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PROFESSIONAL PAPER 294 / September 1980

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**FRENCH NAVAL POLICY
OUTSIDE OF EUROPE**

Stephen S. Roberts

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FRENCH NAVAL POLICY OUTSIDE OF EUROPE

French naval policy, as outlined by senior naval officers and informed observers, is in many ways similar to French defense policy. In particular, the navy's views on strategic nuclear deterrence and the defense of metropolitan France are the logical maritime equivalent of those of the Army, Air Force, and Ministry of Defense. However, in the area of defense policy outside Europe, French naval writings go further than those of the other services or the ministry. The naval writers have defined an additional threat, "indirect strategy," that they feel France faces overseas, and they have adapted French deterrence theory in an effort to respond to it.

The term "indirect strategy" was originated by the noted French strategist General Andre Beaufre.¹ It is one of two components of his concept of "total strategy," the other being "direct strategy." Direct strategy is the achievement of a decision (or of deterrence) by primarily military means, while "the essential feature of indirect strategy is that it seeks to obtain a result by methods other than military victory."² Beaufre's clearest definition of indirect strategy is as follows:

Indirect strategy is ... the art of making the best use of the limited area of freedom of action left us by the deterrent effect of the existence of nuclear weapons and of gaining important and decisive victories in spite of the fact that the military resources which can be employed for the purpose must, in general, remain strictly limited.³

There are two aspects of this definition that are worth underlining. The first is that an actor's resources can be limited either because he is deterred from using them or because he does not possess them. Indirect strategy is thus for use by the weak as well as by the deterred. The second is that, the more complete nuclear deterrence becomes, the more prevalent indirect strategy will become. Since we have practically reached what Beaufre calls "nuclear paralysis," we can expect indirect strategy to be the dominant form of action in today's world.⁴

Beaufre outlines two types of maneuvers that can be used in indirect strategy, each of which uses a combination of direct (military) action and indirect (psychological) action. The first consists of 'nibbling' away at the enemy's weak point by quick, limited military actions separated by periods of negotiation. This he calls the 'piecemeal' or 'salami' maneuver. The second consists of the use of prolonged conflict combined with a psychological offensive to erode or wear down the enemy's will to resist. In this 'erosion' or 'weariness' maneuver, the military objective is not to win but simply to hold out without losing until the enemy gives up. The example of 'nibbling' that Beaufre cites most often is Hitler's actions in Central Europe between 1936 and 1939, while his 'erosion maneuver' is clearly an effort to describe the wars of national liberation since 1945, especially those inspired by the ideas of Mao Tse-tung.⁵

clear deterrence becomes, the more prevalent indirect strategy will become. Since we have practically reached what Beaufre calls "nuclear paralysis" in Europe, we can expect indirect strategy outside of Europe to become the dominant form of action in today's world, both for major powers and for lesser powers.¹⁰

Of the two forms of indirect strategy described by Beaufre, the one that concerns the French navy is the piecemeal approach. (The French clearly hope that Algeria was the last large-scale war of national liberation that they will have to face.) In the navy's view the main threat is an enemy 'nibbling' away at French interests one by one when he is afraid or unable to attack France directly. He would alternate local thrusts with calls for negotiation and conciliation, in an effort to find the point of least resistance and test the will and ability of France to resist.¹¹ At first he would try to choose forms of action that were either covert or non-violent and which therefore could not easily be characterized as aggression. He would choose as his initial targets interests which appeared of marginal importance, even if they were not. The enemy would subsequently have the choice of proceeding to more overt forms of violence if resistance was weak, or of continuing his piecemeal attacks until their cumulative effect brought France to her knees.

Indirect strategy is of particular concern to the navy, since it feels it is most likely to be exercised at sea. Naval forces can easily be moved at sea to interfere with commerce, intimidate

an opponent or protect a friend. Claims to territorial waters, to economic zones at sea and to the right to impose environmental regulations can give a pretext for harassing or interrupting traffic in straits and in coastal waters and for appropriating resources on the sea bed.¹² Covert military actions are also possible at sea. A recent French CNO pointed out that nuclear submarines are capable of sinking merchantmen at sea, selecting them according to departure point, transit route, or arrival point, without revealing the submarines' nationality and making their government subject to retaliation.¹³ Another way to avoid retaliation is to instigate attacks by a small littoral power using fast patrol boats or land-based aircraft. Finally the deployed naval forces of the superpowers (possibly based in the Third World) and the navies of littoral states are capable of limited overt military action, which could also be part of an indirect strategy.

Indirect strategy would be of little importance to France were it not for the fact that it can endanger vital French interests without triggering France's strategic deterrent. Indirect strategy owes its popularity to the fact that the piecemeal attacks that make it up can all be kept small enough so that a strategic nuclear response to any one of them would not be credible. For example, an attack on a few merchant ships would probably not arouse sufficient public sentiment to justify a nuclear response.¹⁴ On the other hand, France has realized

that some of her interests that are vulnerable to indirect strategy are truly vital to her survival. It thus becomes possible for indirect strategy to "turn the flanks" of the French strategic deterrent by nibbling away at these vital interests until the cumulative damage brings France to her knees.

France has traditionally had numerous political and cultural interests overseas, but, while these are important, none of them, as they exist today, is regarded as vital. On the other hand, recent events have made her acutely aware that her economic interests overseas, which are highly vulnerable to indirect strategy, are indeed vital to her survival.¹⁵

Politically, France has the obligation to protect her overseas departments and territories in the West Indies, off Newfoundland, and in the Indian and Pacific Oceans. These are all small specks of land, but they fly the French flag and have recently gained new importance due to the declaration of a 200-mile economic zone around all French territory. France has also accepted extra-European obligations by signing defense agreements with some of her former West African colonies. In addition France has made it known that "de-facto solidarity" could cause her to participate, if asked, in the defense of other former colonies with which she does not have formal agreements.¹⁶ France also wants to be able to participate in peacekeeping operations under the auspices of international organizations, and she wants to be able

to protect French nationals overseas wherever the necessity may arise.

The French also claim that the diffusion and welfare of French culture abroad is a French national interest. This has been a recurrent theme in French history, and today it serves to make French interests greater than they might otherwise be in certain parts of the world, notably West Africa and the southwest Indian Ocean. Cultural affinity could help bring about France's involvement in these areas under the guise of "de-facto solidarity."

France has always had economic interests overseas, but only recently has it become widely agreed that they are vital to her survival. Traditionally agriculture played a large role in the French economy and made her self-sufficient in many areas. Since World War II, however, France has experienced a remarkable economic boom that has greatly increased the relative importance of her industrial sector. This has brought great rewards but has also greatly reduced her self-sufficiency, since she does not have within her own borders either the energy resources, raw materials or markets needed to support her industrial economy.¹⁷ The French defense community was slow to see the significance of this change -- these economic interests did not figure at all in the 1972 White Paper on National Defense, which mentioned only French overseas political interests.¹⁸ In 1973, however, the shock of the oil embargo accompanying the October War and the subsequent

rise in oil prices made everyone aware of the vulnerability of France's energy supplies. 99% of France's oil and 73% of her overall energy supply come from abroad, as does 63% of the minerals used in her industry.¹⁹ More recent controversies, including debates over the Law of the Sea, have drawn attention to other essential resources overseas and the means by which they are brought to France. France also depends on traffic in the other direction -- her exports provide her with the funds she needs to pay for her oil and other supplies.

