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Bureau of Oceans and International
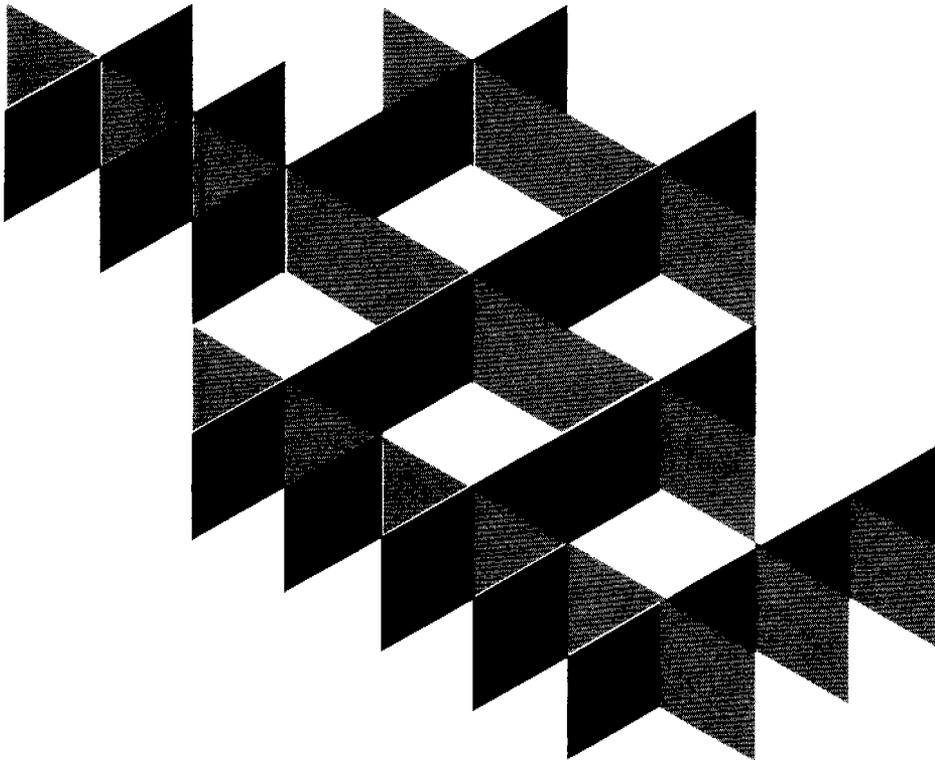*Environmental and Scientific Affairs*

Limits in the Seas

No. 106

Developing Standard Guidelines for Evaluating Straight Baselines

This paper is one of a series issued by the Office of Ocean Law and Policy, Bureau of Oceans and International Environmental and Scientific Affairs in the US Department of State. The aim of the series is to set forth the basis for national arrangements for the measurement of marine areas by coastal states. It is intended for background use only. This paper does not necessarily constitute an official position of the United States Government.

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STRAIGHT BASELINES

August 31, 1987

Office of Ocean Law and Policy
Bureau of Oceans and International
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INTRODUCTION

Beginning with this issue, the responsibility for producing the Limits in the Seas moves from the Office of The Geographer to the Office of Ocean Law and Policy. This paper differs from those typically issued in the Limits in the Seas series. Rather than focusing on a particular country's maritime claim, or on a maritime boundary delimitation, it addresses a general law of the sea issue important to many coastal states--straight baselines.

Critical to an assessment of any country's maritime claims is an understanding and an evaluation of the baseline from which that country's maritime jurisdictional zones are measured. Baselines are normally the low-water line, as marked on large-scale charts officially recognized by the coastal state, and the limits of inland waters as determined through the application of self-executing principles to coastal geography. Nevertheless, international law permits states--in limited geographical circumstances--to measure the territorial sea and other national maritime zones from straight baselines drawn along parts of the coast. The attractiveness of the use of straight baselines is demonstrated by the fact that, at present, at least 55 countries have claimed straight baselines along some portion of their coasts.

A review of these straight baseline systems indicates a broad range of geographical situations where straight baselines have been applied. What is important, however, about the international law and practice concerning straight baselines is the fact that only certain countries and certain coastline areas qualify for their use. Whereas every coastal state may claim a territorial sea, a contiguous zone, an exclusive economic zone, or a continental shelf, a state may use straight baselines only if, and where, its coast exhibits certain characteristics now well established in international law.

The purpose of this study is to elaborate, in light of current international law and practice, the circumstances and manner in which coastal states may use straight baselines. The analysis begins with the long-accepted international law principles reflected in the 1951 Anglo-Norwegian Fisheries Case, the 1958 Geneva Convention on the Territorial Sea and the Contiguous Zone (Territorial Sea Convention), and the 1982 United Nations Convention on the Law of the Sea (LOS Convention). In addition, the analysis draws on the works of recognized authorities in the field, as well as on textual examination and review of existing state practice.

In light of this analysis standard guidelines are suggested, which may permit a reasoned evaluation of the straight baseline systems employed by countries worldwide. Although it must be stressed that these criteria do not have international standing as the benchmarks against which all such systems must be measured, their use makes it possible to distinguish, with a certain degree of confidence, between those baseline systems that appear to be in conformity with international law and those systems that do not.

In an undertaking of this type, there is an inevitable tension between, on the one hand, a desire for establishing objective and uniform standards and, on the other hand, a realistic appreciation for the lack of uniformity of the world's coastal geography. One way to resolve this tension is to abandon any serious effort at identifying objective guides for determining the acceptability of a particular straight baseline system. Doing so, however, not only invites the grossest distortions of rules for establishing straight baselines, but leaves an objecting country without any sort of articulable rationale when it determines that a particular system warrants formal protest.

It seems far more sensible to develop reasonable and defensible standards and then apply them with a realistic recognition of the fact that, in some cases, straight baseline systems having minor deviations from such standards can still be in general conformance with international law. The guidelines articulated in this study are not offered as unequivocal yardsticks of the legality of straight baseline systems. Rather, they represent a series of employable methods that will, in the main, assist in determining whether straight baselines may properly be drawn in a particular situation. The standards are intended to be an aid to a reasoned assessment of a straight baseline system; they are not intended to be a mechanical substitute for such an assessment.

This study will deal principally with two major straight baseline concepts: deep coastal indentations and fringing islands.[1] These two concepts do not exhaust the issues that may properly be considered in evaluating straight baseline systems. Other considerations, such as deltas or low-tide elevations, will appear occasionally, but the above two issues figure in the majority of straight baseline systems. It is essential to remember that a coastal state must first satisfy the geographical conditions of having a coastline that is either deeply indented or that has fringing islands in its immediate vicinity. Only then may it draw straight baselines, and only then do the other aspects of international law and practice concerning straight baselines become relevant. The

following discussion considers objective criteria for each of the two concepts accompanied by hypothetical illustrations.

THE LAW

Although international law on straight baselines is rooted in the Anglo-Norwegian Fisheries Case, it is best reflected in international conventions. Article 7 of the LOS Convention, which repeats virtually verbatim Article 4 of the 1958 Territorial Sea Convention, reads as follows:

Article 7
Straight baselines

1. In localities where the coastline is deeply indented and cut into, or if there is a fringe of islands along the coast in its immediate vicinity, the method of straight baselines joining appropriate points may be employed in drawing the baseline from which the breadth of the territorial sea is measured.

2. Where because of the presence of a delta and other natural conditions the coastline is highly unstable, the appropriate points may be selected along the furthest seaward extent of the low-water line and, notwithstanding subsequent regression of the low-water line, the straight baselines shall remain effective until changed by the coastal State in accordance with this Convention.

3. The drawing of straight baselines must not depart to any appreciable extent from the general direction of the coast, and the sea areas lying within the lines must be sufficiently closely linked to the land domain to be subject to the regime of internal waters.

4. Straight baselines shall not be drawn to and from low-tide elevations, unless lighthouses or similar installations which are permanently above sea level have been built on them or except in instances where the drawing of baselines to and from such elevations has received general international recognition.

5. Where the method of straight baselines is applicable under paragraph 1, account may be taken, in determining particular baselines, of economic interests peculiar to the region concerned, the reality and the importance of which are clearly evidenced by long usage.

6. The system of straight baselines may not be applied by a State in such a manner as to cut off the territorial sea of another State from the high seas or an exclusive economic zone.

Although this study does not specifically address bay delimitations, the LOS Convention article on bays may, in certain situations, be relevant because of the relationship between a state's right to enclose bays and its right to enclose coastline areas having multiple indentations. Article 10 of the LOS Convention, pertaining to bay closing lines, was taken directly from Article 7 of the Territorial Sea Convention and reads as follows:

Article 10
Bays

1. This article relates only to bays the coasts of which belong to a single State.

2. For the purposes of this Convention, a bay is a well-marked indentation whose penetration is in such proportion to the width of its mouth as to contain land-locked waters and constitute more than a mere curvature of the coast. An indentation shall not, however, be regarded as a bay unless its area is as large as, or larger than, that of the semi-circle whose diameter is a line drawn across the mouth of that indentation.

3. For the purpose of measurement, the area of an indentation is that lying between the low-water mark around the shore of the indentation and a line joining the low-water mark of its natural entrance points. Where, because of the presence of islands, an indentation has more than one mouth, the semi-circle shall be drawn on a line as long as the sum total of the lengths of the lines across the different mouths. Islands within an indentation shall be included as if they were part of the water area of the indentation.

4. If the distance between the low-water marks of the natural entrance points of a bay does not exceed 24 nautical miles, a closing line may be drawn between these two low-water marks, and the waters enclosed thereby shall be considered as internal waters.

5. Where the distance between the low-water marks of the natural entrance points of a bay exceeds 24 nautical miles, a straight baseline of 24 nautical miles shall be drawn within the bay in such a manner as to enclose the maximum area of water that is possible with a line of that length.

6. The foregoing provisions do not apply to so-called "historic" bays, or in any case where the system of straight baselines provided for in Article 7 is applied.

CRITERIA FOR DEEPLY INDENTED COASTLINES

Proposed Tests

For a straight baseline system to be justified on the grounds that, in a particular locality, the coast is deeply indented and cut into, the system should fulfill all three of the following criteria:

(1) Within the particular locality being considered, baseline segments accounting for at least 70% of the total length of the relevant baselines should each have at least a 6:10 ratio of coastal penetration to segment length;

(2) A coastline must have at least three significant indentations in any given locality;

(3) No individual straight baseline segment should exceed 48 nautical miles in length.

For the purposes of applying these criteria, the following rules should be observed:

(a) For a length of coastline to be considered a locality, all the straight baselines must be contiguous to each other; however, a coastal state may, at its election, include an Article 10 juridical bay closing line for purposes of establishing contiguity of baselines, but exempt such a closing line from penetration-length ratio calculations;

(b) Coastal penetration shall be measured by the perpendicular linking the coastline, at the deepest point of penetration, with the baseline segment or theoretical extension of the segment;

(c) For purposes of the measurement referred to in (b), above, the coastline shall be considered to be the low-water line, except that where a river flows directly into the sea the coastline shall be considered to be a straight line drawn across the river mouth between points on the low-water line along its banks. Further, if more than one indentation occurs along a baseline (up to 48 nautical miles in length), and each indentation individually meets the penetration-length test when enclosed with a straight baseline, a single line enclosing the indentations shall be permitted.

Discussion and Rationale

By what standards may one determine that a "coastline is deeply indented and cut into?" This language, which appears in both Article 4 of the Territorial Sea Convention and Article 7 of the 1982 LOS Convention, offers little tangible guidance regarding the types of coastal depressions that would allow a state to draw straight baselines. Nevertheless, it is possible to reach some conclusions as to the minimum requirements that a particular stretch of coastline must meet to permit the use of straight baselines.

In reaching these conclusions, some reliance is placed on the International Court of Justice's (ICJ) Anglo-Norwegian Fisheries Case [2] and analyses by several maritime technical experts. Although the decision influenced the formulation of the Territorial Sea Convention (Article 4), the case can be of only limited assistance. Given the extraordinary nature of the Norwegian coastline--both the frequency of the fjords that penetrate deep into the land and the proliferation of offshore islands--one can assume that Article 4 of the Territorial Sea Convention was formulated with the expectation that less extreme coastlines could fulfill its criteria. Article 4 (and now Article 7 of 1982 LOS Convention) serves as the benchmark for straight baselines.

