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NAVY AND POLITY: A 1963 BASELINE

In 1963 Arthur S. Banks and Robert B. Textor published "A Cross-Polity Survey," a volume which compared 115 nation-states on the basis of 57 political, economic, and social variables. By utilizing this work in conjunction with the 1963 and 1969 editions of "Jane's Fighting Ships," the authors of this article have sought to discover in a simple statistical comparison what sociological factors are associated with large and complex navies. (The authors gratefully acknowledge the help of Quentin S. Meeker and James C. Aller.)

An article

by

Professor John M. Roberts

and

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Introduction. Although scholars employing crosscultural methodologies are making an increasing use of available data in various forms, their studies have not as yet dealt directly with military concerns. The present crosscultural study makes use of available data on navies and politics to define a six-type scale of naval complexity and to determine political and other variables associated with the scale. This study is essentially a simple one requiring few resources, but it indicates a direction of research which might profitably be followed in the future, particularly if greater resources permit the use of more elaborate research designs.

In 1963 Banks and Textor published *A Cross-Polity Survey*,¹ a volume intended as a research and reference tool

in comparative politics which dealt with all of the independent politics then existing in the world with the exception of Nationalist China and Western Samoa. Each of the 115 politics in their "total sample" was coded on the basis of 57 variables as of April 1963. These variables then figured in numerous crosstabulations in which each of the 115 politics was given an equal weight. The overall aim of the book was to summarize "a large amount of current information in a form that should enable the trained reader to discern new relationships among political phenomena."²

Banks and Textor, however, did not define or use a naval variable. The present paper presents a six-class ordinal scale of naval complexity as of 1963,

and it examines the associations between this scale and 48 ordinal scales published by Banks and Textor. The seven nominal variables were not considered. This treatment is designed to illustrate a way in which the navies of the world can be scaled and studied crossculturally. In a measure, this study defines the larger cultural environment of the world navies as it existed in 1963, when the Navy of the Soviet Union was not yet at the top of the scale.

No generally accepted operational definition of the term, "navy," exists. Since politics coded by Banks and Textor were also listed in the 1963 edition of *Jane's Fighting Ships*,³ it was decided that if a polity were listed in the latter source, it could be deemed to have a navy. On this basis of the double listing, there was a universe for this study of 91 navies in 1963.

In assembling data on navies, entries were made for both 1963 and 1969 of the total number of naval personnel, the total number of ships, the number of aircraft carriers, the number of cruisers, the number of submarines, the number of destroyers, the number of minesweepers, the number of small craft, defense budget figures, and internal security force strengths. Where figures were missing from *Jane's Fighting Ships*, data from *The Reference Handbook of the Armed Forces of the World*⁴ were used. Much of this information, however, is not used in this paper. Instead, the naval information is reduced to a simple Guttman scale based on the

presence or absence in 1963 of each of six types of ships (see table 1).

Although some of the navies did not fit exactly in one of the types given above, the scale of naval complexity was quite acceptable from a statistical point of view with a Menzel's coefficient of scalability of .89 and a coefficient of reproducibility of .97. In the lists which follow the 15 errors occurring in the scale are noted by a minus sign, followed by the name of the type of ship which was lacking. Within scale types, navies are listed below in order of numbers of ships within the defining type and here, if there are ties, by the numbers of ships within the next defining type and so on. The following then is the six-class ordinal scale of naval complexity arranged in order of listing from the most complex to the least.

The variables with which the scale of naval complexity will be associated are described in full in chapter 3 of Banks and Textor.⁵ They state: "The format of this chapter is quite simple. Each of the raw characteristics, with its subsumed raw attributes, is presented in serial order, accompanied by a brief commentary on coding procedures and problems." Since the 57 raw characteristics (hereafter termed variables) are arranged in a meaningful order in the Banks and Textor volume, the same order is preserved in the list of variables presented here. Roughly speaking, there is a series of background or general variables followed by a series of political

TABLE 1—SCALE OF NAVAL COMPLEXITY

Navy Scale Types	Ships					
	Carrier	Cruiser	Submarine	Destroyer	Minesweeper	Small Craft
I Carrier	x ^B	x	x	x	x	x
II Cruiser	o	x	x	x	x	x
III Submarine	o	o	x	x	x	x
IV Destroyer	o	o	o	x	x	x
V Minesweeper	o	o	o	o	x	x
VI Small Craft	o	o	o	o	o	x

^a(x = present and o = absent)

32 NAVAL WAR COLLEGE REVIEW

Scale of Naval Complexity (N = 91)

Scale Type I, Carrier Navies (n = 9).