Senior navy spokesmen and others now argue that overseas interests are truly vital for France's economic health and standard of living, and that France could be brought to her knees in three months or less if her overseas connections were cut, even if her land frontiers were never crossed.²⁰ Admiral Joybert, then Chief of Staff of the Navy, wrote in 1974 that France's nuclear deterrent force had transformed her into a mighty citadel but that "one can always reduce by famine, and without firing a shot at it, an impregnable fortress."²¹

France's economic interests overseas are vulnerable in three places: the foreign countries that supply France with oil and raw materials and buy her products, the trade routes along which these materials travel to and from France, and the economic zones at sea where resources can be found in and under the water.

The producing countries, either on their own or at the instigation of a cartel or a superpower, could do great harm to France

by imposing arbitrarily high prices or by shutting down production. France would be equally hurt if political instability, civil disorders or a war in the producing country obstructed production. This situation is aggravated by the fact that a few individual states and cartels have a near monopoly over several natural resources that are vital to France.

The French navy is even more concerned about the vulnerability of these supplies on the trade routes. 75 to 80 percent of France's imports travel by sea, and 70% of her oil travels on one long, vulnerable trade route, the one around the Cape of Good Hope.²² The possible actions against these routes have already been mentioned -- they include legal restrictions, covert attacks by submarines or forces of littoral proxy states, or limited but damaging overt attacks. Such attacks could put enormous pressure on France and Western Europe -- one writer argues that the loss of even a few supertankers could cause the suspension of the oil traffic and a serious energy crisis in Western Europe.²³

France's interests in the wealth in and under the seas could also prove of major importance to her. France followed the lead of other states and declared a 200 nautical mile economic zone around her territories, including those overseas, in 1976. Due to France's possession of numerous small isolated islands, this has raised her area from 550,000 to 11,000,000 square kilometers and

raised her rank among coastal states from 53rd in area to 3rd.²⁴ She has already begun searching for oil off Metropolitan France and the Indian Ocean island of Kerguelen, and she also hopes to find manganese nodules off her Pacific Islands. France also draws much wealth from areas not under her control: her fishing fleets work the Dogger and Grand Banks among others, and she has oil survey crews at work around the world. France needs to protect her potential riches at sea from rapacious exploitation by others, and she must protect her own legitimate interests in regions not under her sovereignty.²⁵

The French do not feel that they are alone in being economically vulnerable to indirect strategy outside Europe. They feel that the other major industrial powers, including the superpowers, are all more or less dependent on overseas resources. The result is that the world is now engaged in a subtle competition in which powers, acting on their own or through interposed smaller states, are trying to gain control of these resources (or deny them to their rivals) by any means that will not lead to the use of strategic nuclear weapons. The French feel that the stakes in this competition are truly enormous -- the wealth of the whole world outside Europe, North America and Russia -- and that the redistribution of this wealth could lead to the establishment of a new world balance, despite the fact that the nuclear stalemate prevents use of direct strategy. The dangers of this situation are further increased by the number of Third-World states, the insta-

bility of many of them, the proliferation of armaments, and the increasing economic interdependence of nations. The result is that the world is in a state of permanent crisis and the interests of France and her friends are in continuous jeopardy . The French want to be able to protect their own interests in this dangerous world and also participate in the formation of the new balance, and they have made this a primary mission of their non-strategic forces.²⁶

Having defined the threat of indirect strategy and the interests that are vulnerable to it, we turn to the strategy that the French navy has adopted to counter it. The French realize that in a world populated by two superpowers and a number of strong regional powers, some located at great distances from France, she does not have the ability to respond with brute strength. (In any case, this might not be an appropriate response to certain kinds of indirect attack.) Instead she has turned to her version of deterrence theory in an effort to develop a defensive strategy "for the weak against the strong."²⁷

French deterrence theory of the 1960s generally resembled the U.S. doctrine of massive retaliation, which called for a massive nuclear strike as the reaction to any aggression. In the 1960s both the U.S. and France turned away from this doctrine due to its "all or nothing" character -- it was simply not credible that a nation would respond massively (and presumably absorb a counter strike) in a minor case of aggression in which its central inter-

ests were not at stake.²⁸ The U.S. responded to this problem with the doctrine of "flexible response," which calls for oppressing each threat with the lowest level of force capable of containing it. This allows for a response to any threat, but, in an effort to raise the nuclear threshold, it also calls for the use of conventional warfighting against all but the most massive aggression. France could not afford to buy large conventional forces or to fight a long conventional war, and she has therefore rejected flexible response.

The French have tried to develop an equivalent to flexible response which, instead of countering each threat with an appropriate amount of force, counters it with an appropriate deterrent. France plans to respond initially to aggression with a "coup d'arret" -- a swift, sharp move at a level of violence appropriate to that used by the aggressor.²⁹ The purpose of this move is not to defeat him militarily but to show him that France has the resolve to defend her interests, that the aggression has been detected, and that France has the ability to inflict severe pain on an aggressor. Hopefully a prompt "coup d'arret" would nip the aggression in the bud or "kill the chicken in the egg" before it gets too big for French forces to handle. If the aggressor defies this warning and confirms his aggressive intent by overriding French resistance at this level of violence, France would increase the level of violence (or, preferably, put the aggressor in a position where he had to do it) until he realized that the price

he had to pay to reach his objective had become exorbitant and he backed down.³⁰ In short, France would deter her opponents by showing her readiness and willingness to ascend an escalatory ladder, the top rung of which, in her case, is a strategic nuclear force. Hopefully the fact that the last rung in the ladder is nuclear catastrophe would give actions on the lower rungs sufficient deterrent value to cause the opponent to back down even if the French forces that were confronting him were not strong enough to defeat him militarily.³¹

The original version of this concept of deterrence was first published in 1969 by General Fourquet, then Chief of Staff of the Armies, as the basis for France's response to a direct strategy applied in a European theater.³² However, the fact that it allows for an almost unlimited variety of possible actions (not necessarily violent) in response to threats means that it is also capable of responding to the subtleties of indirect strategy.³³ It has therefore become the basis for French crisis management. The French feel that military forces can contribute to crisis management in two non-violent ways: through their mere existence and through their manipulation. If these fail, the French are prepared to escalate to combat in a further effort to deter their opponent.³⁴

Military forces can help crisis managers by their mere existence, either in general or within reach of a specific region. The presence of forward-deployed forces, either permanent or

periodic, shows French political, economic, and military power and emphasizes the interest France has in the region in which the units are deployed. It also gives solid evidence of her determination to protect her interests in the region.³⁵ Presence forces can also help forestall aggression before it starts by friendly actions such as port calls, disaster relief, etc., designed to reinforce alliances and promote good will between France and the nations in the area.³⁶ The French place considerable emphasis on the importance of a continuing "presence" of forward-deployed conventional forces as a means for deterring indirect strategy.