Depth of Penetration: Article 7 of the Territorial Sea Convention, as well as Article 10 of the 1982 LOS Convention, defines a bay as "a well-marked indentation" meeting certain requirements regarding depth of penetration in relation to the breadth of opening so as to "constitute more than a mere curvature of the coast." Specifically, a "bay" must be an indentation that meets the "semi-circle test"; that is, its water area must at least equal that of a semi-circle whose diameter is the same as the length of the bay's closing line. Thus, in the minimum case--a perfectly semi-circular bay--the ratio of penetration to length of closing line is 1:2 (radius: diameter; Figure 1). Both of these factors are important--the indentation's depth of penetration into the land and the surface area of the water in the indentation.

Bay Closing
Line

X

MAINLAND | Penetration
X

BAY

X

Ratio of penetration
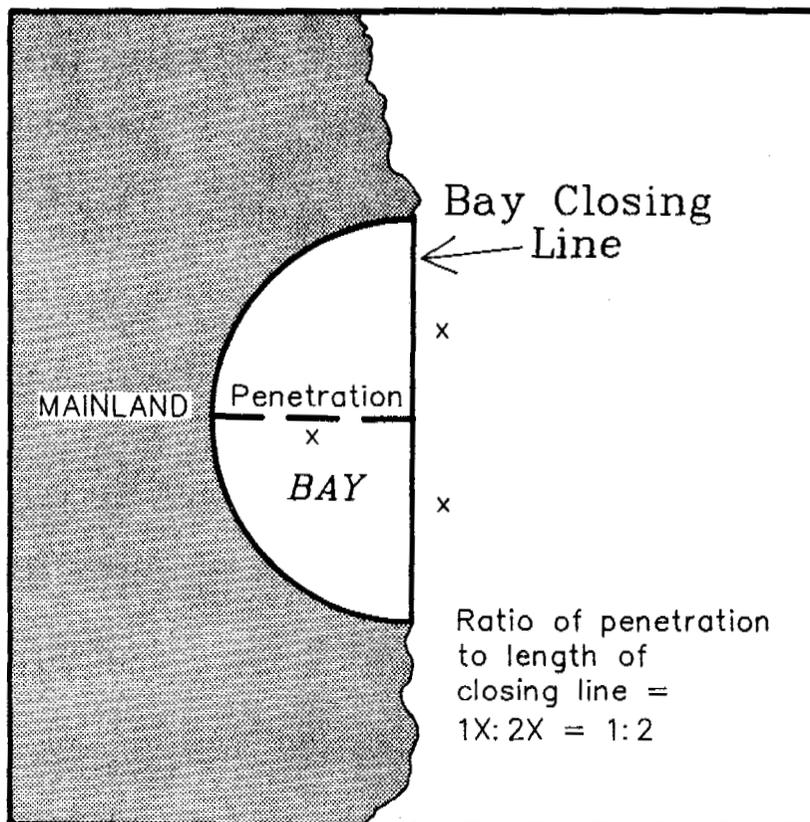to length of
closing line =
1X: 2X = 1: 2

Figure 1

To justify the drawing of straight baselines, a coastline must be <u>deeply</u> indented. One can reasonably infer that, along such a coastline, penetrations must, as a rule, be somewhat deeper than the minimum depth required for a juridical bay; that is, with a ratio of penetration to length of baseline greater than 1:2. After all, a juridical bay need only be a "well-marked indentation", not a deep one--a distinction which Scovazzi has noted as significant.[3] Therefore, to justify straight baselines, the typical penetration along an indented coast should exceed the 1:2 ratio of the minimum juridical bay.

Second, as observed by Beazley[4] (and concurred in by Prescott[5]):

'Deeply indented and cut into' cannot refer to one or two isolated indentations, however large they may be, because if it did there would be no need for Article 7 [of the Territorial Sea Convention]...or its 24 mile limit on closing lines. It must therefore refer to a coastline in which the number and intricacy of the indentations would

make application of Article 7 tedious and largely ir-
relevant. Equally, however, <u>although not every such in-
dentation need conform to the minimum area relationship</u>
<u>laid down in Article 7, it is obvious that the great</u>
<u>majority must do so</u> to satisfy the wording 'deeply
indented and cut into.' (Emphasis added.)

Beazley's point is that, to warrant the drawing of straight
baselines along an indented coast, that coast must have
multiple indentations, and most of those indentations must
encompass areas of water approximating areas of juridical bays
having similarly-sized openings.[6]

Again, penetration is of some importance. For an opening
of any given size, the area of water in the indentation
increases as the penetration increases. A review of the world
coastlines show that coastal indentations are more frequently
fjord-like (i.e., tapered at the end) than semi-circular. To
achieve the semi-circle test ratio of 1:2, a tapered
indentation must penetrate more deeply into the land than a
semi-circular indentation having an opening of the same size.
Therefore, to qualify for straight baselines using the deeply
indented criterion, a length of coastline must be marked by
indentations deeper than the 1:2 (5:10) penetration ratio that
defines the minimally acceptable juridical bay. It is not
unreasonable to expect that to warrant straight baselines a
coastline must include indentations having a penetration-to-
opening ratio of 6:10 (see Annex for a further discussion of
the relationship between bay penetrations and area).

<u>Measurement</u>: Mention should be made of the method of
measuring penetration. As Hodgson and Alexander have pointed
out, a variety of methods may be employed.[7] It is submitted
that determination of the appropriate method must be made in
light of the purpose to be served by the measurement. The
purpose is to produce a figure that, when compared with the
length of the baseline segment, will afford a meaningful
application of the proposed criteria. Therefore, penetration
should be measured along the longest possible perpendicular
from the relevant baseline segment to the coastline of the
indentation.

The rationale for using the perpendicular is simply that,
as noted above and in the annex, the penetration ratio affords
the analyst a method of determining whether the surface area of
water of a particular indentation approximates the area of a
juridical bay having the same-sized opening. In the case of an
indentation more or less rectangular, both geometry and common
sense suggest that penetration should be measured by developing
a perpendicular.

In the case of an indentation more or less semi-circular, neither geometry nor common sense is offended by this method, since the infinite number of radii in a true semi-circle includes one that is precisely perpendicular to the closing line. The method may not, however, be so clearly valid in the case of some more or less triangular indentations, especially fjord-like situations that may angle in a direction parallel to that of the coast. In fact, it is with respect to such indentations that use of the perpendicular is most important. This is because the area of a triangle is determined not by measuring the greatest distance from its base to its apex, but by measuring the perpendicular from the base to the apex (see Figure in the annex).[8]

When measuring penetration the ratio calculation should be based on the relationship between a baseline segment and the penetration as measured from that segment. Thus, where a straight baseline segment is properly laid seaward of the natural entrance points of an indentation (for example, with base points on harbor works, or on coastline points flanking the indentation's headlands) the depth of penetration is the length of the penetration measured from the baseline segment, not from the hypothetical closing line joining headland to headland. This may benefit the coastal state by artificially increasing the penetration measurement, but it may also operate to the state's disadvantage if the baseline segment is longer than the hypothetical closing line.

Required Distribution of Indentations: Every stretch of coastline need not meet the penetration ratio for straight baselines to be employed. Even in the Anglo-Norwegian Fisheries Case, only 94 miles of the 160 miles of baselines along the fjord-indented northern coast--about 60%-- actually traversed fjords. This fact led Hodgson and Alexander to draw the conclusion that, in a coast so configured, straight baselines could be justified if 60% of the total distance was accounted for by fjord-like indentations.[9]

It is submitted, however, that, when dealing with the penetration ratios suggested in this study--substantially less than those of the Norwegian fjords--it is more appropriate to require the indentations to account for at least 70% of the coastal area (Figure 2). This is not inconsistent with the Hodgson and Alexander conclusions. By their calculations, the shallowest fjord penetration along Norway's very deeply indented northern coast is on the order of 3:2 (15:10).[10] The 40% of the coastline that did not meet such extreme ratios was nonetheless sufficiently indented to include a number of juridical bays.[11] Therefore, even the non-fjord areas still had significant coastal indentations.

A) Coastline that does NOT qualify for straight baselines

Total Length of Baseline Segments= 60.5

Total Length of Segments Meeting 6:10
Penetration: Length Ratio   (a+b+c+d)= 31.0

Qualifying Segments as % of Total Length: 31/60.5= 51%

B) Coastline qualifying for straight baselines

Total Length of Baseline Segments= 59.0

Total Length of Segments Meeting
Penetration: Length Ratio   (a+b+c+d+e)= 43.5

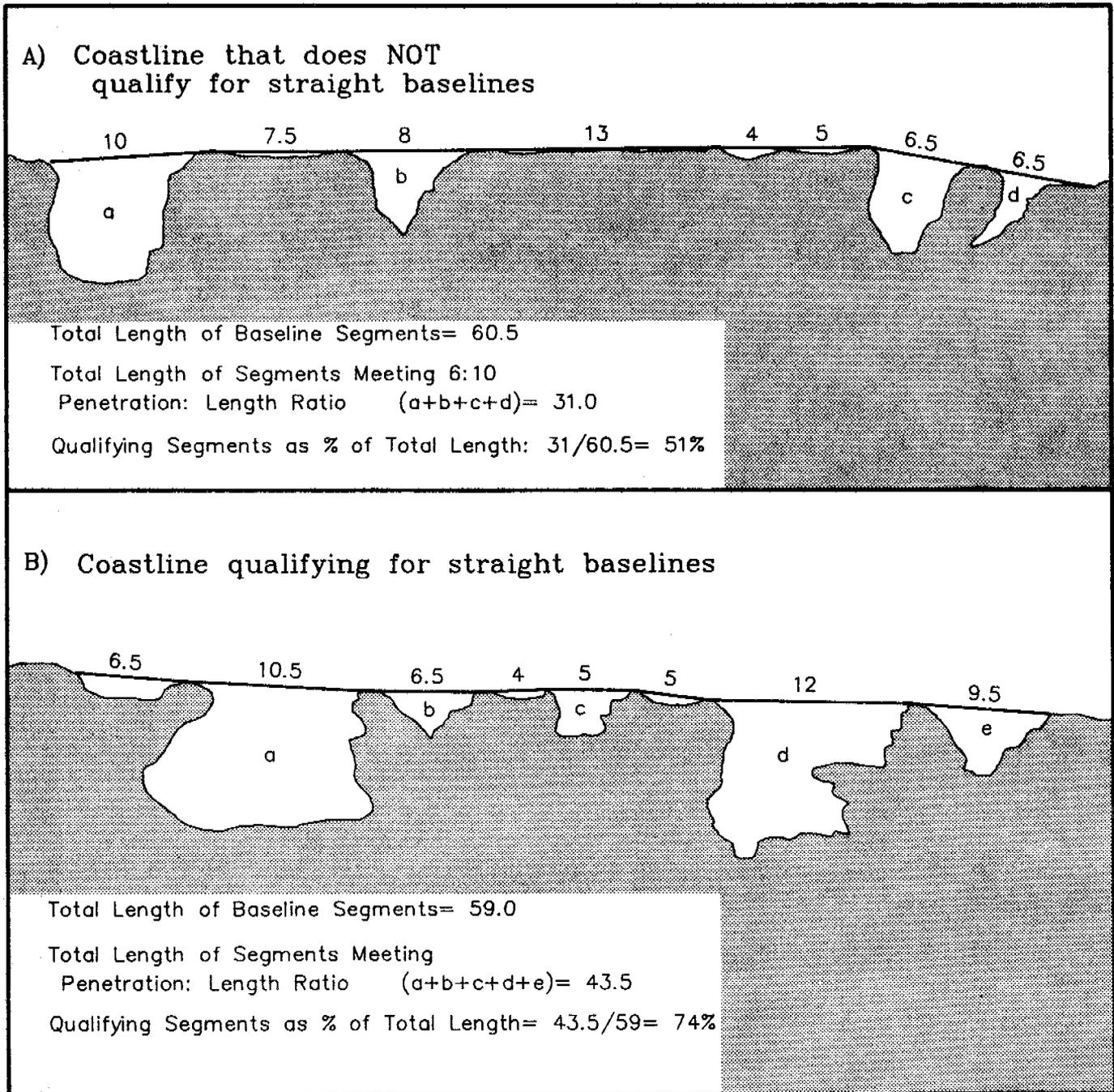Qualifying Segments as % of Total Length= 43.5/59= 74%

Figure 2

Within a particular locality in which the straight baseline system is predicated on deep indentations of the coast, at least three indentations must exist. In large measure, this requirement reflects the judgment of various technical experts, that a straight baseline system cannot be employed in a locality where there are only one or two bay-like indentations. Were the practice otherwise, the limitations on closure of bays--the semi-circle requirement and the 24-nautical-mile limitation on closing lines, for example--would be rendered meaningless.