United States, United Kingdom, France, Argentina, Netherlands, Brazil, India
(-submarine), Australia (-cruiser), Canada (-cruiser).

Scale Type II, Cruiser Navies (n = 10).

Union of Soviet Socialist Republics, Spain, Sweden, Italy, Peru, Chile
(-minesweeper), Indonesia, Greece, Pakistan (-submarine), New Zealand
(-submarine).

Scale Type III, Submarine Navies (n = 14).

China, Rumania, Turkey, West Germany, United Arab Republic, Poland,
Norway, Japan, Portugal, Denmark, Bulgaria, Yugoslavia, Israel (-minesweeper),
Venezuela (-minesweeper).

Scale Type IV, Destroyer Navies (n = 17).

South Korea, Mexico (-minesweeper), Dominican Republic (-minesweeper),
Philippines, Cuba (-minesweeper), South Africa, Thailand, South Vietnam,
Colombia (-minesweeper), Ecuador (-minesweeper), East Germany, Belgium,
Iran, Uruguay, Ceylon, Finland, Burma.

Scale Type V, Minesweeper Navies (n = 9).

North Korea, Hungary, Albania, Malaya, Ghana, Syria, Nigeria, Libya, Algeria
(-small craft).

Scale Type VI, Small Craft Navies (n = 32).

Laos, Iraq, Paraguay, Cambodia, North Vietnam, Ethiopia, Haiti, Iceland,
Nicaragua, Cameroon, Congo (Leo), Guinea, Lebanon, Liberia, Sudan, Togo,
Costa Rica, Ireland, Morocco, Sierra Leone, Somalia, El Salvador, Ivory Coast,
Panama, Senegal, Trinidad, Tunisia, Gabon, Guatemala, Honduras, Saudi Arabia,
Malagasy Republic.

variables. The brief definition of the scale represented by the attributes of the variable is quoted in full from Banks and Textor in the "Results" section which follows, but space does not permit the inclusion of the valuable commentary. The original volume, however, can always be consulted for a more complete description of any given variable.

Banks and Textor were not able to code data for their full sample for every variable, and they always noted the entries for those polities for which the data were ambiguous, irrelevant, unascertained, and unascertainable. In the following "Results" section the polities coded in these residual categories were not included in the number of polities considered for any given variable. Thus, the number of polities figuring in each association is always 91 or fewer.

The Goodman-Kruskal coefficient of ordinal association (G or γ) is used to determine the associations between the ordinal scale of naval complexity

and the ordinal scales presented by Banks and Textor. This coefficient varies from $+1$ to -1 . If two sets of ranks are in perfect agreement, G is $+1$, but if the two sets of ranks are in perfect inversion, G is -1 . No perfect associations are presented in the "Results" section, but it will be seen that as the values increase from 0 to $+1$ or -1 they express increasing association between the two rankings. Furthermore, it is possible to determine the significance of a G by rejecting sampling variation as an explanation of the results.⁶

As an illustration, the ordinal scale labeled "Gross National Product" by Banks and Textor is defined in the following way:

"3. GROSS NATIONAL PRODUCT

- A. Very high (\$125 billion & above)
- B. High (\$25-124.9 billion)
- G. Medium (\$5-24.9 billion)
- H. Low (\$1-4.9 billion)
- I. Very low (under \$1 billion)."⁷

Table II gives the distribution for the scale of naval complexity and the gross

TABLE II

Navy Types	Gross National Product								
	Very High	High	Medium	Low	Very Low	Total	G	z	p < two-tailed
I Carrier	1	4	4	0	0	9			
II Cruiser	1	1	4	4	0	10			
III Submarine	0	3	5	6	0	14			
IV Destroyer	0	0	4	11	2	17			
V Minesweeper	0	0	0	4	5	9			
VI Small Craft	0	0	0	7	25	32			
Total	2	8	17	32	32	91	.871	8.24	.0001

national product scale along with the coefficient of ordinal association.

It can be seen by inspection that the navy scale is positively associated with the gross national product scale, an association which is certainly not surprising but which tends to validate the navy scale to some extent. In the section which follows, other variables are treated in the same way except for the fact that it is not possible to present the actual distributions.

Results. All of the variables will be listed below in the same order as they appear in Banks and Textor. Only the title of the nominal variables will be

entered. With the remaining ordinal variables, however, the title is given followed by the number of polities for which the coded information exists, the coefficient of ordinal association (gamma) which may be either positive or negative, the z score, and the two-tailed probability (all two-tailed probabilities greater than .05, such as .10, will simply be listed as nonsignificant). Then a brief definition of the scale classes is given with the highest class being given the number of "1," the next highest, the number "2," and so on. The number of polities coded in each class is entered in parentheses after the description of the class or attribute.