Presence forces can make a more intense non-violent contribution to crisis management if they are properly manipulated during crises. Maneuvering these forces increases their deterrent effect by making more clear the connection between their presence and specific French diplomatic objectives. Techniques often used include placing presence forces on alert, moving them closer to the crisis area, and reinforcing them.³⁷ Even if not reinforced, presence forces on the scene may have the capability of resolving a local crisis through fast action before it can spread. If they do not, they can help deter an aggressor by introducing uncertainty into his calculations. They can deny him the possibility of "nibbling" without risk -- even very small forces can be manipulated so as to force him to make his act of aggression overt. They can be used to show him that France is watching him

and knows what he is doing. They can also provide Paris with the information it needs to manage the crisis.³⁸

The ways in which naval forces can be manipulated in response to indirect strategy are limited only by the imagination of commanders -- each threat is likely to lead to a different response. The French have given several examples of ways even weak naval forces can respond constructively to specific threats that might be part of an indirect strategy. One problem encountered during the October 1973 Middle East War was that merchant ships would not enter the danger zone declared by the belligerents, primarily because their insurance would not cover them there or would do so only at exorbitant rates. In 1973 the danger zones did not block any important French trade routes, but, if they had, the navy could have taken operational control of these ships, accompanied them through the zone, and thus minimized their insurance problems.³⁹ A more serious problem would arise if French shipping were directly threatened by another power. In this case the navy could again take operational control of French merchantmen and assign them routes distant from the usual ones so as to conceal them in the vastness of the sea. In areas such as straits, where only one route is feasible, the navy could use its few ships as escorts. Any action against an escorted French merchantman would thus automatically be escalated to an action against a French warship, which would be much more serious politically and might deter the action altogether.⁴⁰

If these non-violent military actions coupled with diplomacy fail, the next option is actual combat. This option could be used in an effort to resolve the crisis directly by force, but it is much more likely in the French case that combat will be regarded as a continuation of deterrence by other means. Following the principle of deterrence referred to above, France would use her forces to force the conflict up the escalatory ladder until the aggressor backs down. The French speak of several tactics they would use in combat: riposte, retaliation, and a combination of these.

Riposte consists of a direct parry against the enemy and refers to the situation in which French forces would be strong enough to confront him directly and defeat him on the battlefield. The French would certainly use this when feasible; but they feel that, due to the limited strength and size of their forces, they cannot count on it.

Retaliation (retorsion) might be used when riposte was not possible. It consists of striking the aggressor hard, not at the point of aggression, but where he is most vulnerable. It is a deterrent act, designed to show the enemy the French will to resist, her ability to harm her opponent, and her ability to escalate the level of violence if necessary. Its objective is to induce him to reconsider the advisability of his aggression. It is a tactic of the weak which uses shock to compensate for lack of strength, and in theory could be a brutal affair. It requires

skillful and imaginative management on both the political and military levels. Speed and surprise are necessary, and it is essential that the retaliating country have justice squarely on its side.⁴¹

Against a determined opponent, riposte and retaliation would be used together in climbing the escalatory ladder. French plans for war in Europe call for confronting advancing Warsaw Pact forces with significant resistance by conventional and tactical nuclear forces, while the more mobile French forces launch retaliatory strikes on the enemy's flank or in his rear. The level of violence would be progressively increased until the enemy backed down or was unambiguously confronted with the threat of a strategic nuclear strike.

France has made it clear that she regards some of her overseas interests (especially her SLOCs) as vital, and in principle the same tactics could be applied overseas. The only difference is that France's strategic nuclear deterrent might not be usable against aggression in the Third World. French policy is far from clear on this subject (the matter appears still to be under debate) but there are indications that France might use tactical nuclear weapons in a conflict outside Europe, either as a warning shot or as the ultimate form of retaliation.⁴²

Current French doctrine assigns tactical nuclear weapons two functions: to do substantial harm to the enemy's military capabilities in the theater, and to serve as a penultimate deterrent

that will confront him unmistakably with the prospect of a strategic nuclear strike. Due to the escalatory nature of the use of tactical nuclear weapons in Europe and due to France's limited resources, French doctrine discourages the use of these weapons in isolated warning shots or in any conflict not directly involving the territorial security of metropolitan France.⁴³

It has been suggested, however, that these obstacles to the use of tactical nuclear weapons are greatly reduced at sea and that the sea is the optimum environment for their use. There is, for example, practically no danger of collateral damage to civilian populations -- this could be interpreted as meaning that the danger of uncontrollable escalation would be reduced. In the context of a crisis outside Europe, even a single tactical nuclear warning shot would have an extremely high impact, both as a diplomatic signal and as a means of retaliation.⁴⁴

Current discussions refer only to the use of these weapons in conflicts involving other countries whose naval forces also have tactical nuclear weapons. The French feel that possession of these weapons is required to give their naval crisis-management forces credibility against nuclear-armed opponents, and will help offset the inferiority in numbers of French forces. They are currently equipping both of their aircraft carriers with tactical nuclear weapons. Current French naval tactical nuclear weapons are gravity bombs, although there is talk of developing air- and sea-launched tactical nuclear missiles.⁴⁵

In conclusion, current French defense policy calls for basing French defenses at all levels of violence on deterrence. This deterrence is achieved by demonstrating to potential opponents France's readiness and willingness to ascend an escalatory ladder which consists of three main sections:

1. French forces would first mark France's determination not to let certain limits be passed. They do this through peacetime presence and maneuvers.
2. If war breaks out, French forces would force the aggressor to pay an excessive price for his covetousness (through retaliation and escalation) in an effort to persuade him to renounce his enterprise. (If possible, of course, they would stop him by riposte.)
3. If the war goes badly, the strategic nuclear deterrent constitutes an ultimate threat designed to enable France to escape an unconditional surrender imposed by force.⁴⁶

The existence of the strategic nuclear deterrent at the top of the ladder is the basis for the credibility of the whole structure -- the fact that it is directly linked to actions further down the ladder will hopefully give these actions sufficient deterrent value to stop the conflict before it reaches the nuclear level.

The navy has four missions, three of which are directly connected to this strategy. These four missions are:

1. Participating in nuclear deterrence (i.e., providing and protecting the SSBN force)
2. Maintaining surveillance over and, if necessary, defending the maritime approaches to France
3. Retaining at sea and overseas the freedom of action that is needed
4. Participating at sea in the tasks of public service (i.e., non-military Coast Guard functions).⁴⁷

The first two of these cover the participation of the Navy in France's deterrent strategy in Europe. The third, "retaining at sea and overseas the freedom of action that is needed" is the one that covers action outside of Europe. "Freedom of action," according to Beaufre, is the ultimate objective of all strategy.⁴⁸ Since France has no expansionist aims, "freedom of action" means in her case having available the widest possible range of responses to aggression, in particular to indirect strategy. The navy has implemented its mission of action outside Europe in three ways. It has set up a worldwide crisis management organization that allows close control of forces overseas by political authorities in Paris, it provides presence forces permanently stationed overseas, and it has intervention forces capable of being sent from France in case of special need.⁴⁹

The Navy has designed its peacetime operational command structure so it can respond to crises anywhere in the world. It has divided the world into seven zones: the North Sea, the North

Atlantic, the Mediterranean, the Indian Ocean, the Pacific, the West Atlantic and Caribbean, and the South Atlantic. Each of these is assigned to the senior naval commander in the zone. Of the four non-European zones, the Pacific and Indian Ocean are under specially designated flag officers who have fleets of roughly 10 ships each while the other two are under commanders of the French naval shore facilities in the zones. These zone commanders are responsible for keeping track of events in their zones and controlling the operations of naval forces there. During crises their actions are in turn controlled by the Chief of Staff of the Armies who in turn reports to the civilian government. During routine periods this control is delegated to the Chief of Staff of the Navy.⁵⁰

Naval presence is an essential part of the French response to indirect strategy, but there are severe limitations on the French ability to carry it out. France has few ships, her budget does not permit many long deployments, and she has few support facilities overseas. The result is that she cannot maintain overseas on a permanent basis forces sufficient to cope with crises. Instead she maintains token forces in her overseas zones during routine periods and attempts to anticipate crises and reinforce her forces where their psychological impact and military capabilities are most needed. This reinforcement capability is demonstrated during routine periods by periodic overseas cruises (especially in the Indian Ocean) by small task forces (usually two destroyers) drawn

from the Atlantic and Mediterranean fleets. French deployments are proportioned according to French interests and political objectives in a region as well as to the potential crisis level. Aircraft carriers are only sent if the situation is particularly grave or if the French President has a particularly strong diplomatic signal that he wishes to transmit. The most recent case of this was the deployment of a carrier to the Red Sea during Djibouti's transition to independence.⁵¹

If presence forces fail to deter a crisis, France would send larger forces with the capability to intervene, either at sea or ashore. Recent African crises have involved the use of non-naval intervention forces (notably transport aircraft and airborne troops), but the navy also has a substantial intervention capability which, it feels, is far less dependent on support facilities and far more capable of sustained operations than other forms of intervention.