A more difficult question is the requisite nature, if any, of such multiple indentations. There remains the requirement that, within a given locality, 70% of the length of the straight baseline segments enclose indentations having a penetration ratio of at least 6:10. One can, however, hypothesize a fjord-like opening of 35 miles in length, flanked by two very shallow indentations, with a total baseline length for the locality of under 50 miles (Figure 3). In such a case, can one wide-mouthed, albeit deep-penetrating indentation alone provide the requisite deep indentation to justify use of straight baselines along a coast otherwise marked only by shallow depressions? Clearly, the answer is no. In order for a locality to warrant the use of straight baselines, there must be not merely multiple indentations, but multiple indentations of significant penetration into the land mass. For these purposes, it seems reasonable to look again to the 6:10 ratio, although in some cases it may be appropriate to consider indentations not quite so deep if they otherwise qualify for closure as juridical bays.

24 nautical mile closing line

7.5 (a)

35 (b)

a+b+c= 50

Even though the 70% requirement is met (35/50= .70) there is only one deep indentation (b) which should be treated as a bay whose entrance exceeds 24 nautical miles.
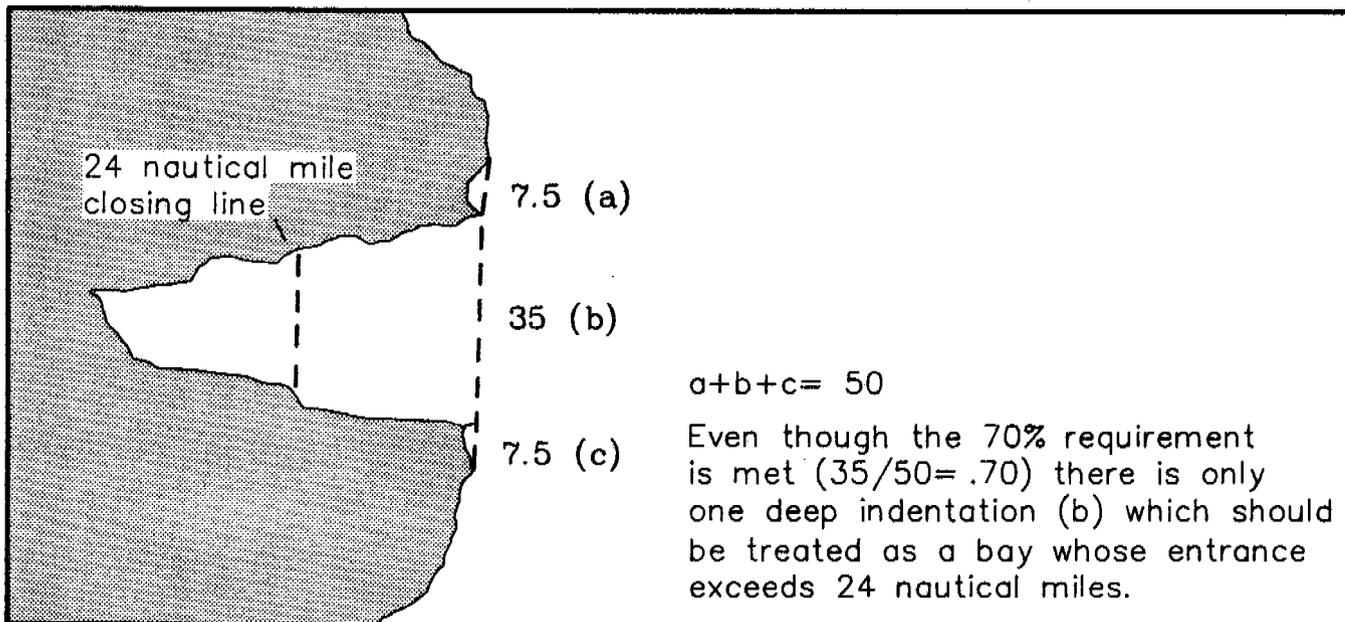
7.5 (c)

Figure 3

When evaluating the 70% requirement, one should bear in mind the importance of locality. Article 7 of the LOS Convention, like Article 4 of the Territorial Sea Convention, speaks of drawing straight baselines "in localities" where the coastline is deeply indented or cut into or where the necessary fringing islands are present. As made clear by the debates prior to the adoption of the Territorial Sea Convention, the use of the term "localities" emphasizes that a country may draw straight baselines along relevant parts of its

coast, and need not demonstrate that the entire coast is sufficiently indented or fringed before doing so.[12]

In one respect, this benefits coastal states, because it makes possible the use of straight baselines by more than the relatively few states whose entire coasts have the necessary configuration. On the other hand, non-claimant states benefit as well, because coastal states have no need to draw straight baselines along smooth portions of their coasts. Thus, coastal states have no excuse for drawing straight baselines other than in those portions of their coasts meeting the appropriate criteria.

A generally accepted definition of "locality" has not been found; consequently, development of a working definition is necessary. One approach might be to define locality merely in terms of a specified distance. The problem with such an approach is that it is both simplistic and complex--simplistic because it would purport to reduce the concept of locality to mere numbers, and complex because it would still require a definition of the relevant distances (e.g., is the distance to be measured along coastal sinuosities or along an idealized line?).

Another approach might be to define a locality as one having a shared set of geographic characteristics that justify treating it differently from an adjacent portion of the coast. This has intellectual appeal, but it seems to involve far too detailed and subjective an analysis to make it useful for this type of endeavor.

In the end, a certain amount of deference should be paid to the coastal state's judgments about what constitutes a relevant locality along its coastline. As a practical matter, the coastal state itself defines a particular locality when it draws a series of straight baseline segments between parts of its coast where the baseline is the low-water line; in effect, it declares that, between those two parts, the coast is of a nature to warrant the use of straight baselines. Thus, within limits, the relevant locality can be defined by the coastal state itself as any area in which it has an uninterrupted series of straight baselines. Contiguity is the key requirement. Along a stretch of coast having several groups of straight baseline segments, there are likewise several localities, and within every such locality, the 70% requirement should be met.

This definition of the relevant locality as limited by the beginning and end of the coastal state's use of the low-water line as the baseline not only gives deference to the coastal state's evaluations of its coastal characteristics, but offers an incentive for the coastal state to draw straight baselines only in areas where they are truly justified (see next section

for a discussion of appropriate endpoints). Without the
requirement of contiguity of baseline segments, a coastal state
might be tempted, for example, to enclose shallow indentations
by straight baselines, merely because elsewhere on the coast
there may be one or more indentations having penetration ratios
of 6:10 or greater (Figure 4).

For the purpose of calculating the
percentage of baseline segments meeting the
minimum 6:10 penetration to segment ratio, segment AB
may not be considered, because it is not contiguous
to the other segments: ie., there is no segment BC.
AB may qualify as a juridical bay; between B and C
the low water line must be used as the baseline;
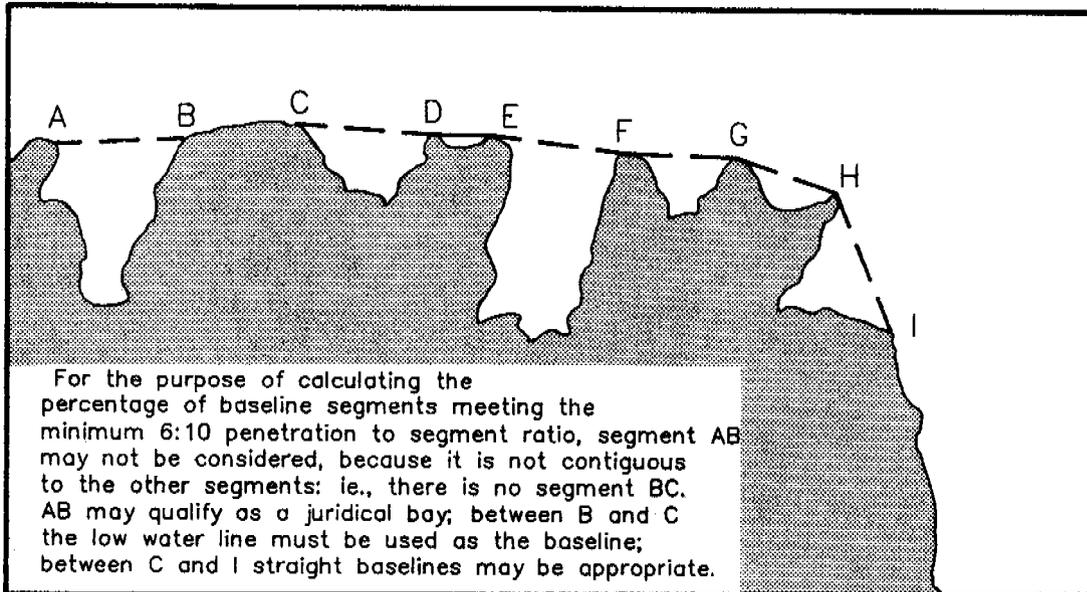between C and I straight baselines may be appropriate.

Figure 4

In theory, this contiguity requirement could inure to the
disadvantage of an otherwise deserving coastal state; namely,
where several of a series of baseline segments enclose
juridical bays, but bays that do not meet the 6:10 penetration
ratio. In such a case, an otherwise legitimate use of straight
baselines (or more precisely, bay closing lines) might appear
to be prohibited because less than 70% of the length of the
series of baseline segments enclosed indentations having 6:10
penetration ratios.

This problem can, however, be alleviated by application of
the optional rule that a properly drawn bay-closing line may be
included for the purpose of determining contiguity, but
excluded for all other purposes. In other words, such a bay-
closing line may help define the locality, but is disregarded
for purposes of determining the penetration-to-segment-length
ratio and of determining the percentage of baseline segments
meeting the minimum ratio within a given locality (Figure 5).

Segments AB, BC, and CD do not meet the requirement
that 70% of their length account for penetration
ratios of 6:10. Segments AB, BC, CD, EF, FG, GH, HI, and
IJ do meet the 70% requirement but lack contiguity,
because segment DE is not included. When segment
DE, a juridical bay, is included, the contiguity
requirement is met, but the 70% requirement is not.
Thus, segment DE may be included for the purpose of
establishing contiguity, but ignored for the purposes of
testing for the 70% requirement, thereby allowing a
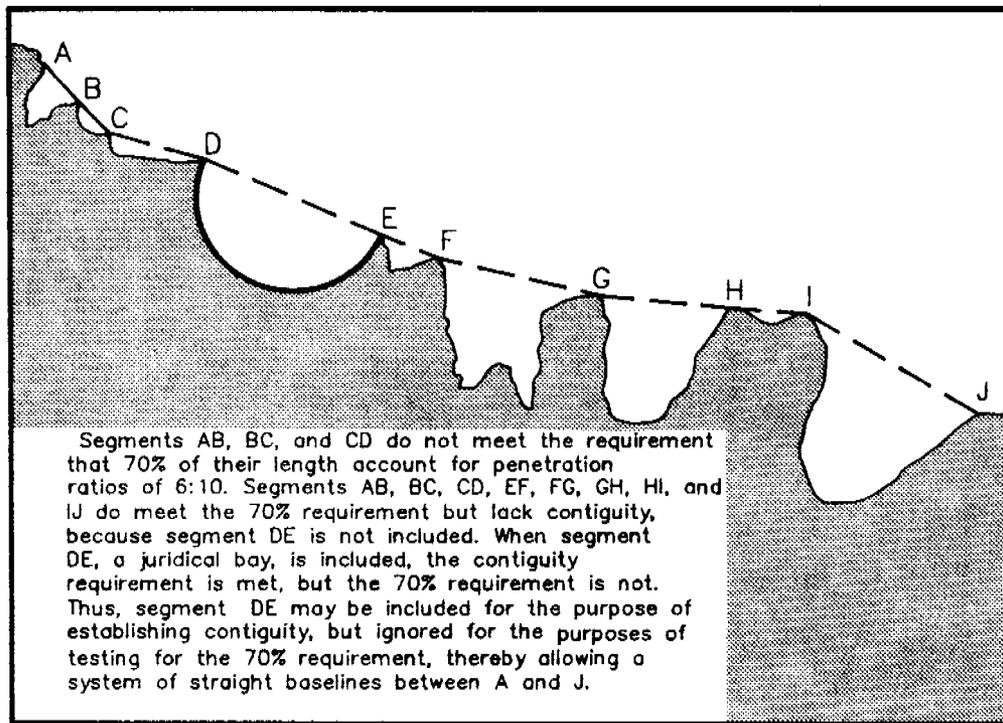system of straight baselines between A and J.