The Variables

1. **Areal Grouping:** (Nominal variable).

2. **Size:** n = 91; G = .436; z = 3.75; p < .002.

Scale: (1) Very large (2 million square miles and above) (6); (2) Large (300,000-1.9 million square miles) (19); (3) Medium (75,000-299,000 square miles) (30); (4) Small (below 75,000 square miles) (36).

3. **Population:** n = 91; G = .727; z = 6.56; p < .0001.

Scale: (1) Very large (100 million and above) (4); (2) Large (17-99.9 million) (23); (3) Medium (6-16.9 million) (28); (4) Small (under 6 million) (36).

4. **Population Density:** n = 91; G = .326; z = 2.62; p < .01.

Scale: (1) Very High (600/square miles and above) (4); (2) High (300-599/square miles) (10); (3) Medium (180-299/square miles) (25); (4) Low (below 100/square miles) (52).

5. **Population Growth Rate:** n = 86; G = -.260; z = -1.72; p (nonsignificant).

Scale: (1) High (2 percent or above) (51); (2) Low (less than 2 percent) (35).

6. **Urbanization:** n = 81; G = .697; z = 4.51; p < .8001.

Scale: (1) High (20 percent or more of population in cities of 20,000 or more and 12.5 percent or more of population in cities of 100,000 or more) (50); (2) Low (less than 20 percent of population in cities of 20,000 or more and less than 12.5 percent of population in cities of 100,000 or more) (31).

34 NAVAL WAR COLLEGE REVIEW

7. Agricultural Population: $n = 89$; $G = -.628$; $z = -5.47$; $p < .0001$.

Scale: (1) High (over 66 percent) (39); (2) Medium (34-66 percent) (29); (3) Low (16-33 percent) (14); (4) Very low (under 16 percent) (7).

8. Gross National Product: $n = 91$; $G = .871$; $z = 8.24$; $p < .0001$.

Scale: (see table II).

9. Per Capita Gross National Product: $n = 91$; $G = .577$; $z = 5.43$; $p < .0001$.

Scale: (1) Very high (\$1,200 and above) (9); (2) High (\$600-1,199) (11); (3) Medium (\$300-599) (16); (4) Low (150-299) (22); (5) Very low (under \$150) (33).

10. International Financial Status: $n = 85$; $G = .896$; $z = 8.20$; $p < .0001$.

Scale: (1) Very high (UN assessment of 10 percent or above) (2); (2) High (UN assessment of 1.50-9.99 percent) (8); (3) Medium (UN assessment of 0.25-1.49 percent) (24); (4) Low (UN assessment of 0.05-0.24 percent) (30); (5) Very low (minimum UN assessment of 0.04 percent) (21).

11. Economic Developmental Status: $n = 86$; $G = .736$; $z = 6.69$; $p < .0001$.

Scale: (1) Developed (self-sustaining economic growth; GNP/capita over \$600) (16); (2) Intermediate (sustained and near self-sustaining economic growth) (15); (3) Underdeveloped (reasonable prospect of attaining sustained economic growth by the mid-1970's) (16); (4) Very underdeveloped (little or no prospect of attaining sustained economic growth within the foreseeable future) (39).

12. Literacy Rate: $n = 83$; $G = .599$; $z = 5.27$; $p < .0001$.

Scale: (1) High (90 percent or above) (21); (2) Medium (50-89 percent) (25); (3) Low (10-49 percent) (25); (4) Very low (under 10 percent) (12).

13. Freedom of the Press: $n = 80$; $G = .442$; $z = 1.17$; p (nonsignificant).

Scale: (1) Complete (no censorship or government control of either domestic press or foreign correspondents) (32); (2) Intermittent (occasional or selective censorship of either domestic press or foreign correspondents) (16); (3) Internally absent (strict domestic censorship; no restraint on foreign news-gathering, or selective cable-head censorship) (20); (4) Internally and externally absent (strict direct or indirect censorship or control, domestic and foreign) (12).

14. Newspaper Circulation per 1,000 Population: $n = 89$; $G = .633$; $z = 5.55$; $p < .0001$.

Scale: (1) High (300 and over) (12); (2) Medium (100-299) (19); Low (10-99) (38); Very low (below 10) (20).

15. Religious Configuration: (Nominal variable).

16. Religious Homogeneity: $n = 85$; $G = .219$; $z = 1.36$; p (nonsignificant).

Scale: (1) Homogeneous (50); (2) Heterogeneous (35).

17. Racial Homogeneity: $n = 87$; $G = .241$; $z = 1.27$; p (nonsignificant).

Scale: (1) Homogeneous (90 percent or more of one race) (67); (2) Heterogeneous (less than 90 percent of one race) (20).

