rank with presidential authority to pick his own staff from the services, and further to fortify his own judgments with outside technical counsel. The purpose of this war-gaming was to provide U.S. planners with a realistic forecast of the opposing capabilities up to three years ahead. This searching analysis of Soviet capability concluded that the Red air force by 1958 would have a theoretical capability of inflicting several tens of millions of casualties upon the U.S.; however, the U.S. capability for crushing response would still be intact and with it the country's ability to function, however crippled."
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> ("Defense: The Revolution Gets Revolutionary" C.J.V. Murphy, Fortune, May 1956, p. 252)

A game like this is ponderous in its detail and cumbersome to play. It eats up both time and manpower in large quantities. It is not possible to discover which of the assumptions are the crucial ones simply by playing many times under varying conditions. It is difficult, therefore, to persuade a skeptical critic that the results represent with any faithfulness even a very likely future. This criticism of war gaming—that its time and manpower requirements are such that only very few games can be played—is often made and is often justified. It cannot be answered merely by repeating several times the play of a game under various conditions—choosing blindly the alternatives to be played.

There are just too many alternatives, too many places where the road forks and we must choose one route or another. The best judgment and insight should be used to study the assumptions, the estimates, the planning factors, the structure of the game, and to intuit which of these are critical in determining the results. These critical inputs should then be varied—for several plays either of the total game or merely for parts of the total game—provided time and manpower are available.

What I have just said about the desirability of repeating the play of a game under varying assumptions does not mean that a game played only once is of little value. On the contrary, if the results are interpreted judiciously, are taken with the proper grains of salt, they may be very useful. And there are by-products that may be of even greater usefulness. Every command that participates in a joint war game benefits greatly from that traumatic experience—not necessarily because of the answers given by the game but because of the questions the game raises, the ideas it suggests, the problems it highlights. These are by-products, but they are useful ones.

The example of war games that we have looked at have varied tremendously—large and small, detailed and aggregated; some have used human umpires or control teams, others made their assessments solely on the basis of rules and planning factors. In some time is compressed a second to a day; in others the game moves more slowly than does the real world. Some use an electronic computing machine as a computational

aid; in others the back of an envelope is all that is required. All of them, however, share one feature in common: competition. The free competition between Red and Blue exposes weak points in an argument, vague points in a plan.

It is possible to use the spirit of war gaming without the formal paraphernalia. For example, in analyzing the problem of the defense of the U.S. against air attack, the RAND analyst thought through the problem from the defense standpoint. He then changed hats, mentally, and did his best, as the Red Commander, to beat the defense system. Then he put the defense commander's hat on once more and tried to counter the best offense threat. And so on. This use of the spirit of war gaming—of free competition—may often be the most valuable contribution that gaming has to make to a given problem. Is a staff planning the possible deployment of a mobile tactical force? Then the staff's best man should be given the thankless job of fighting the plan, of acting as obnoxious opponent and obstreperous umpire.

We have argued that the essential element in any war game is free competition—the intelligent and obnoxious opponent. But, as we have seen, it is possible to have competition without a formal game. And it is possible to go through the motions of a game without really having completely free competition. There is, for example, a strong tendency to avoid making the Red attack too ungentlemanly.

Let me fold my tent with a quotation from an Air Force officer friend of mine. Listen to him as he talks about the relation between war games and plans.

"The important thing about a war game is the effect of competition—a real game is a two-sided affair. When the A-2 and A-3 are brought out of their ivory towers and faced with the dirty situations which an intelligent opponent can devise, it often has the same salutory effect as the swift kick in the pants which they may well deserve. It even gets them to talk turkey to one another, which is even more exhilarating. Most of you have probably had more than one opportunity to read the real dream stuff which is sometimes passed off as a plan, such as:

"(1) Immediately upon receipt of warning, the Commanders will take measures to provide for the security of their forces, and

"(2) Upon the initiation of hostilities by the enemy, the 122nd Air Force will conduct operations to attain air superiority, and

"(3) When the situation is no longer tenable, forces will initiate an orderly withdrawal to phase line X.

"Believe me, these kinds of statements are still being written into plans, and attached to an estimate of enemy capabilities—not enemy intentions, mind you—are being sold as real plans. Of course, a lot of fine detail may be shown, like target lists and schedules of strikes from X, Y, and Z

bases. Then all kinds of logistic and support plans get written, all based on a rosy assumption that warning was received, that the enemy has initiated hostilities in a gentlemanly manner—that efforts to attain air superiority are both possible and rewarding—and that there is also some place to withdraw to.

"Now I wouldn't say a war game will tell you how to write a better plan, but the exercise of a plan against a free thinking opponent may bring to light a lot of foolish optimism, lazy thinking, and sheer lack of coordination that otherwise would go unnoticed."