Figure 5

Maximum baseline length: No baseline segment should exceed 48 nautical miles in length. On first examination, this might appear to be one of the more controversial guidelines articulated in this study. In both the Territorial Sea Convention and the 1982 LOS Convention, the article on bays limits the length of a closing line to 24 nautical miles. Neither convention contains any such limits for straight baselines. For this reason, it is often said that there is no juridical limitation on the length of a straight baseline drawn in accordance with Article 4 of the Territorial Sea Convention or Article 7 of the 1982 LOS Convention. But the absence of an explicit length limitation does not mean that length is irrelevant to the overall determination of the validity of a straight baseline system. It seems unreasonable to suggest otherwise.

Scovazzi notes that the Territorial Sea Convention very nearly had a baseline length limitation of 15 nautical miles.[13] He suggests, with justification, that agreement on a maximum length might have been reached had there also been agreement on the maximum breadth of the territorial sea.[14]

Thus, historically there has been sympathy for some restriction on the length of individual baseline segments. Moreover, it is anomalous to set length limitations on closing lines for juridical bays, but to exclude all consideration of the length of a straight baseline segment. This is particularly true when, as often occurs, there is a demonstrable relation between the length of a baseline segment and its divergence from the general direction of the coast.

Once one asserts that a maximum length limitation is required, it then becomes necessary to establish that length. In part, this criterion is more or less empirically derived from analysis of the Anglo-Norwegian Fisheries Case. Beazley, like Hodgson and Alexander, suggests that the longest straight baseline considered in that case should set the maximum length for baselines in other systems. They disagree, however, on what should be considered the longest baseline for this purpose. Beazley suggests the use of a 45-nautical-mile line.[15] Hodgson and Alexander urge the use of a 40-nautical-mile line, arguing that the longer one was premised on considerations of historic usage, rather than mere application of the principle that a deeply indented coast will justify the drawing of appropriate straight baselines.[16] When considering what maximum length to set, it should be borne in mind not only that several of the most respected authorities in the field have urged 40 and 45 nautical miles, but also that the International Court of Justice has already sanctioned baseline segments of those lengths.

In light of the above, 48 nautical miles, which is only marginally greater than the lengths used by Beazley and by Hodgson and Alexander, appears to be a reasonable limit. Moreover, because it is double the maximum length for a juridical bay closing line, it preserves the significance of the differences between the bay articles and the straight baseline articles of the two conventions, without according coastal states unrestrained license in drawing baselines.

There is even some justification in its relation to the breadth of the territorial sea. In 1958, at the time when the Territorial Sea Convention was debated and subsequently adopted, the most frequently claimed territorial sea breadth was three nautical miles.[17] The maximum baseline lengths then considered by the conferees--10 and 15 nautical miles--were, respectively, 3.3 and 5 times the breadth of the territorial sea. International law now permits a territorial sea of 12 nautical miles in breadth, and it is therefore reasonable to suggest a maximum straight baseline length 4 times as great.

Appropriate Baseline Endpoints: One aspect of evaluating a straight baseline system would be the identification of

appropriate endpoints of the straight baselines. Article 7 of
the 1982 LOS Convention makes three references to appropriate
basepoints. Paragraph 1 declares that, where the necessary
coastal configuration exists, straight baselines may be used,
"joining appropriate points." Paragraph 2 states that, where
the coastline is unstable, "the appropriate points may be
selected along the furthest seaward extent of the low-water
line" and maintained there until changed by the coastal state,
notwithstanding subsequent regression of the low-water line.
Finally, paragraph 4 declares that low-tide elevations may be
used only as straight baseline endpoints if they have
lighthouses or similar installations on them. Article 4 of the
Territorial Sea Convention contains provisions identical to
paragraphs 1 and 4; paragraph 2 is new to the 1982 LOS
Convention.

Several inferences can be drawn from these provisions.
First, unless a straight baseline is drawn to a low-tide
elevation having on it a lighthouse or similar installation, no
endpoint may be placed seaward of the low-water mark. Thus,
straight baselines must be drawn to and from land, as defined
by the low-water mark, and not to points in the ocean.

Second, it is reasonable to infer that such "appropriate
points" must lie in close proximity to the coastal features
whose presence justifies the use of straight baselines,
although it is not always necessary to locate endpoints
directly on such features. For example, where a series of deep
indentations justifying the use of straight baselines includes
one having a small island near its mouth, it may be appropriate
to use the island as one endpoint for a straight baseline
segment, even though that island is not part of a fringing
group. Similarly, although a coastal state is not entitled to
draw straight baselines merely because there lies off its coast
a low-tide elevation having a lighthouse or other installation,
that low-tide elevation may still be used as an endpoint if
straight baselines are otherwise justified by deep coastal
indentations or by a fringe of islands.

Inevitably, as soon as one introduces an element of
uncertainty--in this case, the question of placing endpoints
seaward of the features justifying the use of straight
baselines--one then seeks to limit the uncertainty by
suggesting guidelines for acceptable deviations. Here, two
such guidelines suggest themselves. The first is simply a
reiteration of the standard requirement that the drawing of the
straight baselines not depart to any appreciable extent from
the general direction of the coast (see discussion on general
direction later in the paper). Thus, where the choice of an
offshore formation (island or low-tide elevation) causes the
straight baseline segment to depart radically from the general
direction of the coast, the choice cannot be justified.

A second guideline may be a 12-nautical-mile limitation on the acceptable distance of the offshore formation from the coastal configuration that justifies the use of straight baselines--the distance of an island or low-tide elevation off a deeply indented coast, or that of a low-tide elevation seaward of a fringe of islands. This limitation is justified, in part, by Article 13 of the 1982 LOS Convention, which declares that the territorial sea may be measured from a low-tide elevation, provided that it is no more than the breadth of the territorial sea from the mainland or an island. Of course, no such impediment exists with respect to islands, i.e., naturally formed areas of land above water at all times. Nevertheless, it is not unreasonable to set this distance as a general limitation on the extent to which a coastal state may draw a straight baseline that does not touch the mainland coast, when the baseline is justified by the indentations of that coast.

CRITERIA FOR FRINGING ISLANDS

Proposed Tests

In order for a straight baseline system to be justified on the grounds that, in a particular locality, there is a fringe of islands along the coast in its immediate vicinity, all of the following requirements should be met:

(1) The directional trend of the outermost islands (i.e., the islands on which the straight baseline turning points will be situated) should not deviate more than 20° from the opposite mainland coastline (including any closing lines that may properly be drawn across bays, river mouths and harbors), or from the general direction of the opposite mainland coastline, whichever more nearly parallels the relevant islands;

(2) There must be a consideration of distance between the outermost islands and the mainland coastline.

(3) Islands considered part of the fringe should not be further apart from each other than 24 nautical miles;

(4) Such islands should mask 50% of the opposite mainland coastline;

(5) No individual straight baseline segment should exceed 48 nautical miles in length.

When applying the foregoing tests, the following rules shall be followed[18]:

(a) Directional deviations of more than 20° from the opposite mainland coastline are permissible with respect to directional trend lines linking the fringing islands to the mainland coastline.

(b) Masking of the coast is to be determined with respect to constructed lines representing the general direction of the mainland coast (rather than along its sinuosities) and the calculation of the proportion of that distance that is masked. A point on the coastline (or, more properly, a point on the constructed general direction line) is considered to be masked if a perpendicular line drawn from that point intersects an island.

(c) A general direction line should meet certain tests including a maximum length of 60 nautical miles.

Discussion and Rationale

The question of fringing islands has attracted much attention, evoking from a number of internationally recognized authorities a variety of suggestions for reaching some more or less objective judgments about the relationship between offshore islands and the mainland and between the islands and the straight baselines. The conclusions contained in this study do not, unsurprisingly, comport in all respects with conclusions reached by some of those authorities. Moreover, this study attempts to define some evaluative criteria that have generally not been addressed by those authorities--for example, the maximum distance between islands and the maximum distance of islands from the mainland. However, where relevant, reference will be made to expressions of opinion by such authorities.

Directional Trend: Although the concept of a "fringe of islands" connotes a directional relationship between the islands and the mainland off which they lie, there has been little discussion in the better known studies on the maximum deviation permissible for a group of islands to be considered fringing. Both Prescott and Scovazzi note that directional deviation may be important to determining whether offshore islands are fringing, but they do little beyond suggesting the extremes of possible directional relationships between islands and mainland coasts. Prescott declares:

> [I]t would be hard to argue that islands arranged like stepping-stones, at right angles to the general direc-tion of the coast, should be considered as a fringe. Equally, it would be easy to argue that the line of stepping-stones which lay at an angle of 10° to the general direction of the coast constituted a fringe. But no-one can say what is the critical angle at which

the line of islands ceases to be a fringe within the meaning of Article 7.[19]

Scovazzi similarly suggests that more or less perpendicular formations should not be considered fringing, without, however, offering any further insights as to what kinds of offshore island groupings might be so considered.[20]

How, then, does one determine what might be a maximum permissible deviation? It may help to resort to the language of the Convention articles (Article 4 of the Territorial Sea Convention and Article 7 of the 1982 LOS Convention), as well as to elementary geometry. Both Convention articles speak of a "fringe of islands along the coast in its immediate vicinity...." (emphasis added). A group of islands running perpendicular to a coast is not a proper fringe, because it does not run along the coast; indeed, it deviates from the coastal direction at the greatest possible angle, 90°. Even a 45° deviation represents a significant divergence from the direction of the coast, because, for every mile which it can be said that the island group more or less follows the direction of the coast, it also departs from the direction of the coast by a mile (Figure 6).