18. Linguistic Homogeneity: $n = 90$; $G = .246$; $z = 1.85$; p (nonsignificant).

Scale: (1) Homogeneous (majority of 85 percent or more; no significant single minority) (44); (2) Weakly heterogeneous (majority of 85 percent or more; significant minority of 15 percent or less) (12); (3) Strongly heterogeneous (no single groups of 85 percent or more) (34).

19. Date of Independence: $n = 87$; $G = .522$; $z = 4.48$; $p < .0001$.

Scale: (1) Before 19th century (16); (2) 1800-1913 (30); (3) 1914-1945 (10); (4) After 1945 (31).

20. Westernization: $n = 89$; $G = .643$; $z = 5.98$; $p < .0001$.

Scale: (1) Historically Western nation (22); (2) Significantly Westernized (no colonial relationship) (7); (3) Significantly Westernized (colonial relationship) (25); (4) Partially Westernized (no colonial relationship) (6); (5) Partially Westernized (colonial relationship) (28); (6) Non-Westernized (no colonial relationship, little or no visible Westernization) (1).

21. Former Colonial Ruler: (Nominal variable).

22. Political Modernization: Historical Type. $n = 91$; $G = .593$; $z = 5.31$; $p < .0001$.
Scale: (1) Early European or early European derived (early modernizing European society or offshoot) (9); (2) Later European or later European derived (later modernizing European society or offshoot) (37); (3) Non-European autochthonous (self-modernizing extra-European society) (7); (4) Developed tutelary (developed society modernizing under tutelage) (26); (5) Undeveloped tutelary (undeveloped society modernizing under tutelage) (12).

23. Political Modernization: Periodization. $n = 91$; $G = .690$; $z = 5.27$; $p < .0001$.
Scale: (1) Advanced (transitional phase completed) (53); (2) Midtransitional (entered transitional phase prior to 1945) (14); (3) Early transitional (entered transitional phase 1945 or later) (23); (4) Pretransitional (not yet entered transitional phase) (1).

24. Ideological Orientation: (Nominal variable).

25. System Style: $n = 88$; $G = .014$; $z = 0.07$; p (nonsignificant).
Scale: (1) Mobilizational (18); (2) Limited mobilizational (9); (3) Nonmobilizational (61).

26. Constitutional Status of Present Regime: $n = 76$; $G = .132$; $z = 0.93$; p (nonsignificant).
Scale: (1) Constitutional (government conducted with reference to recognized constitutional norms) (43); (2) Authoritarian (no effective constitutional limitation or fairly regular recourse to extraconstitutional powers. Arbitrary exercise of power confined largely to the political sector) (19); (3) Totalitarian (no effective constitutional limitation. Broad exercise of power by the regime in both political and social spheres) (14).

27. Governmental Stability: $n = 74$; $G = .313$; $z = 2.56$; $p < .05$.
Scale: (1) Government generally stable since World War I or major interwar constitutional change (19); (2) Government generally stable since World War II or major postwar constitutional change (25); (3) Government moderately stable since World War II or major postwar constitutional change (10); (4) Government unstable since World War II or major postwar constitutional change (20).

28. Representative Character of Current Regime: $n = 78$; $G = .312$; $z = 2.31$; $p < .05$.
Scale: (1) Polyarchie (broadly representative system) (35); (2) Limited polyarchie (mass-sector representative or broadly oligarchie system) (7); (3) Pseudopolyarchie (ineffective representative or disguised oligarchie or autocratic system) (31); (4) Nonpolyarchie (nonrepresentative in form as well as content) (5).

29. Current Electoral System: $n = 65$; $G = .435$; $z = 2.65$; $p < .01$.
Scale: (1) Competitive (no party ban or ban on extremist or extraconstitutional parties only) (37); (2) Partially competitive (one party with 35 percent or more of legislative seats) (4); (3) Noncompetitive (single-list voting or no elected opposition) (24).

30. Freedom of Group Opposition: $n = 77$; $G = .202$; $z = 2.15$; $p < .05$.
Scale: (1) Autonomous groups free to enter politics and able to oppose government (save for extremist groups, where banned) (39); (2) Autonomous groups free to organize in politics but limited in capacity to oppose government (includes absorption of actual or potential opposition leadership into government) (12); (3) Autonomous groups tolerated informally and outside politics (17); (4) No genuinely autonomous groups tolerated (9).