In the case of a crisis at sea the navy could respond with whatever type ship was most appropriate: submarines, surface combatants, minesweepers, etc. If projection of force ashore was required, the navy would probably turn to its two aircraft carriers. One of the carriers would be quickly converted to a helicopter assault ship, while the other would act as an attack carrier, providing air cover for the naval force and tactical air support ashore. A typical French naval intervention force might consist of the following:

- One carrier with 40 fighters and attack aircraft escorted by 6 to 8 AAW and ASW ships.
- One carrier rigged as a helo assault ship, one dock landing ship and several tank landing ships. This force could land and support ashore 2,300 men from the Navy's commando force and the Army's marine infantry, along with 250 vehicles including a squadron of AMX-30 light tanks.
- A logistic force, consisting of two tankers and two repair ships.⁵²

Some of the escorts might also carry small commando groups of 20-30 men. If supplies or troops in excess of these carried in the task force were required, the navy would organize a sealift using chartered merchantmen.

The navy's ability to intervene varies according to the geographic region involved. The French have decided that they must maintain their primary naval intervention capability (including the two carriers) in the Mediterranean, since it is an unstable region where both direct and indirect strategy could do great harm to France.⁵³ This disposition has the advantage of putting the carriers within reach of the area outside Europe that is of greatest importance to France -- the Indian Ocean. (They could also reach West Africa if necessary, although this has not occurred.) Elsewhere French naval crisis management forces would be smaller, but they would still be capable of limited combat ac-

tions, patrol of sea lanes, and support actions such as providing technical military assistance or war supplies.⁵⁴

The weakest point in the French navy's overseas strategy from the French viewpoint appears to be the defense of the sea lanes. French writers have repeatedly stated that France cannot do this alone, and that she would need allies. They believe, however, that any crisis affecting the sea lanes will affect all of Western Europe and the United States, and they seem to expect that the allies would be there when needed.⁵⁵

French naval policy outside Europe thus consists of the use of deterrence against the threat of indirect strategy using both presence forces and intervention forces. Navy writers fear that an enemy could use an indirect strategy to "turn the flanks" of France's nuclear deterrent and defeat France through a deliberate series of small actions against vital French interests outside of Europe, especially her supplies of oil and raw materials. The navy, with its ability to operate worldwide, is the logical counter to this threat; but, due to its limited resources, it would have to base its actions on the use of escalation as a deterrent. Possible actions include non-violent crisis-management techniques, riposte, retaliation, and perhaps ultimately the use of tactical nuclear weapons. The French navy maintains presence forces, intervention forces, and a crisis management organization which it hopes will enable it to respond to indirect strategy anywhere in the world.

Looking into the future, it seems that this policy will endure, although the means for executing it may change. The need to protect French territories overseas, the economic zone around them, and the supply of oil and other raw materials all seem to ensure that France will continue to maintain a naval presence overseas (especially in the Indian Ocean) regardless of any political changes that may occur in Paris. However, the disappearance of the aircraft carriers in the 1990s could cause some changes in the navy's intervention capabilities. Some indication of future French capabilities may be gleaned from the fact that the French are already talking of the retaliatory potential of nuclear submarines outside Europe⁵⁶, the possible equipping of surface combatants with nuclear-tipped cruise missiles⁵⁷, and the construction of specialized helicopter assault carriers.⁵⁸ It appears that deterrent action against indirect strategy will be a major role of the French navy well into the 21st century.

1. General Andre Beaufre, An Introduction to Strategy (New York: Praeger, 1965), p. 108.
2. Beaufre, An Introduction to Strategy, p. 108.
3. Beaufre, An Introduction to Strategy, pp. 109-110.
4. Beaufre, Deterrence and Strategy (New York: Praeger, 1966), p. 145.
5. Beaufre, An Introduction to Strategy, pp. 113-120.
6. Beaufre, An Introduction to Strategy; Beaufre, Deterrence and Strategy; Beaufre, Strategy of Action (London: Faber and Faber, 1967).
7. Particularly prominent Navy writers were Admirals Joire-Noulens and de Joybert (Chiefs of Staff of the Navy) and Vice Admirals Schweitzer and Wolff (Major-Generals of the Navy). These posts equate roughly to our CNO and VCNO.
8. For example, Bourges' speeches to the Institut des Hautes Etudes de Defense Nationale on 15 November 1976 and 11 October 1977: "La Politique Militaire de la France," Dossier d'Information no. 51, Service d'Information et de Relations Publique des Armees (SIRPA), Paris, January 1977, pp. 6-7; "Independance Nationale," Armees d'Aujourd'hui, November 1977, pp. 6-7.
9. A main navy spokesman on indirect strategy is Admiral Joire-Noulens. See his "Reflexions sur les missions de la marine," Armees d'Aujourd'hui, July 1975, especially p. 29; "Problemes operationnels et financiers de la marine nationale," Defense Nationale, October 1975, pp. 5-22; "Quelle marine et pour quoi faire des le temps de paix," Defense Nationale, July 1976, pp. 21-42. See also Admiral Marc de Joybert, "Cassandre bleu marine," Defense Nationale, June 1974, pp. 9-14.
10. Joire-Noulens, "Quelle marine," pp. 22, 27; Vice Admiral Marcel Wolff, "Politique de defense et politique navale," Defense Nationale, May 1976, p. 55.
11. "Marine et defense de la France," Revue Maritime, March 1977, p. 229. This article is by a group of former attendees of the Institut des Hautes Etudes de Defense Nationale (IHEDN) and is referred to hereafter as IHEDN, "Marine et defense."

12. Joire-Noulens, "Quelle marine," pp. 21-22; G. Mouline, "Des missions, une marine," Cols Bleus, 19 June 1976, p. 14; Gen G. Mery (Chief of Staff of the Armies), "Une armee pour quoi faire et comment?" Defense Nationale, June 1976, p. 21; Joire-Noulens, "Problemes operationnels," p. 10; Rear Admiral H. Labrousse, "La route du petrole peut-elle etre coupee?" Defense Nationale, October 1976, p. 29.
13. Joybert, "Cassandra bleu marine," p. 12. See also Philippe Veyrard, "Quelques aspects de l'evolution des menaces et de leurs parades," Defense Nationale, November 1974, p. 18.
14. Vice Admiral Jean Schweitzer, "La marine dans l'ocean Indien," Armees d'Aujourd'hui, November 1976, p. 33.
15. Joire-Noulens, "Reflexions," p. 29; "Problemes operationnels," pp. 10-11; Bourges, "Politique militaire de la France," p. 7.
16. Bourges, "Politique militaire de la France," p. 6.
17. Joybert, "Cassandra bleu marine," pp. 11-12; Joire-Noulens, "Reflexions," p. 28; Joire-Noulens, "Quelle marine," p. 7; Veyrard, "Quelques aspects," pp. 16-17.
18. Joire-Noulens, "Problemes operationnels," p. 11; "White Paper on National Defense," French Embassy, New York, 1972, vol. 1, p. 8. (This is an official French translation of "Livre blanc sur la defense nationale," vol. 1, Cedocor, Paris, 1972.)
19. Bourges, "Politique Militaire de la France," p. 7; Bourges, "Independance Nationale," p. 7.
20. Joybert, "Cassandra bleu marine," p. 12; A. Leost, "Pour une fois, ecoutons Cassandra," Revue Maritime, Jan-Feb 1975, pp. 80-92; "Programmation militaire pour les annees 1977-1982," Law no. 76-531 of June 19, 1976, Assemblée Nationale, Textes d'Interest General, no. 76-139, Paris, 1976, p. 3, (hereafter referred to as Law 1977-82).
21. Joybert, "Cassandra bleu marine," p. 11.
22. Joire-Noulens, "Quelle marine," p. 26; Schweitzer, "La marine dans l'Ocean Indien," p. 32; Mouline, "Des missions," p. 13.
23. Labrousse, "La route du petrole," p. 30.