45° Deviation: For every mile that the island system moves "along" the mainland general direction, it also moves one mile "seaward" away from the mainland. This island system would not constitute a "fringe of islands along the coast in its [mainland] immediate vicinity" (Article 7, 1982 LOS Convention)
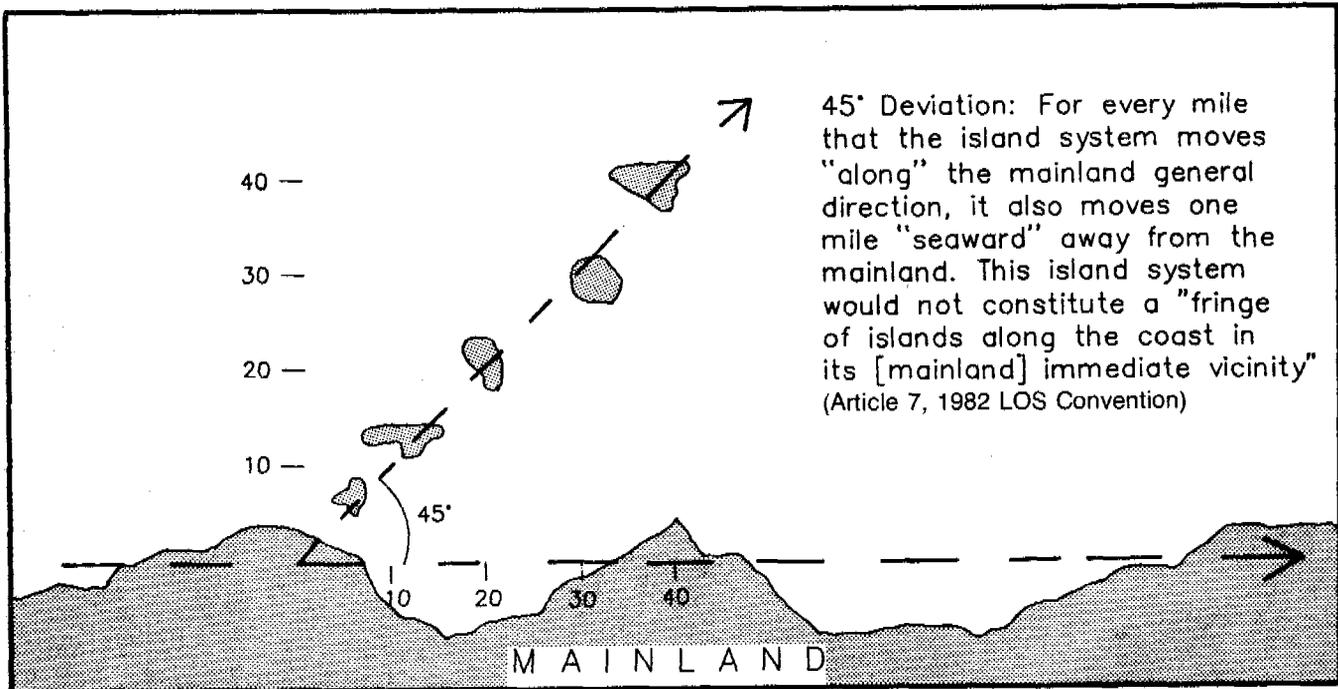
Figure 6

A reasonable deviation angle would seem to lie somewhere between 45° and 10°. Scovazzi implies as much when he states that the Florida Keys deviate too much to constitute a fringe[21]--although their deviation from the general direction of the southern Florida coast is much less than 45°.

We propose that an appropriate limit on the angle of deviation would be 20° (Figure 7). When discussing the

related issue of an individual straight baseline's deviation
from the mainland, Hodgson and Alexander state that in the
Anglo-Norwegian Fisheries Case, only one baseline segment
deviated by more than 15°.[22] Prescott also implies a
figure when discussing the issue of individual straight
baselines' deviations from the general direction of the coast:
"Further, individual segments along fringing islands might
differ from the general direction of the coast by 20° or more,
simply because the line has to reflect the alignment of the
rampart of islands as closely as possible."[23] If a 20°
deviation for an individual segment along an island grouping is
considered remarkable, it seems reasonable to suggest that, in
the main, the directional trend of an offshore island grouping
should not deviate more than 20° from the direction of the
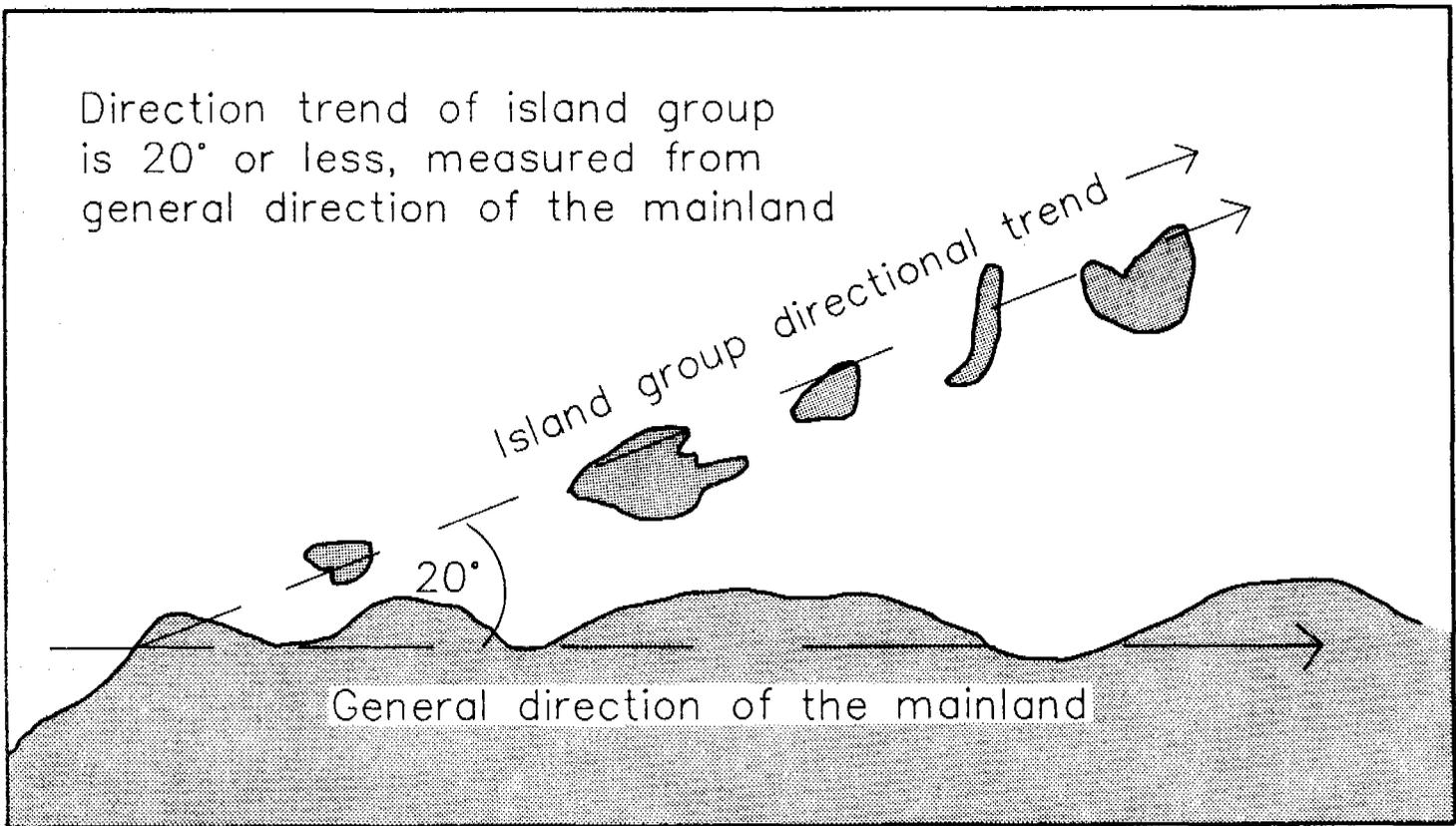relevant mainland coast.

Figure 7

It is important, however, to make the distinction between
the directional trend of the "fringing islands" and the
individual straight baseline segments. In determining the
angle of deviation of the "fringing islands" from the mainland,
one is testing for the appropriateness of a straight baseline
system in the area. Once it is determined that straight
baselines are proper, based on this and the other cited
criteria, the straight baselines can be drawn. An individual
straight baseline may deviate by more than 20° from the
general direction of the mainland under many circumstances.

For example, the straight baseline segment joining the mainland

For example, the straight baseline segment joining the mainland to the first island in the fringe could in some situations create an angle greater than 20° to the mainland coast (Figure 8). Prescott notes that "individual segments along fringing islands might differ from the general direction of the coast by 20° or more, simply because the line has to reflect the alignment of the rampart of islands as closely as possible." In fact, Prescott correctly suggests than one pay little attention to the direction of the individual baseline segments and "to focus instead on the characteristics required for straight baselines to be appropriate."[24]

Permissible departures from the rule that baselines not deviate more than 20° from general direction of mainland

Island group directional trend ⟶

Angle greater than 20°

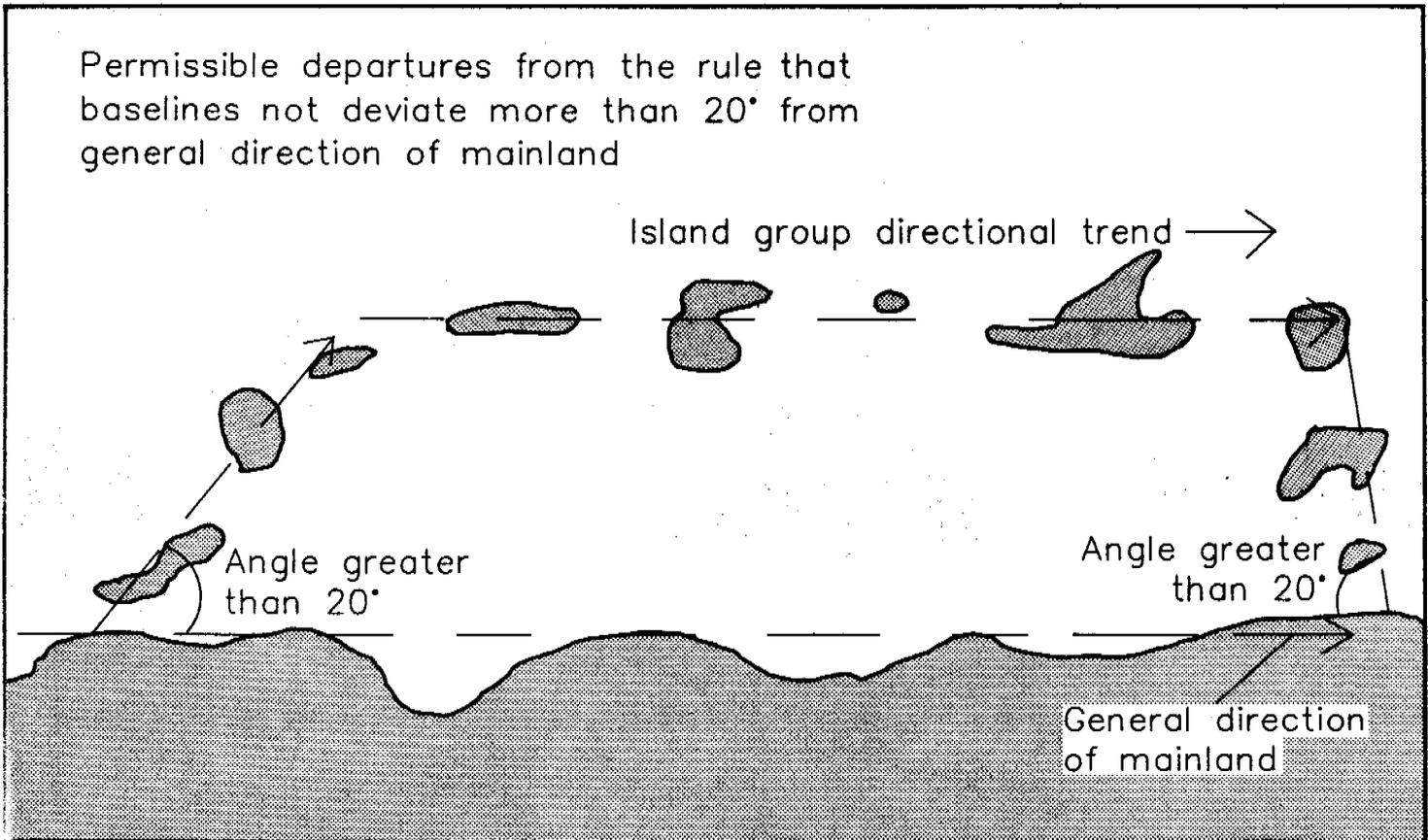Angle greater than 20°

General direction of mainland

Figure 8

Distance From the Opposite Mainland Coast: This criterion, like the following one (maximum distance between islands), may be, in part, subjective. But, just as the limitation on directional deviation is a method of ensuring that the relevant island grouping truly fringes the mainland, so this criterion helps to ensure that the island group is in the immediate vicinity of the mainland coast.

The principal authorities on baselines generally have been reluctant to express an opinion on this issue. Prescott at least acknowledges its existence when he says:

Probably everyone would agree that a fringe of islands 3 nautical miles from the coast was in its immediate vicinity. Equally, everyone would probably concur that a fringe of islands 100 nautical miles from the coast was outside its immediate vicinity. Unfortunately, it would not be possible to predict with confidence what the majority thought of a fringe of islands 25, 40 or 65 nautical miles from the coast.[25]

This criterion has been developed with the intention of providing a guideline that would help eliminate from straight baseline consideration island groupings that stretch seaward for extensive distances. Although not cited in the proposed tests, a suggested limit of 48 nautical miles may be set as a cap against which straight baselines may be judged.