31. Political Enculturation: $n = 77$; $G = .211$; $z = 1.50$; p (nonsignificant).
Scale: (1) High (integrated and homogeneous polity with little or no extreme opposition, communalism, fractionalism, disenfranchisement, or political nonassimilation) (13); (2) Medium (less fully integrated polity with significant minority in extreme opposition, communalized, fractionalized, disenfranchised, or politically nonassimilated) (34); (3) Low (relatively nonintegrated or restrictive polity with majority or near majority in extreme opposition, communalized, fractionalized, disenfranchised, or politically nonassimilated) (30).

36 NAVAL WAR COLLEGE REVIEW

- 32. Sectionalism:** $n = 87$; $G = .103$; $z = 0.81$; p (nonsignificant).
Scale: (1) Extreme (one or more groups with extreme sectional feeling) (22); (2) moderate (one group with strong sectional feeling or several with moderate sectional feeling) (29); (3) Negligible (no significant sectional feeling) (36).
- 33. Interest Articulation by Associational Groups:** $n = 87$; $G = .656$; $z = 5.81$; $p < .0001$.
Scale: (1) Significant (18); (2) Moderate (11); (3) Limited (25); (4) Negligible (33).
- 34. Interest Articulation by Institutional Groups:** $n = 86$; $G = -.164$; $z = -1.38$; p (nonsignificant).
Scale: (1) Very significant (35); (2) Significant (29); (3) Moderate (13); (4) Limited (9).
- 35. Interest Articulation by Nonassociational Groups:** $n = 91$; $G = -.476$; $z = -4.17$; $p < .0001$.
Scale: (1) Significant (36); (2) Moderate (26); (3) Limited (23); (4) Negligible (6).
- 36. Interest Articulation by Anomic Groups:** $n = 78$; $G = -.295$; $z = -2.30$; $p < .05$.
Scale: (1) Frequent (12); (2) Occasional (38); (3) Infrequent (15); (4) Very Infrequent (13).
- 37. Interest Articulation by Political Parties:** $n = 74$; $G = .059$; $z = 0.45$; p (nonsignificant).
Scale: (1) Significant (17); (2) Moderate (25); (3) Limited (6); (4) Negligible (26).
- 38. Interest Aggregation by Political Parties:** $n = 50$; $G = .306$; $z = 1.96$; $p < .05$.
Scale: (1) Significant (10); (2) Moderate (14); (3) Limited (17); (4) Negligible (9).
- 39. Interest Aggregation by Executive:** $n = 68$; $G = .116$; $z = 0.86$; p (nonsignificant).
Scale: (1) Significant (18); (2) Moderate (24); (3) Limited (15); (4) Negligible (11).
- 40. Interest Aggregation by Legislature:** $n = 72$; $G = .466$; $z = 3.60$; $p < .0005$.
Scale: (1) Significant (10); (2) Moderate (15); (3) Limited (14); (4) Negligible (33).
- 41. Party System: Quantitative.** $n = 75$; $G = -.199$; $z = -1.64$; p (nonsignificant).
Scale: (1) No parties or all parties illegal or ineffective (4); (2) One party (all others nonexistent, banned, nonparticipant, or adjuncts of dominant party in electoral activity. Includes "national fronts" and one-party fusional systems) (24); (3) One party dominant (opposition, but numerically ineffective at national level. Includes minority participation in government while retaining party identity for electoral purposes) (9); (4) One-and-a-half-party (opposition significant but unable to win majority) (3); (5) Two party or effectively two party (reasonable expectation of party rotation) (9); (6) Multiparty (coalition or minority party government normally mandatory if parliamentary system) (26).
- 42. Party System: Qualitative.** (Nominal variable).
- 43. Stability of Party System:** $n = 71$; $G = .312$; $z = 2.18$; $p < .05$.
Scale: (1) Stable (all significant parties stable and organizationally nonsituational) (36); (2) Moderately stable (relatively infrequent of abrupt system changes or mixed situational-permanent party complex) (13); (3) Unstable (all parties unstable, situational, personalistic, or *ad hoc*) (22).
- 44. Personalismo:** $n = 79$; $G = -.270$; $z = 1.88$; p (nonsignificant).
Scale: (1) Pronounced (all parties highly personalistic or fractionalized along personalistic lines) (14); (2) Moderate (some tendency toward personalism by all parties, or mixed personalistic, nonpersonalistic party complex) (17); (3) Negligible (no parties with significant personalist tendencies) (48).