24. Joire-Noulens, "Quelle marine," p. 25; Speech of Admiral Lan-nuzel (Chief of Staff of the Navy), March 16, 1977, Cols Bleus, April 2, 1977, p. 7; Wolff, "Politique navale," p. 949.
25. Schweitzer, "La marine dans l'Ocean Indien," p. 32-34; Jacques Perrot, "Le developpement oceanologique et la France d'Outre-Mer," Defense Nationale, February 1975, pp. 23-40.
26. Vice Admiral Marcel Wolff, "Politique navale," Revue Maritime, August-September 1976, pp. 943, 949; Mery, "Reflexions sur le concept d'emploi des forces," Defense Nationale, November 1975, pp. 17-19; Mery, "Armees pour quoi faire," p. 13; IHEDN, "Marine et Defense," p. 229; Law 1977-82, pp. 3-4; D'Allieres, "Rapport fait au nom de la commission de la defense nationale et des forces armees sur le projet de loi portant approbation de la programmation militaire pour les annees 1977-1982," Assemblée Nationale, no. 2292, Paris, May 13, 1976, vol. 1, pp. 4-5.
27. IHEDN, "Marine et defense," p. 226.
28. Bourges, "Politique militaire," p. 10. An example of the earlier French doctrine is General Ailleret, "Opinion sur la theorie strategique de la 'flexible response'," Defense Nationale, August-September 1964, pp. 1323-1340.
29. IHEDN, "Marine et defense," p. 229.
30. IHEDN, "Marine et defense," p. 232.
31. Bourges, "Politique militaire," p. 10; IHEDN, "Marine et defense," pp. 232, 236, 240; Bourges, "Dissuasion et forces nucleaires strategiques," Dossier d'Information no. 48, SIRPA, Paris, August 1976, p. 8.
32. General M. Fourquet, "Emploi des differents systemes de forces dans le cadre de la strategie de dissuasion," Defense Nationale, May 1969, pp. 757-767.
33. IHEDN, "Marine et defense," pp. 232-233.
34. Mery, "Refexions," pp. 20-21; Law 1977-1982, p. 6.
35. Joire-Noulens, "Quelle marine," p. 23.
36. Schweitzer, "La Marine dans l'Ocean Indien," p. 33; "La Marine," Forces Armees Francaises, March 1974, p. 32.

37. Law 1977-1982, p. 6; Mery, "Reflexions," p. 20; Joire-Noulens, "Quelle marine," p. 24.
38. IHEDN, "Marine et defense," p. 234; Joire-Noulens, "Quelle marine," p. 23.
39. Schweitzer, "La Marine dans l'Ocean Indien," p. 33; Wolff, "Politique navale," p. 948.
40. Schweitzer, "La Marine dans l'Ocean Indien," p. 33; Labrousse, "La route du petrole," p. 32.
41. IHEDN, "Marine et defense," pp. 235-236.
42. Defense Nationale, June 1978, p. 171.
43. IHEDN, "Marine et defense," p. 236; Paul-Marie de la Gorce, "Marine et armee nucleaire tactique," Armees d'Aujourd'hui, October 1977, p. 6; "White Paper," pp. 13-14.
44. IHEDN, "Marine et defense," p. 236; Joire-Noulens, "Quelle marine," p. 36; Veyrard, "Quelques aspects," p. 19; J. Gerville-Reache, "La France et la defense militaire," Defense Nationale, October 1974, p. 105.
45. Joire-Noulens, "Quelle marine," p. 36; Veyrard, "Quelques aspects," p. 19.
46. IHEDN, "Marine et defense," p. 240, also 232-233.
47. This list of missions is from M. Crespin, "Avis presente au nom de la commission de la defense nationale et des forces armees sur le projet de loi de finances pour 1977," Defense, Tome VI: Section Marine, Assemblee Nationale, no. 2532, Paris, October 12, 1976, vol. 6, pp. 8-11. A slightly different version is in G. Mouline, "Des missions, une Marine," Cols Bleus, June 19, 1976, p. 8.
48. Beaufre, An Introduction to Strategy, p. 110; Beaufre, Deterrence and Strategy, pp. 56-57.
49. Joire-Noulens, "Quelle marine," p. 29.
50. Wolff, "Politique navale," pp. 952-953; Joire-Noulens, "Quelle marine," p. 24.

51. IHEDN, "Marine et defense," p. 234. On the base problem see Joire-Noulens, "Quelle marine," pp. 28, 30.
52. Joire-Noulens, "Quelle marine," pp. 27-28.
53. Bourges, "Politique militaire," p. 6; Joire-Noulens, "Quelle marine," pp. 22-24; Joire-Noulens, "Problemes operation-
nelles," p. 12.
54. Mery, "Armees pour quo faire," p. 15; Mery, "Reflexions," p. 20.
55. Law 1977-1982, p. 7; Mery, "Armee pour quoi faire," p. 15; Mery, "Reflexions," p. 21; Joire-Noulens, "Quelle marine," p. 28; Joire-Noulens, "Reflexions," p. 28; Joybert, "Cassandra bleu marine," p. 12; Labrousse, "Route du petrole," p. 29; Mouline, "Des missions," p. 14; "White Paper," pp. 13-14, 26; Admiral Marc de Joybert, "Transports maritimes et defense," Defense Nationale, April 1973, pp. 33-44.
56. Joire-Noulens, "Quelle marine," p. 28; Jean Bertaux, "Sprendre et frappe -- les sous-marines d'attaque," Armees d'Aujourd'hui, May 1976, pp. 50-51.
57. Joire-Noulens, "Quelle marine," p. 36; Veyrard, "Quelques aspects," p. 36.
58. This ship, the PA-75 (formerly PH-75) is best described in Jean Labayle-Coubat, Combat Fleets of the World, 1976/77, (Annapolis: Naval Institute Press, 1976), p. 84. This ship was to have been begun in 1975, but is currently scheduled to be laid down in 1982.