Justification for the selection of a 48-nautical-mile limit can be articulated as follows: it is difficult to argue that islands are too far removed from the coast if territorial seas measured from their low-water marks would overlap with territorial seas measured from the low-water mark along the mainland coast. Thus, at a minimum, there is likely to be general agreement that a 24-nautical-mile separation between island and mainland is not excessive (12 nautical miles measured from each land mass). It is important to note that by drawing straight baselines the coastal state converts those intervening waters from territorial sea to internal waters--a significant juridical distinction. Doubling that distance to 48 nautical miles means that, in the extreme case, there would be as wide an expanse of high seas between the two hypothetical territorial sea areas as there is territorial sea itself (Figure 9).

Viewed in that legal perspective, it is difficult to justify, as a general consideration, a much greater distance between the mainland and the outermost island. However, where, under a 12-nautical-mile territorial sea regime, there would be no high seas areas (i.e., where there is no water more than 12 nautical miles from land) enveloped by the straight baseline system, some deviation from the 48-mile rule may be appropriate. For instance, one can envision an island grouping consisting of a number of islands that are not far separated from each other but that, nevertheless, work their way considerably seaward from the mainland coast.

A few such groupings, such as along a part of the Chilean coast or along southeast Alaska in the United States, may actually spread themselves seaward more than 48 miles from the mainland. They tend to be fairly tightly packed near the coast, very closely linked to the mainland, and separated by narrow channels of water. If other criteria were met, straight baselines in these areas would not be precluded by this rule.
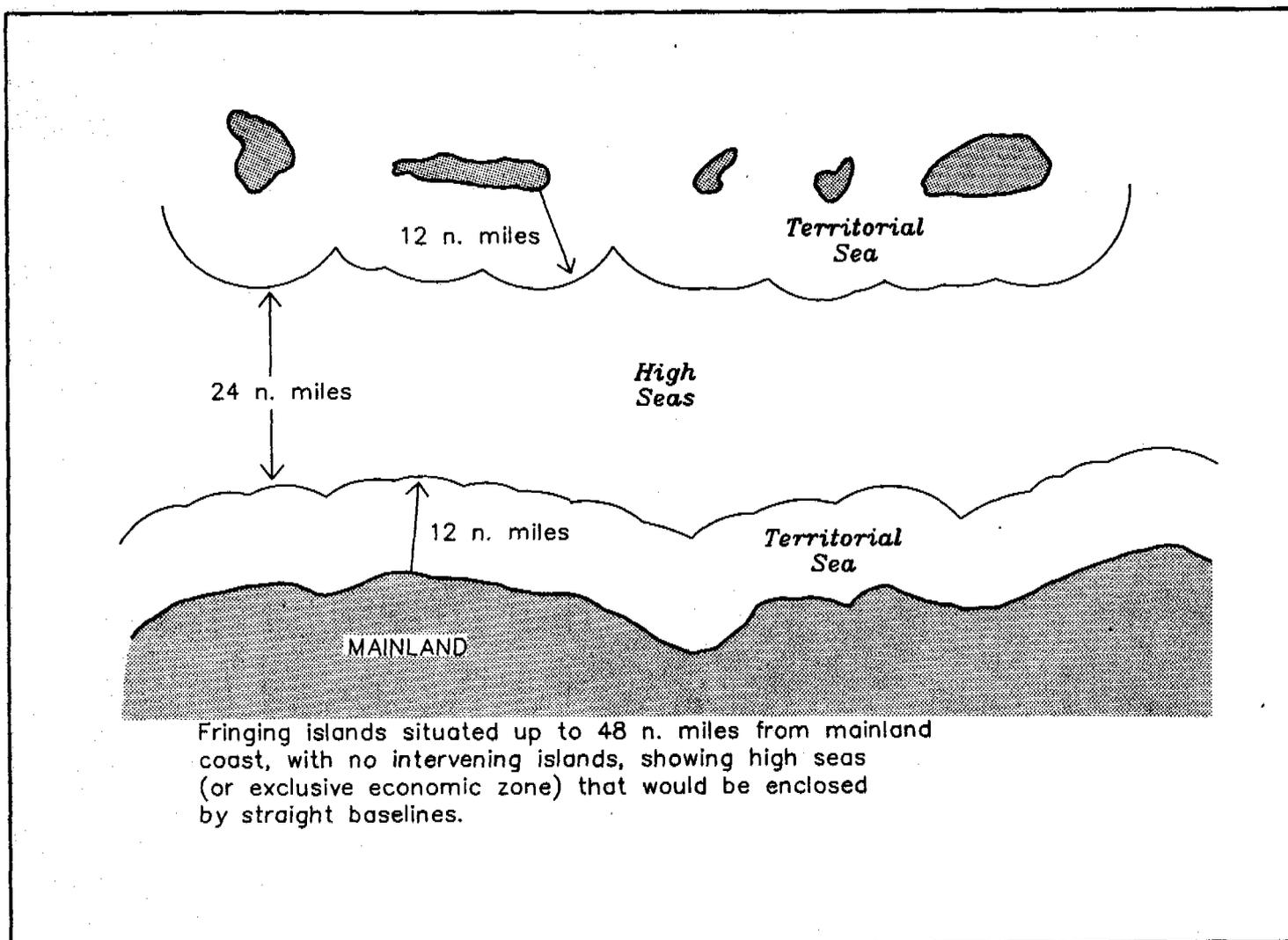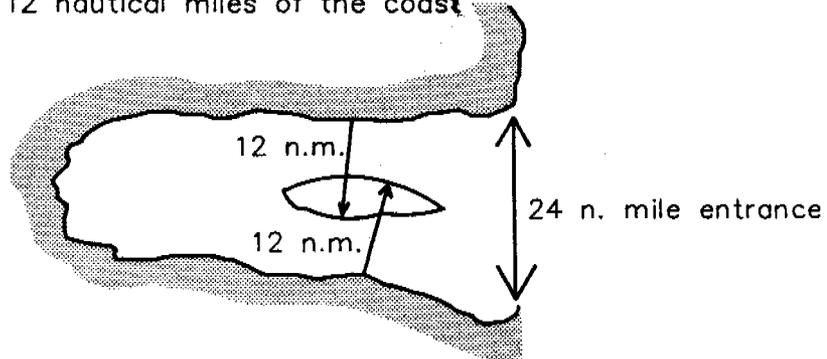
Fringing islands situated up to 48 n. miles from mainland coast, with no intervening islands, showing high seas (or exclusive economic zone) that would be enclosed by straight baselines.

Figure 9

Using such patterns of territorial sea to justify enclosure of the waters as internal is not without some juridical precedent. After all, in a country claiming a 12-nautical-mile territorial sea, a long and narrow bay having a mouth no more than 24 nautical miles wide would, if not enclosed, be a long stretch of territorial sea. Furthermore, a bay with a similarly-sized mouth, but opening to more than 24 nautical miles inside, could be viewed as having an enclave of high seas/EEZ surrounded by a belt of territorial sea. Yet, there is no dispute that such bodies of water can be closed as bays, comprising internal waters (Figure 10).

10a) Long and narrow bay — all waters inside
entrance within 12 nautical miles of the coast

12 n.m.

12 n.m.

24 n. mile entrance

10b) Broad bay —

Area beyond
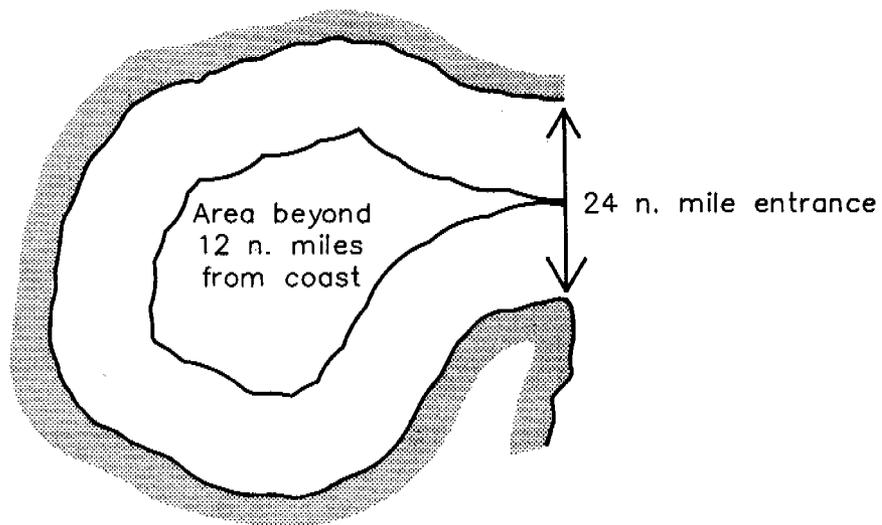12 n. miles
from coast

24 n. mile entrance

Figure 10

However, premising straight baseline systems on the
pattern of waters surrounding the offshore islands is a
troubling concept, because it carries the seeds of the most
significant distortions of the straight-baseline principle.
One such distortion is that of leapfrogging to extraordinary
distances from the mainland coast, a propensity of coastal
States in any event, and one that is likely to be given free
rein if there is an understood juridical principle that waters
already claimable as territorial sea need little justification
to become internal.

Prescott declares, with justification, that, whatever the chosen maximum distance from the mainland coast, it should be measured from the landward side of the island.[26] Were the measurement made to the seaward side of the island, a wide island that otherwise appeared satisfactorily close to the mainland would be deemed unacceptable because it stretched beyond the suggested 48-mile limit. Measuring from the landward side of the island (and closest point to the mainland) is consistent with the analysis discussed in this study, which assumed calculations of distances between the coast and the landward side of the relevant islands.

It should stressed, however, that as these criteria are being applied in given situations, paragraph 3 of Article 7 of the LOS Convention must be remembered: "...the sea areas lying within the (straight base) lines must be sufficiently closely linked to the land domain to be subject to the regime of internal waters." Thus, 48 nautical miles, or even a less distance, may, in certain circumstances, be too broad and cut off waters that should not be given internal status.

Maximum Distance Between Islands. The purpose of establishing a maximum distance between islands is, in large measure, to ensure that the islands form what can reasonably be considered a fringe, rather than an unconnected offshore aggregation. The rationale for the distance of 24 nautical miles is probably self-evident: 24 nautical miles is the maximum distance between islands that would permit an overlap of 12-nautical-mile territorial seas measured from low-water lines (Figure 11). Beazley suggests this test when he says that "where the territorial waters measured from the low-water line around individual islands spaced along the coast do not overlap, those islands are unlikely to constitute a fringe."[27]

Masking of the mainland coast. Application of the first three criteria will presumably preclude the use of straight baselines in egregious cases. Satisfying these criteria will not, however, guarantee that a particular island grouping truly can be considered fringing. For example, a string of small rocks or islets essentially paralleling the coast, no more than 24 nautical miles away from each other, may still not justify the use of straight baselines. The masking requirement is intended to address this kind of situation.

Neither Hodgson and Alexander nor Beazley is specific about the size or area relationship, if any, that must exist between the land mass of a fringing island group and the land mass of the opposite mainland. Beazley does point out that "'fringe of islands' must mean a number of islands although the exact number will depend partially on size; three large islands might constitute a fringe where three islets over the same area would not."[28] The implication seems clear that the islands

11a) Fringing Islands: each island within
24 n. miles of at least one other island.