- 45. Political Leadership:** $n = 77$; $G = -.104$; $z = -1.38$; p (nonsignificant).
Scale: (1) Elitist (recruitment confined to a particular racial, social, or ideological stratum) (25); (2) Moderate elitist (recruitment largely, but not wholly, confined to a particular racial, social, or ideological stratum) (16); (3) Nonelitist (recruitment largely on the basis of achievement criteria only) (36).
- 46. Leadership Charisma:** $n = 82$; $G = -.238$; $z = -1.49$; p (nonsignificant).
Scale: (1) Pronounced (12); (2) Moderate (11); (3) Negligible (59).
- 47. Vertical Power Distribution:** $n = 90$; $G = .486$; $z = 3.03$; $p = .005$.
Scale: (1) Effective federalism (6); (2) Limited federalism (federal structure with limited separation or pronounced "centralist" tendencies) (6); (3) Formal federalism (formal or limited formal federal structure only) (6); (4) Formal and effective unitarism (72).
- 48. Horizontal Power Distribution:** $n = 84$; $G = .310$; $z = 2.45$; $p < .05$.
Scale: (1) Significant (effective allocation of power to functionally autonomous legislative, executive, and judicial organs) (24); (2) Limited (one branch of government without genuine functional autonomy or two branches with limited functional autonomy) (24); (3) Negligible (complete dominance of government by one branch or by extragovernmental agency) (36).
- 49. Legislative-Executive Structure:** (Nominal variable).
- 50. Current Status of Legislature:** $n = 77$; $G = .307$; $z = 2.52$; $p < .05$.
Scale: (1) Fully effective (performs normal legislative function as reasonably "co-equal" branch of national government) (23); (2) Partially effective (tendency toward domination by executive or otherwise partially limited in effective exercise of legislative functions) (21); (3) Largely ineffective (virtually complete domination by executive or by one-party or dominant party organization) (10); (4) Wholly ineffective (restricted to consultative or "rubber-stamp" legislative function) (23).
- 51. Character of Legislature:** $n = 82$; $G = -.450$; $z = -2.99$; $p = .005$.
Scale: (1) Unicameral (38); (2) Bicameral (44).
- 52. Current Status of Executive:** $n = 75$; $G = -.258$; $z = -1.64$; p (nonsignificant).
Scale: (1) Dominant (40); (2) Strong (34); (3) Weak (1).
- 53. Character of Bureaucracy:** $n = 87$; $G = .673$; $z = 5.15$; $p < .0001$.
Scale: (1) Modern (generally effective and responsible civil service or equivalent, performing in a functionally specific, nonascriptive social context) (18); (2) Semimodern (largely "rationalized" bureaucratic structure of limited efficiency because of shortage of skilled personnel, inadequacy of recruitment, or performance criteria; excessive intrusion by nonadministrative organs or partially noncongruent social institutions) (50); (3) Postcolonial transitional (largely rationalized ex-colonial bureaucratic structure in process of personnel "nationalization" and adaptation to the servicing or restructuring of autochthonous social institutions) (13); (4) Traditional (largely nonrationalized bureaucratic structure performing in the context of an ascriptive or "deferential" stratification system) (6).
- 54. Political Participation by the Military:** $n = 85$; $G = -.203$; $z = -1.59$; p (nonsignificant).
Scale: (1) Interventive (presently exercises or has recently exercised direct power) (20); (2) Supportive (performs parapolitical role in support of traditionalist, authoritarian, totalitarian, or modernizing regime) (27); (3) Neutral (apolitical or of minor political importance) (38).
- 55. Role of Police:** $n = 84$; $G = -.554$; $z = -3.58$; $p < .0005$.
Scale: (1) Politically significant (important continuing or intermittent political function in addition to law enforcement) (56); (2) Not politically significant (role confined primarily to law enforcement) (28).
- 56. Character of Legal System:** (Nominal variable).

38 NAVAL WAR COLLEGE REVIEW

57. Communist Bloc: $n = 91$; $G = .198$; $z = 0.96$; p (nonsignificant).

Scale: (1) Communist (11); (2) Quasi-Communist (1); (3) Non-Communist (79).

In summary, it can be noted that seven of the 57 variables were nominal. Of the remaining 50 variables, two were doubtfully ordinal. Nineteen of the associations with the scale of naval complexity were not significant, and some of the significant associations were at too low levels to be very interesting. Still, there were 22 associations of .4 or better, and of these, nine were associations of .6 or better.

Discussion. In a sense the foregoing associations speak for themselves and require no further discussion. Some of the patterns of association, however, merit comment. The possibilities of deviant case and trend analysis ought to be mentioned even if they cannot be developed in this brief paper. Finally, a few suggestions for future research need to be made.

It is unfortunately the case that causality cannot be inferred from simple associations. Common experience, however, permits some judgments or educated guesses. Before making such guesses, however, it would be well to note that many of these variables are quite closely related to each other. Gross national product and international financial status, for example, are certainly not independent variables. Ultimately a multivariate analysis might reveal that actually only a few factors of importance exist. For the present, however, the linkages are largely a matter of judgment.