CNA Professional Papers – 1976 to Present*

- PP 141
Mizrahi, Maurice M., "Generalized Hermite Polynomials," 5 pp., Feb 1976 (Reprinted from the *Journal of Computational and Applied Mathematics*, Vol. 1, No. 4 (1975), 273-277).
*Research supported by the National Science Foundation
- PP 143
Morowitz, Stanley and Sherman, Allan (LCdr., USN), "Maintenance Personnel Effectiveness in the Navy," 33 pp., Jan 1976 (Presented at the RAND Conference on Defense Manpower, Feb 1976) AD A021 581
- PP 144
Duch, William J., "The Navy of the Republic of China – History, Problems, and Prospects," 66 pp., Aug 1976 (Published in "A Guide to Asiatic Fleets," ed. by Barry M. Blechman and Robert Berman, Naval Institute Press) AD A030 460
- PP 145
Kelly, Anne M., "Port Visits and the "Internationalist Mission" of the Soviet Navy," 36 pp., Apr 1976, AD A023 436
- PP 147
Kessler, J. Christian, "Legal Issues in Protecting Offshore Structures," 33 pp., Jun 1976 (Prepared under task order N00014-68-A-0091-0023 for ONR) AD A026 388
- PP 148
Squires, Michael L., "Counterforce Effectiveness: A Comparison of the Tulpis "K" Measure and a Computer Simulation," 24 pp., Mar 1976 (Presented at the International Study Association Meetings, 27 Feb 1976) AD A022 591
- PP 150
Kelly, Anne M. and Petersen, Charles, "Recent Changes in Soviet Naval Policy: Prospects for Arms Limitations in the Mediterranean and Indian Ocean," 28 pp., Apr 1976, AD A 023 723
- PP 151
Morowitz, Stanley A., "The Economic Consequences of Political Philosophy," 8 pp., Apr 1976 (Reprinted from *Economic Inquiry*, Vol. XIV, No. 1, Mar 1976)
- PP 152
Mizrahi, Maurice M., "On Path Integral Solutions of the Schrodinger Equation, Without Limiting Procedure," 10 pp., Apr 1976 (Reprinted from *Journal of Mathematical Physics*, Vol. 17, No. 4 (Apr 1976), 566-576).
*Research supported by the National Science Foundation
- PP 153
Mizrahi, Maurice M., "WKB Expansions by Path Integrals, With Applications to the Anharmonic Oscillator," 137 pp., May 1976, AD A025 440
*Research supported by the National Science Foundation
- PP 154
Mizrahi, Maurice M., "On the Semi-Classical Expansion in Quantum Mechanics for Arbitrary Hamiltonians," 19 pp., May 1976 (Published in *Journal of Mathematical Physics*, Vol. 18, No. 4, pp. 788-790, Apr 1977), AD A025 441
- PP 155
Squires, Michael L., "Soviet Foreign Policy and Third World Nations," 26 pp., Jun 1976 (Prepared for presentation at the Midwest Political Science Association meetings, Apr 30, 1976) AD A028 388
- PP 156
Stallings, William, "Approaches to Chinese Character Recognition," 12 pp., Jun 1976 (Reprinted from *Pattern Recognition* (Pergamon Press), Vol. 8, pp. 87-98, 1976) AD A028 692
- PP 157
Morgan, William F., "Unemployment and the Pentagon Budget: Is There Anything in the Empty Pork Barrel?" 20 pp., Aug 1976 AD A030 455
- PP 158
Haskell, LCdr. Richard D. (USN), "Experimental Validation of Probability Predictions," 25 pp., Aug 1976 (Presented at the Military Operations Research Society Meeting, Fall 1976) AD A030 458
- PP 159
McConnell, James M., "The Gorskoy Articles, The New Gorskoy Book and Their Relation to Policy," 93 pp., Jul 1976 (Published in *Soviet Naval Influence: Domestic and Foreign Dimensions*, ed. by M. McGuire and J. McDonnell; New York: Praeger, 1977) AD A029 227
- PP 160
Wilson, Desmond F., Jr., "The U.S. Sixth Fleet and the Conventional Defense of Europe," 50 pp., Sep 1976, AD A030 457
- PP 161
Melich, Michael E. and Peet, Vice Adm. Ray (USN, Retired), "Fleet Commanders: Afloat or Ashore?" 9 pp., Aug 1976 (Reprinted from *U.S. Naval Institute Proceedings*, Jun 1976) AD A030 456
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Friedheim, Robert L., "Parliamentary Diplomacy," 106 pp., Sep 1976 AD A033 306
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Lockman, Robert F., "A Model for Predicting Recruit Losses," 9 pp., Sep 1976 (Presented at the 84th annual convention of the American Psychological Association, Washington, D.C., 4 Sep 1976) (Published in *Defense Manpower Policy* (Richard V. L. Cooper, ed.), The Rand Corporation, 1979), AD A030 459
- PP 164
Mahoney, Robert B., Jr., "An Assessment of Public and Elite Perceptions in France, The United Kingdom, and the Federal Republic of Germany," 31 pp., Feb 1977 (Presented at Conference "Perception of the U.S. – Soviet Balance and the Political Use of Military Power" sponsored by Director, Advanced Research Projects Agency, April 1976) AD A036 509
- PP 165
Jondrow, James M., "Effects of Trade Restrictions on Imports of Steel," 67 pp., November 1976, (Delivered at ILAB Conference in Dec 1976)
- PP 166 – Revised
Feldman, Paul, "Why It's Difficult to Change Regulation," Oct 1976, AD A037 682
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Kleinman, Samuel, "ROTC Service Commitments: a Comment," 4 pp., Nov 1976, (Published in *Public Choice*, Vol. XXIV, Fall 1976) AD A033 306
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Lockman, Robert F., "Revalidation of CNA Support Personnel Selection Measures," 36 pp., Nov 1976
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Jacobson, Louis S., "Earnings Losses of Workers Displaced from Manufacturing Industries," 36 pp., Nov 1976, (Delivered at ILAB Conference in Dec 1976), AD A036 508
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Brechling, Frank P., "A Time Series Analysis of Labor Turnover," Nov 1976, (Delivered at ILAB Conference in Dec 1976)
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Jordan, A. S. and Reiston, J. M., "A Diffusion Model for GaP Red LED Degradation," 10 pp., Nov 1976, (Published in *Journal of Applied Physics*, Vol. 47, pp. 4518-4527, Oct 1976)
*Bell Laboratories
- PP 172
Glassen, Kathleen P., "Unemployment Insurance and the Length of Unemployment," Dec 1976, (Presented at the University of Rochester Labor Workshop on 16 Nov 1976)
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Kleinman, Samuel D., "A Note on Racial Differences in the Added-Worker/Discouraged-Worker Controversy," 2 pp., Dec 1976, (Published in the *American Economist*, Vol. XX, No. 1, Spring 1976)
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Mahoney, Robert B., Jr., "A Comparison of the Brookings and International Incidents Projects," 12 pp., Feb 1977 AD A037 206
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Levine, Daniel; Stoloff, Peter and Scrull, Nancy, "Public Drug Treatment and Addict Crime," June 1976, (Published in *Journal of Legal Studies*, Vol. 5, No. 2)
- PP 176
Felix, Wendi, "Correlates of Retention and Promotion for USNA Graduates," 38 pp., Mar 1977, AD A039 048
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Lockman, Robert F. and Warner, John T., "Predicting Attrition: A Test of Alternative Approaches," 33 pp., Mar 1977, (Presented at the OSD/ONR Conference on Enlisted Attrition, Xerox International Training Center, Leesburg, Virginia, 4-7 April 1977), AD A039 047
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Kleinman, Samuel D., "An Evaluation of Navy Unrestricted Line Officer Accession Programs," 23 pp., April 1977, (Presented at the NATO Conference on Manpower Planning and Organization Design, Stresa, Italy, 20 June 1977), AD A039 048

*CNA Professional Papers with an AD number may be obtained from the National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia 22151. Other papers are available from the Management Information Office, Center for Naval Analyses, 2000 North Beauregard Street, Alexandria, Virginia 22311. An index of Selected Publications is also available on request. The index includes a Listing of Professional Papers, with abstracts, issued from 1969 to February 1978.