MAINLAND

11b) Non-fringing Islands: islands more
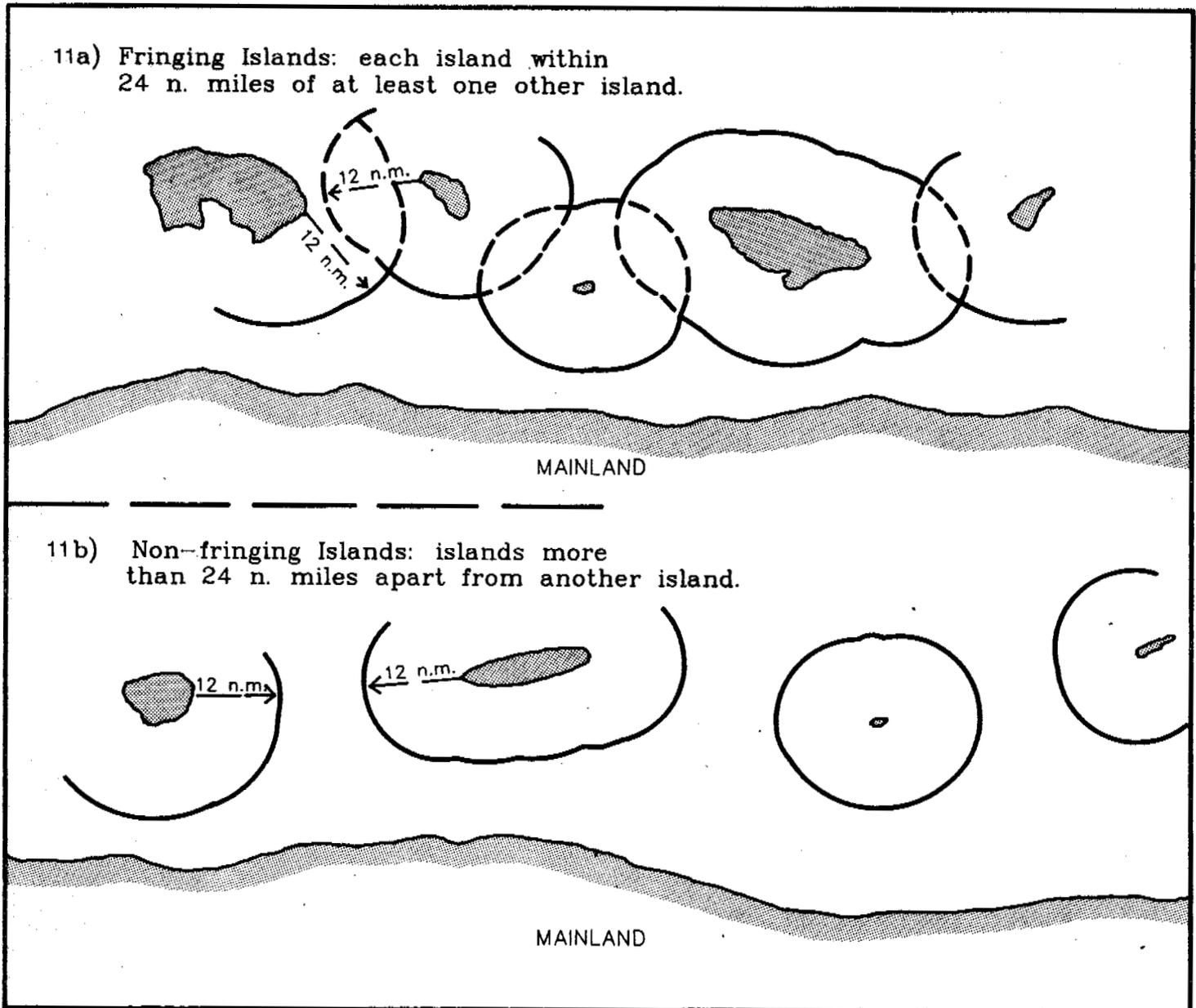than 24 n. miles apart from another island.

MAINLAND

Figure 11

must mask and be sufficiently close to the mainland to justify
being treated as a seaward extension of the coast. This
implication is consonant with the Court's observation, in the
Anglo-Norwegian Fisheries Case, that the skjaergaard, rather
than the mainland shore, was de facto the Norwegian coast.[29]

   Prescott addresses the issue, although his approach seems
more discursive than judgmental.[30] Among several factual
situations that Prescott identifies in which States might claim
that offshore islands fringe the coast are two that are
essentially variations on the masking criterion: 1) islands

that more or less form a unity with the mainland (i.e., those
that appear to be part of the mainland whether viewed from air
or sea) and 2) masking islands (i.e., those that, from the sea
but not from the air, appear to form the mainland).[31] The
first of these can be subsumed under the second because it only
makes a stronger case for straight baselines. Therefore, the
two types need not be treated separately. (Figure 12).

12a) Islands masking the mainland coast by
     more or less forming a unity with the mainland
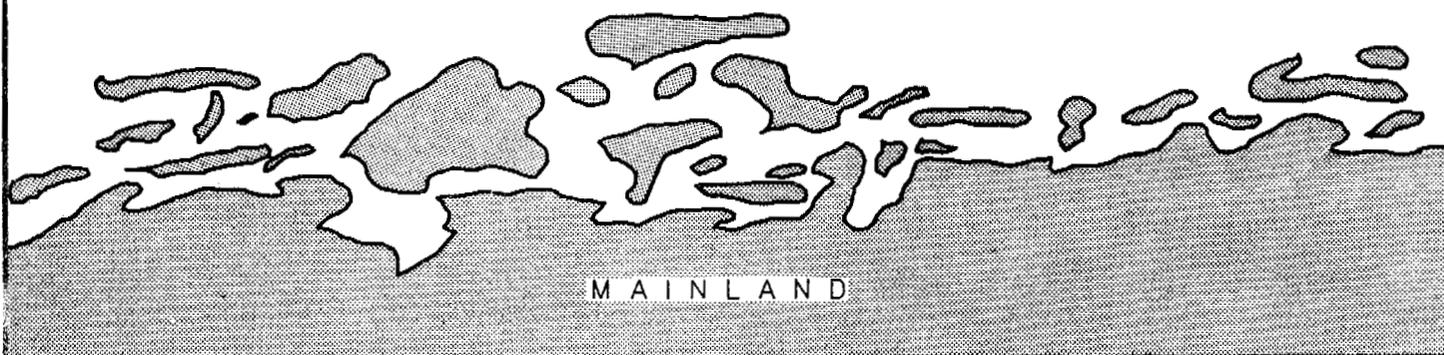
MAINLAND

12b) Islands masking the mainland
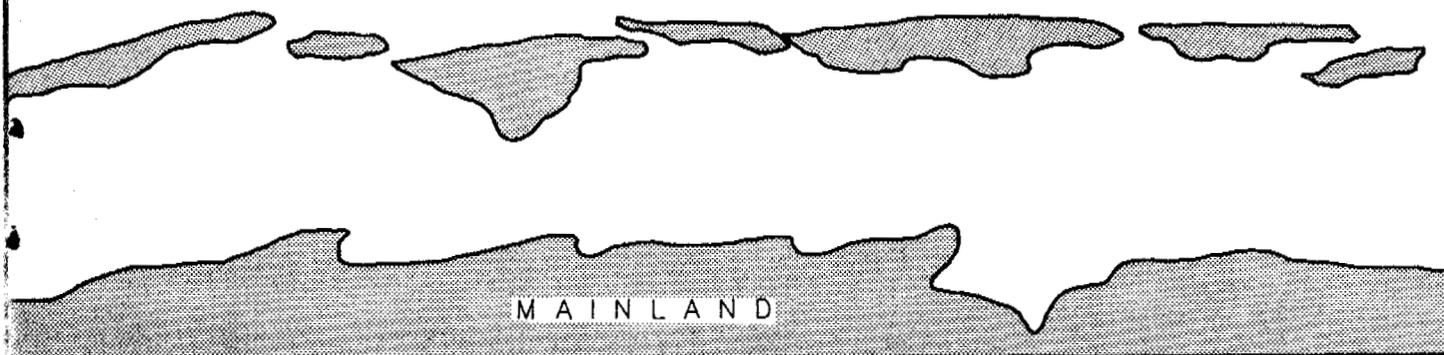   coast by creating a fringe

MAINLAND

Figure 12

To require masking of the mainland coast is to help ensure that the establishment of the straight baseline system--which will become, for all practical purposes, the new coastline--is premised on a significant relationship between the islands and the mainland coast. Assuming that masking is an essential aspect of justifying a straight baseline system, how does one measure the relationship between the islands and the opposite mainland coast? Although Hodgson does not detail a methodology for testing, he does suggest a quantification of such a test for masking by referring to the Norwegian situation:

> In the Norwegian example the islands masked, on the average, nearly two-thirds of the length of the coastline. In many areas, the mainland was totally obscured from the sea by continuous and overlapping lines of islands. The Norwegian guide should be paramount.[32]

Prescott talks of masking in terms of the impression that the relationship between the islands and the mainland may create for mariners or aviators or both[33], but he does not suggest a method of quantifying the relationship in order to make objective judgments about such matters.

Recognizing that the Norwegian situation is not easily replicated elsewhere in the world, it is difficult to hold other countries to the standard which Norway met by virtue of the proliferation of islands along its coast. Therefore, accepting Hodgson's determination that islands masked nearly two-thirds of the Norwegian coast, it seems appropriate to choose here some lesser number as the criterion for effective masking. The figure of 50% has been selected as a reasonable compromise between the need for a significant island-to-coast land mass ratio and a desire not to burden coastal States unduly.

Determining the masking percentage begins with constructing general direction lines for the mainland coast. This permits calculation of the masked and unmasked coastal areas without the tedious measurement of every coastal sinuosity. After these lines are established, perpendiculars are drawn from them seaward to the offshore islands.[34] A point along the coastal general direction line is considered masked if the perpendicular that has been drawn from that point intersects an island. Once this is done, it is a matter of calculating the proportion between the length of the coastal direction line that is masked and the total length of that line. If the proportion equals or exceeds 50%, then the masking requirement is met.

In the example illustrated in Figure 13 the mainland is characterized by three general direction lines- wx (36 n.miles long), xy (32 n.miles), and yz (42 n.miles). Eleven islands

Testing for Island Masking
  General direction lines:
  WX= 36
  XY= 32
  YZ= 42

  Part of General Direction Line
    that is masked:
        —along WX=21.7 or 60%
        —along XY=19.7 or 62%
        —along YZ=5.1 or 13%

MAINLAND

Therefore, coastlines defined
by general direction lines WX
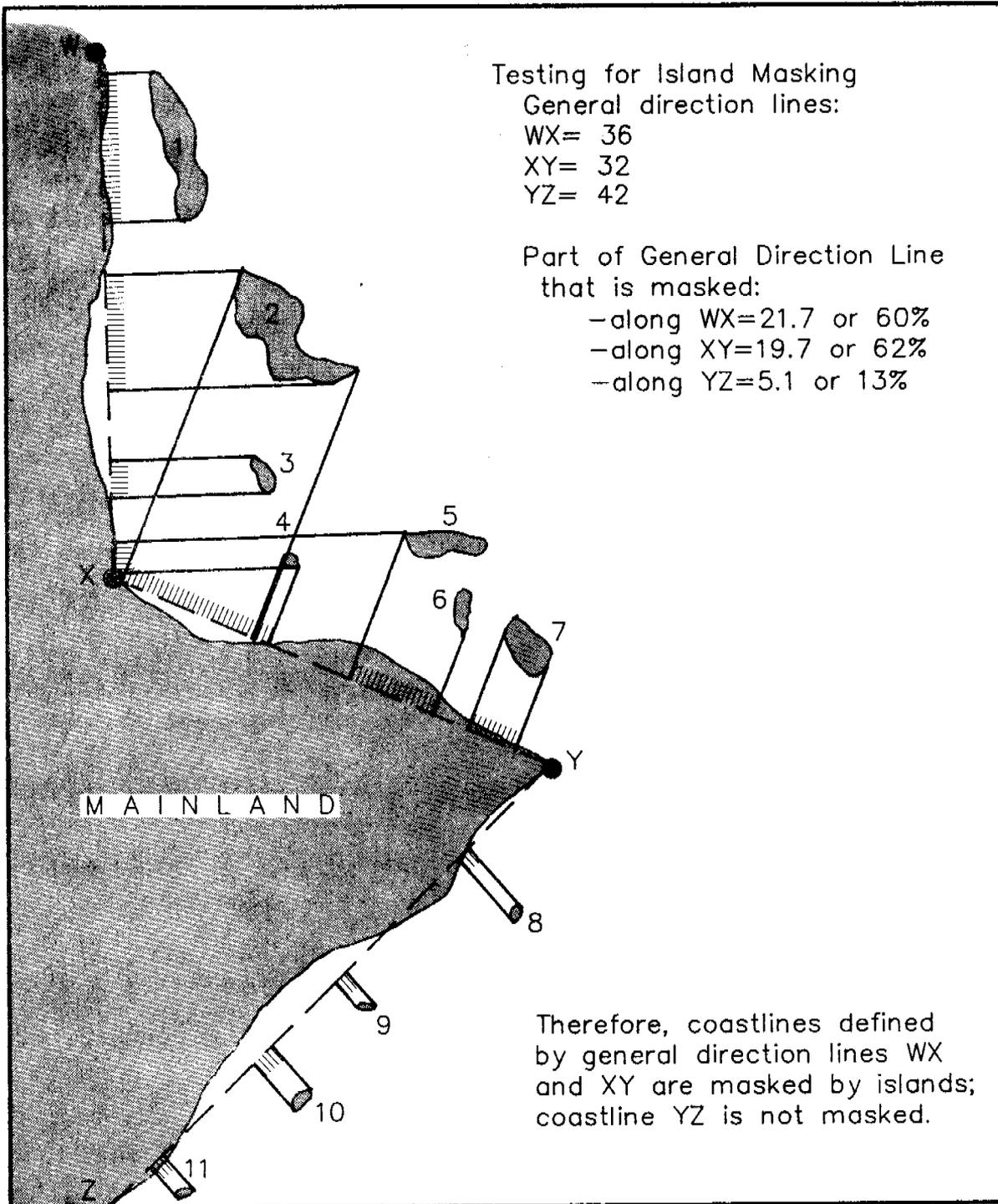and XY are masked by islands;
coastline YZ is not masked.