Most of the strong associations found by this inquiry were not particularly surprising. It was to be expected, for example, that politics which were large (variable 2), populous (variable 3), urbanized (variables 6 and 7), wealthy (variables 8, 9, and 10), developed (variable 11), educated and informed (variables 12 and 14), would have complex navies, while their opposites at the

other end of these scales would have simple navies. Again an expected historical dimension is to be discerned for, in the main, complex navies appear to have been Western development linked with the political, economic, and technological ramifications of the continuing industrial revolution (variables 12, 20, 22, and 23).

It would also seem that complex navies are associated with advanced bureaucracies (variable 53), but when it is realized that the presence or absence of various ship types is only an indicator of many different bureaucratic manifestations, this is not surprising.

In sum, all of these and other associations may validate the scale of naval complexity, but they do not seem to lead to new insights and perspectives.

One group of associations may be more interesting, for it suggests that navies may flourish in open, pluralistic, and decentralized environments, although even here it must be admitted that this may be a historical rather than a functional relationship. In this connection the set of associations having to do with interest articulation is informative. The scale of naval complexity was strongly associated with the scale for interest articulation by associational groups ($G = .656$). Banks and Textor describe this particular variable:

This raw characteristic and the three that follow are based on the interest articulation schema set forth in *The Politics of Developing Areas*. Almond and Coleman describe associational interest groups as "the specialized structures of interest articulation—trade unions, organizations of businessmen or industrialists, ethnic associations (but not the ethnic groups themselves), associations organized by religious de-

nominations (but not the churches themselves), civic groups, and the like. Their characteristics are explicit representation of the interests of a particular group, orderly procedures for the formulation of interests and demands, and transmission of these demands to other political structures such as political parties, legislatures, bureaucracies.⁸

In contrast to the strong association with the scale for interest articulation by associational groups, there was no significant association between the scale of naval complexity and the scale for interest articulation by institutional groups. This latter scale was discussed by Banks and Textor in the following way:

In their discussion of institutional interest groups, Almond and Coleman state that "we have in mind phenomena occurring within such organizations as legislatures, political executives, armies, bureaucracies, churches, and the like. These are organizations which perform other social or political functions but which, as corporate bodies or through groups within them (such as legislative blocs, officer cliques, higher or lower clergy or religious orders, departments, skill groups, and ideological cliques in bureaucracies), may articulate their own interests or represent the interests of groups in the society."

For present purposes we go somewhat beyond the apparent scope of the foregoing quotation by regarding totalitarian parties as institutional groups.⁹

In other words, high associational articulation appears to be more fluid and free than high institutional articulation,

and complex navies are associated with the former variable.

Continuing this consideration of interest articulation, there was a significant negative association ($G = -.476$) with the scale of interest articulation by nonassociational groups. These groups were defined as: "kinship and lineage groups, ethnic, regional, religious, status, and class groups which articulate interests informally and intermittently, through individuals, cliques, family and religious heads, and the like."¹⁰ Banks and Textor make the point that this variable really deals with those groups to which an individual belongs as a matter of birth in contrast to those considered associational groups. There was also a weak, negative association of the scale of naval complexity with the scale of interest articulation by anomie groups ($G = -.295$). These groups were defined by Banks and Textor (quoting from Almond and Coleman) as: "more or less spontaneous breakthroughs into the political system from the society, such as riots and demonstrations. Their distinguishing characteristic is their relative structural and functional liability."¹¹ In general, these negative interest articulation associations suggest that complex navies occur in pluralistic, decentralized settings which are not dominated either by the mob or by heavily entrenched traditional institutions or groups.

This pluralistic environment for complex navies was further supported by the association between the navy scale and the current electoral systems scale ($G = .435$) in which a fully competitive system was linked with complex navies. There was an association too with the interest aggregation by legislature scale ($G = .466$) where the high or "significant" end applies to the "so-called" working multi-party context, where parliamentary accommodation by the parties concerned is an indispensable requisite of reasonably stable government." The consultative legislatures of

40 NAVAL WAR COLLEGE REVIEW

traditionalist regimes were at the low end of this scale. Again the federalistic character of the high end of the navy scale was underscored by the association between the scale of vertical power distribution and the scale of naval complexity ($G = .486$). Complex navies were also associated with bicameral legislatures ($G = -.450$) which are at the low end of the character of legislature scale. Finally, the negative association with the role of the police scale ($G = -.554$) must be noted, for it confirms the relatively open, fluid, environment in which complex navies seem to flourish.