- PP 178
Stoloff, Peter H. and Balut, Stephen J., "Vacates: A Model for Personnel Inventory Planning Under Changing Management Policy," 14 pp. April 1977, (Presented at the NATO Conference on Manpower Planning and Organization Design, Stresa, Italy, 20 June 1977), AD A038 048
- PP 180
Horowitz, Stanley A. and Sherman, Allan, "The Characteristics of Naval Personnel and Personnel Performance," 16 pp. April 1977, (Presented at the NATO Conference on Manpower Planning and Organization Design, Stresa, Italy, 20 June 1977), AD A038 050
- PP 181
Balut, Stephen J. and Stoloff, Peter, "An Inventory Planning Model for Navy Enlisted Personnel," 35 pp., May 1977 (Prepared for presentation at the Joint National Meeting of the Operations Research Society of America and The Institute for Management Science, 9 May 1977, San Francisco, California), AD A042 221
- PP 182
Murray, Russell, 2nd, "The Quest for the Perfect Study or My First 1138 Days at CNA," 57 pp., April 1977
- PP 183
Kessing, David, "Changes in Soviet Naval Forces," 33 pp., November, 1976, (Published as part of Chapter 3, "General Purpose Forces: Navy and Marine Corps," in Arms, Men, and Military Budgets, Francis P. Hoebler and William Schneider, Jr. (eds.), (Crane, Russak & Company, Inc.: New York), 1977), AD A040 106
- PP 184
Lockman, Robert F., "An Overview of the OSD/ONR Conference on First Term Enlisted Attention," 22 pp., June 1977, (Presented to the 39th MORIS Working Group on Manpower and Personnel Planning, Annapolis, Md., 28-30 Jun 1977), AD A043 618
- PP 185
Kessing, David, "New Technology and Naval Forces in the South Atlantic," 22 pp. (This paper was the basis for a presentation made at the Institute for Foreign Policy Analyses, Cambridge, Mass., 28 April 1977), AD A043 619
- PP 186
Mizrahi, Maurice M., "Phase Space Integrals, Without Limiting Procedure," 31 pp., May 1977, (Invited paper presented at the 1977 NATO Institute on Path Integrals and Their Application in Quantum Statistical, and Solid State Physics, Antwerp, Belgium, July 17-30, 1977) (Published in Journal of Mathematical Physics 19(1), pp. 298-307, Jan 1978), AD A040 107
- PP 187
Collo, Russell C., "Homography for Operations Research," 35 pp., April 1977 (Presented at the Joint National Meeting of the Operations Research Society of America and The Institute for Management Science, San Francisco, California, 9 May 1977), AD A043 620
- PP 188
Durch, William J., "Information Processing and Outcome Forecasting for Multilateral Negotiations: Testing One Approach," 53 pp., May 1977 (Prepared for presentation to the 18th Annual Convention of the International Studies Association, Chase-Park Plaza Hotel, St. Louis, Missouri, March 16-20, 1977), AD A042 222
- PP 189
Collo, Russell C., "Error Detection in Computerized Information Retrieval Data Bases," July, 1977, 13 pp. (Presented at the Sixth Cranfield International Conference on Mechanized Information Storage and Retrieval Systems, Cranfield Institute of Technology, Cranfield, Bedford, England, 26-28 July 1977), AD A043 580
- PP 190
Mahoney, Robert B., Jr., "European Perceptions and East-West Competition," 96 pp., July 1977 (Prepared for presentation at the annual meeting of the International Studies Association, St. Louis, Mo., March, 1977), AD A043 661
- PP 191
Sawyer, Ronald, "The Independent Field Assignment: One Man's View," August 1977, 25 pp.
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Holen, Arlene, "Effects of Unemployment Insurance Entitlement on Duration and Job Search Outcomes," August 1977, 6 pp., (Reprinted from Industrial and Labor Relations Review, Vol., 30, No. 4, Jul 1977)
- PP 193
Horowitz, Stanley A., "A Model of Unemployment Insurance and the Work Test," August 1977, 7 pp. (Reprinted from Industrial and Labor Relations Review, Vol. 30, No. 40, Jul 1977)
- PP 194
Clausen, Kathleen P., "The Effects of Unemployment Insurance on the Duration of Unemployment and Subsequent Earnings," August 1977, 7 pp. (Reprinted from Industrial and Labor Relations Review, Vol. 30, No. 40, Jul 1977)
- PP 195
Brechtling, Frank, "Unemployment Insurance Taxes and Labor Turnover: Summary of Theoretical Findings," 12 pp. (Reprinted from Industrial and Labor Relations Review, Vol. 30, No. 40, Jul 1977)
- PP 196
Rakston, J. M. and Lorimer, O. G., "Degradation of Bulk Electroluminescent Efficiency in Zn, O-Doped GaP LED's," July 1977, 3 pp. (Reprinted from IEEE Transactions on Electron Devices, Vol. ED-24, No. 7, July 1977)
- PP 197
Wells, Anthony R., "The Centre for Naval Analysis," 14 pp., Dec 1977, AD A048 107
- PP 198
Clausen, Kathleen P., "The Distributional Effects of Unemployment Insurance," 25 pp., Sept. 1977 (Presented at a Hoover Institution Conference on Income Distribution, Oct 7-8, 1977), AD A054 423
- PP 199
Durch, William J., "Revolution From A.F.A.R. - The Cuban Armed Forces in Africa and the Middle East," Sep 1977, 16 pp., AD A046 288
- PP 200
Powers, Bruce F., "The United States Navy," 40 pp. Dec 1977 (Published as a chapter in The U.S. War Machine by Salamander Books, England, 1978), AD A048 108
- PP 201
Durch, William J., "The Cuban Military in Africa and The Middle East: From Algeria to Angola," Sep 1977, 67 pp., AD A045 675
- PP 202
Feldman, Paul, "Why Regulation Doesn't Work," (Reprinted from Technological Change and Welfare in the Regulated Industries, Brookings Reprint 219, 1971, and Review of Social Economy, Vol. XXIX, March, 1971, No. 1.) Sep 1977, 8 pp.
- PP 203
Feldman, Paul, "Efficiency, Distribution, and the Role of Government in a Market Economy," (Reprinted from The Journal of Political Economy, Vol. 79, No. 3, May/June 1971.) Sep 1977, 19 pp., AD A045 676
- PP 204
Wells, Anthony R., "The 1967 June War: Soviet Naval Diplomacy and The Sixth Fleet - A Re-appraisal," Oct 1977, 36 pp., AD A047 238
- PP 205
Collo, Russell C., "A Bibliometric Examination of the Square Root Theory of Scientific Publication Productivity," (Presented at the annual meeting of the American Society for Information Science, Chicago, Illinois, 29 September 1977.) Oct 1977, 6 pp., AD A047 237
- PP 206
McConnell, James M., "Strategy and Missions of the Soviet Navy in the Year 2000," 48 pp., Nov 1977 (Presented at a Conference on Problems of Sea Power as we Approach the 21st Century, sponsored by the American Enterprise Institute for Public Policy Research, 6 October 1977, and subsequently published in a collection of papers by the Institute), AD A047 244
- PP 207
Goldberg, Lawrence, "Cost-Effectiveness of Potential Federal Policies Affecting Research & Development Expenditures in the Auto, Steel and Food Industries," 36 pp., Oct 1977, (Presented at Southern Economic Association Meetings beginning 2 November 1977), AD A046 268
- PP 208
Roberts, Stephen S., "The Decline of the Overseas Station Fleets: The United States Asiatic Fleet and the Shanghai Crisis, 1932," 18 pp., Nov 1977 (Reprinted from The American Neptune, Vol. XXXVII, No. 3, July 1977), AD A047 245
- PP 209 - Classified.
- PP 210
Kessing, David, "Protecting The Fleet," 40 pp., Dec 1977 (Prepared for the American Enterprise Institute Conference on Problems of Sea Power as We Approach the 21st Century, October 6-7, 1977), AD A048 109
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Mizrahi, Maurice M., "On Approximating the Circular Coverage Function," 14 pp., Feb 1978, AD A054 426
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Mangel, Marc, "On Singular Characteristic Initial Value Problems with Unique Solutions," 20 pp., Jun 1978, AD A058 535
- PP 213
Mangel, Marc, "Fluctuations in Systems with Multiple Steady States. Application to Lancaster Equations," 12 pp., Feb 78, (Presented at the First Annual Workshop on the Information Linkage Between Applied Mathematics and Industry, Naval PG School, Feb 23-25, 1978), AD A071 472