In sum, then, all of these associations or nonassociations with interest articulation point in the same direction. It must be admitted that there are enough exceptions to the rule of a pluralistic and open environment to raise the question of whether the associations are only the product of specific historical development rather than indicative of functional relationships. Yet, when it is realized that navies often operate independently at long distances from the homeland and that under these circumstances responsibility must be internally monitored rather than externally controlled, the possibility of a functional relationship cannot be discarded.

Although this course of analysis was not pursued here, a deviant case analysis might well be productive. Thus, in table II, which deals with the naval scale and the gross national product, it can be seen that there was one navy in the cell defined by the type II row and the "Very High" column. In other words, in 1963 this polity, the Union of Soviet Socialist Republics, appeared to have the resources for a navy of a higher scale type than it was then supporting. Similarly the three navies in the cell defined by the type III row and the "High" column clearly had a potentiality for future development—these were navies of China, West Germany, and Japan. Alternatively, the navies in the cell defined by the type II row and

the "Low" column (Peru, Chile, Greece, and New Zealand) may have been too complex for the supporting resource level. In general, then, where the resource level is high and the navy scale type is low, there may always be a potentiality for future development, and the opposite may also be true where the resource level is low and the navy scale type is high, for here there is a potentiality of future decline. A similar deviant case analysis might be instituted for many of the other variables.

Clearly the attributes of the best possible scale of naval complexity will vary from period to period. In 1935, for example, the presence or absence of battleships would have been a very important consideration. It is probably the case, however, that any acceptable scale will be useful for a period of years. Thus the 1963 scale still was satisfactory statistically in 1969.

The changes between 1963 and 1969 in scale type position are interesting. The Union of Soviet Socialist Republics and Spain moved from scale type II to scale type I. Greece moved from scale type II to scale type III. New Zealand moved from scale type II to scale type IV. Rumania moved from scale type III to scale type V. North Korea and Albania moved from scale type V to scale type III. Malaya, Ghana, and Algeria moved from scale type V to scale type IV. North Vietnam moved from scale type VI to scale type V. Tunisia moved from scale type VI to scale type IV. These moves appeared to be compatible positions on the 1963 gross national product scale. The Soviet Union obviously could move up the naval scale and did. Spain, with its medium 1963 gross national product, moved to the top of its gross national product category, one occupied in 1963 by Argentina, the Netherlands, Brazil, and Australia. Greece and New Zealand, on the other hand, in 1963, had navies which were too advanced for their gross national product level, and it is not

surprising that they declined. Rumania, on the other hand, declined much further than its 1963 gross national product level would indicate. Each of these shifts merits further analysis.

Interestingly enough, of the 10 polities with scale type V navies existing in 1963, five had moved upward in the scale by 1969. Perhaps scale type V is only a transitional stage for movement in the more complex direction. Once a navy leaves scale type VI, it may have a potential for future development.

The foregoing discussion simply indi-

cates the types of considerations that might be salient if more advanced analysis were used. There is a need to expand the base of available data. More importantly, advanced scaling techniques and multivariate analysis should be used. The present paper, however, shows that with available data it is feasible to construct a scale of naval complexity, that this scale has interesting associations with background and political variables, and that the deviant case analyses and trend analyses have potential for the future.

BIOGRAPHIC SUMMARY



Professor John M. Roberts holds a doctoral degree in anthropology from Yale University (1947) and is a recognized authority on Navaho and Zuni cultures. He has published a variety of books, ar-

ticles, and monographs and has taught at Harvard University, the University of Minnesota, and the University of Nebraska. He has served since 1958 as Professor of Anthropology at Cornell University. During the academic year 1969-1970, he took a year's leave of absence from Cornell to occupy the Chair of Comparative Cultures at the Naval War College.

BIOGRAPHIC SUMMARY



Lt. Comdr. Thomas V. Golder, U.S. Navy, earned his undergraduate degree in international relations at the U.S. Naval Postgraduate School at Monterey, Calif., and holds a master's degree in interna-

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FOOTNOTES

1. Arthur S. Banks and Robert B. Textor, *A Cross-Polity Survey* (Cambridge: MIT Press, 1963).
2. *Ibid.*, p. 1.
3. *Jane's Fighting Ships, 1963-64* (New York: McGraw-Hill, 1963).
4. *The Reference Handbook of the Armed Forces of the World, 1966* (Washington: Sellers, 1966), *passim*.
5. Banks and Textor, p. 54.
6. These statistics are explained in chapters 8 and 13 of Linton C. Freeman, *Elementary Applied Statistics* (New York: Wiley, 1965).
7. Banks and Textor, p. 62.
8. *Ibid.*, p. 89.
9. *Ibid.*, p. 90-91.
10. *Ibid.*, p. 92-93.
11. *Ibid.*, p. 97.