- PP 214
Weinland, Robert G., "A Somewhat Different View of The Optimal Naval Posture," 37 pp., Jun 1978 (Presented at the 1976 Convention of the American Political Science Association (APSA/IUS Panel on "Changing Strategic Requirements and Military Posture"), Chicago, Ill., September 2, 1976), AD A056 228
- PP 215
Coile, Russell C., "Comments on: Principles of Information Retrieval by Manfred Kochen," 10 pp., Mar 78, (Published as a Letter to the Editor, *Journal of Documentation*, Vol. 31, No. 4, pages 296-301, December 1975), AD A054 428
- PP 216
Coile, Russell C., "Lotka's Frequency Distribution of Scientific Productivity," 18 pp., Feb 1978, (Published in the *Journal of the American Society for Information Science*, Vol. 28, No. 6, pp. 368-370, November 1977), AD A054 425
- PP 217
Coile, Russell C., "Bibliometric Studies of Scientific Productivity," 17 pp., Mar 78, (Presented at the Annual meeting of the American Society for Information Science held in San Francisco, California, October 1976), AD A054 442
- PP 218 - Classified.
- PP 219
Huntzinger, R. LeVar, "Market Analysis with Rational Expectations: Theory and Estimation," 60 pp., Apr 78, AD A054 422
- PP 220
Maurer, Donald E., "Diagonalization by Group Matrices," 26 pp., Apr 78, AD A054 443
- PP 221
Weinland, Robert G., "Superpower Naval Diplomacy in the October 1973 Arab-Israeli War," 76 pp., Jun 1978 (Published in *Seapower in the Mediterranean: Political Utility and Military Constraints*, The Washington Papers No. 61, Beverly Hills and London: Sage Publications, 1979), AD A055 564
- PP 222
Mizrahi, Maurice M., "Correspondence Rules and Path Integrals," 30 pp., Jun 1978 (Invited paper presented at the CNRS meeting on "Mathematical Problems in Feynman's Path Integrals," Marseille, France, May 22-26, 1978) (Published in *Springer Verlag Lecture Notes in Physics*, 106, (1979), 234-253) AD A055 536
- PP 223
Mangel, Marc, "Stochastic Mechanics of Molecular Molecule Reactions," 21 pp., Jun 1978, AD A056 227
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Mangel, Marc, "Aggregation, saturation, and Extinction in Exploited Animal Populations," 48 pp., Mar 1978, AD A058 536
*Portions of this work were started at the Institute of Applied Mathematics and Statistics, University of British Columbia, Vancouver, B.C., Canada
- PP 225
Mangel, Marc, "Oscillations, Fluctuations, and the Hopf Bifurcation," 43 pp., Jun 1978, AD A058 537
*Portions of this work were completed at the Institute of Applied Mathematics and Statistics, University of British Columbia, Vancouver, Canada.
- PP 226
Rahston, J. M. and J. W. Mann, "Temperature and Current Dependence of Degradation in Red-Emitting GaP LEDs," 34 pp., Jun 1978 (Published in *Journal of Applied Physics*, 50, 3630, May 1979), AD A058 538
*Bell Telephone Laboratories, Inc.
- PP 227
Mangel, Marc, "Uniform Treatment of Fluctuations at Critical Points," 50 pp., May 1978, AD A058 539
- PP 228
Mangel, Marc, "Relaxation at Critical Points: Deterministic and Stochastic Theory," 54 pp., Jun 1978, AD A058 540
- PP 229
Mangel, Marc, "Diffusion Theory of Reaction Rates, I: Formulation and Einstein-Smoluchowski Approximation," 50 pp., Jan 1978, AD A058 541
- PP 230
Mangel, Marc, "Diffusion Theory of Reaction Rates, II Ornstein-Uhlenbeck Approximation," 34 pp., Feb 1978, AD A058 542
- PP 231
Wilson, Desmond P., Jr., "Naval Projection Forces: The Case for a Responsive MAF," Aug 1978, AD A058 543
- PP 232
Jacobson, Louis, "Can Policy Changes Be Made Acceptable to Labor?" Aug 1978 (Submitted for publication in *Industrial and Labor Relations Review*), AD A061 528
- PP 233
Jacobson, Louis, "An Alternative Explanation of the Cyclical Pattern of Quites," 23 pp., Sep 1978
- PP 234 - Revised
Jondrow, James and Levy, Robert A., "Does Federal Expenditure Displace State and Local Expenditure: The Case of Construction Grants," 25 pp., Oct 1979, AD A061 529
- PP 235
Mizrahi, Maurice M., "The Semiclassical Expansion of the Anharmonic-Oscillator Propagator," 41 pp., Oct 1978 (Published in *Journal of Mathematical Physics* 20 (1979), pp. 844-855), AD A061 538
- PP 237
Maurer, Donald, "A Matrix Criterion for Normal Integral Bases," 10 pp., Jan 1979 (Published in the *Illinois Journal of Mathematics*, Vol. 22 (1978), pp. 672-681)
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Utgoff, Kathleen Classen, "Unemployment Insurance and The Employment Rate," 20 pp., Oct 1978 (Presented at the Conference on Economic Indicators and Performance: The Current Dilemma Facing Government and Business Leaders, presented by Indiana University Graduate School of Business), AD A061 527
- PP 239
Trost, R. P. and Warner, J. T., "The Effects of Military Occupational Training on Civilian Earnings: An Income Selectivity Approach," 38 pp., Nov 1979, AD A077 831
- PP 240
Powers, Bruce, "Goals of the Center for Naval Analyses," 13 pp., Dec 1978, AD A063 759
- PP 241
Mangel, Marc, "Fluctuations at Chemical Instabilities," 24 pp., Dec 1978 (Published in *Journal of Chemical Physics*, Vol. 69, No. 8, Oct 15, 1978), AD A063 787
- PP 242
Simpson, William R., "The Analysis of Dynamically Interactive Systems (Air Combat by the Numbers)," 160 pp., Dec 1978, AD A063 780
- PP 243
Simpson, William R., "A Probabilistic Formulation of Murphy Dynamics as Applied to the Analysis of Operational Research Problems," 18 pp., Dec 1978, AD A063 781
- PP 244
Sherman, Allan and Horowitz, Stanley A., "Maintenance Costs of Complex Equipment," 20 pp., Dec 1978 (Published By The American Society of Naval Engineers, *Naval Engineers Journal*, Vol. 91, No. 6, Dec 1979) AD A071 473
- PP 245
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