Figure 13

are situated off this part of the mainland. Perpendiculars
have been drawn from the general direction line seaward to
intersect the islands.

In this example, the percentage of general direction lines
wx and xy that is masked exceeds 50%, indicating that, if other
straight baseline criteria are met, straight baselines would be
proper. However, only 13% of the coastline defined by general
direction line yz is masked, thereby making straight baselines
improper along this section of the coast.

Determining General Direction

The general direction of the coastline, which conceptually
has its genesis in the Anglo-Norwegian Fisheries Case, is
relevant in two contexts. First, both the Territorial Sea
Convention and the 1982 LOS Convention require that straight
baselines "not depart to any appreciable extent from the
general direction of the coast...."[35] Second, general
direction lines are useful in determining the acceptability of
straight baseline systems involving fringing islands.

A general direction line should fulfill all of the
following criteria:

(1) The line should approximately parallel the direction
    of the relevant coastline;

(2) The line should not exceed 60 nautical miles in length,
    unless it does not deviate anywhere in its length more
    than 20° from the direction of the relevant coastline;

(3) Each endpoint of a general direction line should be on
    the mainland.

General Direction Line Must Parallel the Coast: This
requirement may be self-evident and, therefore, may not need to
be treated as a separate criterion. The course of a general
direction line may put it seaward or landward of a particular
coastal feature. It is a requirement, under international law,
that a straight baseline not depart to an appreciable extent
from the general direction of the coast--which really means
that if the straight baseline lies seaward of the general
direction line, its angle should not deviate significantly
(more than 20 degrees) from the general direction line. The
international community has little cause to complain if a
coastal State draws conservative straight baselines that hew
more closely to the low-water mark and therefore are situated
inside (on the landward side) of the general direction line,
even if the angle deviates more than 20°.

It must be borne in mind that the "coast" whose general
direction is to be reflected in the constructed line should be

the mainland. To be sure, in the <u>Anglo-Norwegian Fisheries</u>
<u>Case</u> the ICJ noted that the offshore islands forming the
"skjaergaard constitutes a whole with the sovereign
mainland."[36] The skjaergaard, however, comprises islands
exceptionally grouped and close to the mainland to form a unity
with it; therefore, the <u>Anglo-Norwegian Case</u> does not represent
a departure from the principle that general direction reflects
that of the mainland coast. To suggest, as a guiding
principle, that the general direction of a coast having
offshore islands is defined by those islands is, of course, to
disregard the importance of the mainland and to engage in an
exercise in circular reasoning.

<u>Maximum Length of General Direction Line</u>: The general
direction line is an approximation of the relevant portion of
the coast. The most faithful representation of the direction
of the coast is one that follows its every sinuosity, but that
can hardly be considered a "general direction" line. Some
accommodation must be reached between the need for a reasonable
reflection of coastal directional trends and the need for a
manageable number of directional changes. All other things
being equal, the longer the stretch of coastline, the greater
the number of directional changes and, as a result, the greater
the overall disparity between a single general direction line
and the actual coastal configuration. Therefore, setting a
maximum length for a general direction line seems to afford
some guarantee that there is a reasonable correspondence
between that line and the coast it is intended to represent.

As with other such criteria proposed in this study, the
authorities have not been unanimous in their treatment of this
issue. Hodgson and Alexander do not discuss maximum length of
a general direction line, but do suggest that no straight
baseline should exceed 40 nautical miles.[37] Beazley (who
supports 45 miles as the maximum baseline length), goes further
and declares, "One can then assume that the same yardstick
provides a scale within which to judge the extent of coastline
to be considered when assessing the general direction of the
coast."[38] Prescott, on the other hand, passes the issue off
without suggesting anything like a maximum acceptable length.
In fact, Prescott attaches scant importance to the general
direction question at all, arguing that there is little
opportunity for baselines to deviate significantly from the
general direction of the coast if they involve either truly
deep indentations or truly fringing islands and if they are
drawn from appropriate points.[39]

Beazley's suggestion has a certain amount of merit to it,
but it may, like other analyses that place heavy reliance on
the <u>Anglo-Norwegian Fisheries Case</u>, be a bit too conservative
for current practice. It seems reasonable to add a little more
flexibility to this requirement and increase the maximum length
of a general direction line by a factor of one-third, to 60

miles. Even this length may, of course, appear unnecessarily limiting in the hypothetical case of a State having an extremely long stretch of straight coastline (although one may wonder whether such a stretch of coastline is likely to warrant serious consideration for straight baselines if the state is claiming them based on the deeply indented criteria). In such an event, further flexibility could be provided by permitting a general direction line longer than 60 nautical miles, provided that the relevant coastline does not at any point change direction by more than 20 degrees.

For purpose of determining general direction, charts having a scale of approximately 1:1,000,000 should be used.[40] This would comport with the ICJ's adjuration not to judge the relationship between baseline and coast on the basis of representations on large-scale charts. Use of this scale should moderate the apparent directional changes caused by the occasional presence of small curvatures on an otherwise generally smooth coast.

Location of Endpoints: Finally, in order to ensure that the general direction line truly reflects coastal changes, and not an artificial perception of coastal configuration, it should be required that such lines have as their endpoints appropriate points along the relevant coast. For these purposes, appropriate points have been defined as natural or artificial formations from which the territorial sea may be measured. Examples of such points, in addition to coastal headlands, could include the seaward low-water lines of fringing reefs (LOS Convention, Article 6) low-tide elevations having installations permanently above sea level (LOS Convention, Article 7.4), and permanent harbor works (LOS Convention, Article 11).

NOTES

1. Excluded from consideration are archipelagic baselines and bay or river closing lines.

2. Anglo-Norwegian Fisheries Case, (1951) I.C.J. Reports 1951, p.116.

3. T. Scovazzi, "Le Linee di Base Rette", in T.Scovazzi ed., La Linea Di Base Del Mare Territoriale (1986), 83, p.106.

4. Cmdr. P.B. Beazley. Maritime Limits and Baselines: A Guide to their Delineation. The Hydrographic Society Special Publication No. 2 (2nd Ed., Revised August 1978), p.8.

5. J. Victor Prescott, "Straight Baselines: Theory and Practice", Monograph, Typescript, p.4 (1985).

6. Were Beazley's point not correct, Article 10 (6) of the LOS Convention (Article 7(6) of the Territorial Sea Convention), which exempts straight baselines from rules on bays, would render the 24-mile bay closing line not only unnecessary, but useless.

7. Robert Hodgson and Lewis Alexander, "Towards an Objective Analysis of Special Circumstances: Bays, Rivers, Coastal and Oceanic Archipelagoes and Atolls," Law of the Sea Institute Occasional Paper No. 13, 1971, p.8.

8. At first glance, this method may appear inconsistent with the suggestion made by Hodgson and Alexander, that depth of penetration should be based on the longest possible line from a closing line to the head of the bay. They, however, were recommending a method of measuring penetration for an entirely different purpose--not to determine the propriety of drawing straight baselines, but to determine whether an individual indentation is sufficiently "land-locked" to justify its closure as a bay. In their analysis, the necessity that an indentation be "land-locked" is entirely separate from the requirement that its area equal the area of a semi-circle having a similarly-sized opening. Thus, penetration is, in their analysis, irrelevant to area.

9. Hodgson and Alexander, pp. 29,36,41.

10. Ibid, p.27.

11. Ibid, p.24.

12. Summary Report of Committee II, First United Nations
    Conference on the Law of the Sea (1958), pp.157-159. See
    also, Scovazzi, pp.102-103.

13. Scovazzi, pp. 128-136.

14. Ibid., pp.135-36. See also Summary Records of the Plenary
    Session, First United Nations Conference on the Law of the
    Law of the Sea (1958), p. 62.

15. Beazley, p.9.

16. Hodgson and Alexander, p.42.

17. Robert W. Smith. Exclusive Economic Zone Claims: An
    Analysis and Primary Documents. Martinus Nijhoff
    Publishers (Dordrecht: 1986), p.6.

18. With respect to a straight baseline system justified on
    fringing islands criteria, straight baselines may be drawn
    on the seaward side of the connected islands of that
    system if the criteria for a straight baseline system
    based on the deeply indented coastline criteria can be met.

19. Prescott, p.10.

20. Scovazzi, pp.116-17.

21. Ibid.

22. Hodgson and Alexander, pp.37-38.

23. Prescott, p.25.

24. Ibid., pp.13-14.

25. Ibid.

26. Ibid., p.14.

27. Beazley, p.9.

28. Ibid., p.8.

29. Anglo-Norwegian Fisheries Case, p. 127.

30. Prescott, pp.9-13.

31. Ibid., pp.10-11.

32. Robert D. Hodgson, "Islands, Normal and Special Circumstances," Department of State Research Study RGS-3 (December 10, 1973), p. 23.

33. Prescott, pp.10-11.

34. Another method could be used where perpendiculars would be drawn from the straight baseline segments landward to the general direction line. The application would be more complicated, but the results would essentially be the same.

35. Territorial Sea Convention, Article 4; 1982 Law of the Sea Convention, Article 7.

36. Anglo-Norwegian Fisheries Case, p.

37. Hodgson and Alexander, p.42.

38. Beazley, p.9.

39. Prescott, p.24.

40. Hodgson and Alexander recommend this scale, p.38.

ANNEX

GEOMETRIC RELATIONSHIP BETWEEN
BAY PENETRATION AND AREA

Some geometric analysis illustrates the depth of penetration concept. Recognizing that any use of geometry in this context requires some idealization, it is fair to suggest, as do Hodgson and Alexander, that bays can be treated as being roughly of three shapes: semi-circular, triangular and rectangular.[*] Accepting the premise that bays form these geometric figures permits calculations regarding the penetration of an indentation necessary to approximate the water area comparable to that of a semi-circular juridical bay of similar opening (Figure 1, p. 7).

a. Semi-circle: For a semi-circle having diameter X (and therefore radius X/2), the area is $1/2 \pi (X/2)^2$ or $\pi X^2/8$. Assigning π the value of 3.14, $\pi X^2/8$ is slightly more than $0.39X^2$. Thus, the area of a semi-circle having diameter X is approximately $0.4X^2$ (Figure A1).

b. Rectangle: The area of a rectangle is length times width (or base times height). Assuming a rectangular indentation of length (or base) X, an area of $0.4X^2$ is achieved when the penetration (height) is $0.4X$. Thus, a rectangular indentation only 40% as deep as it is wide fulfills the semi-circle test for a juridical bay (Figure A2).
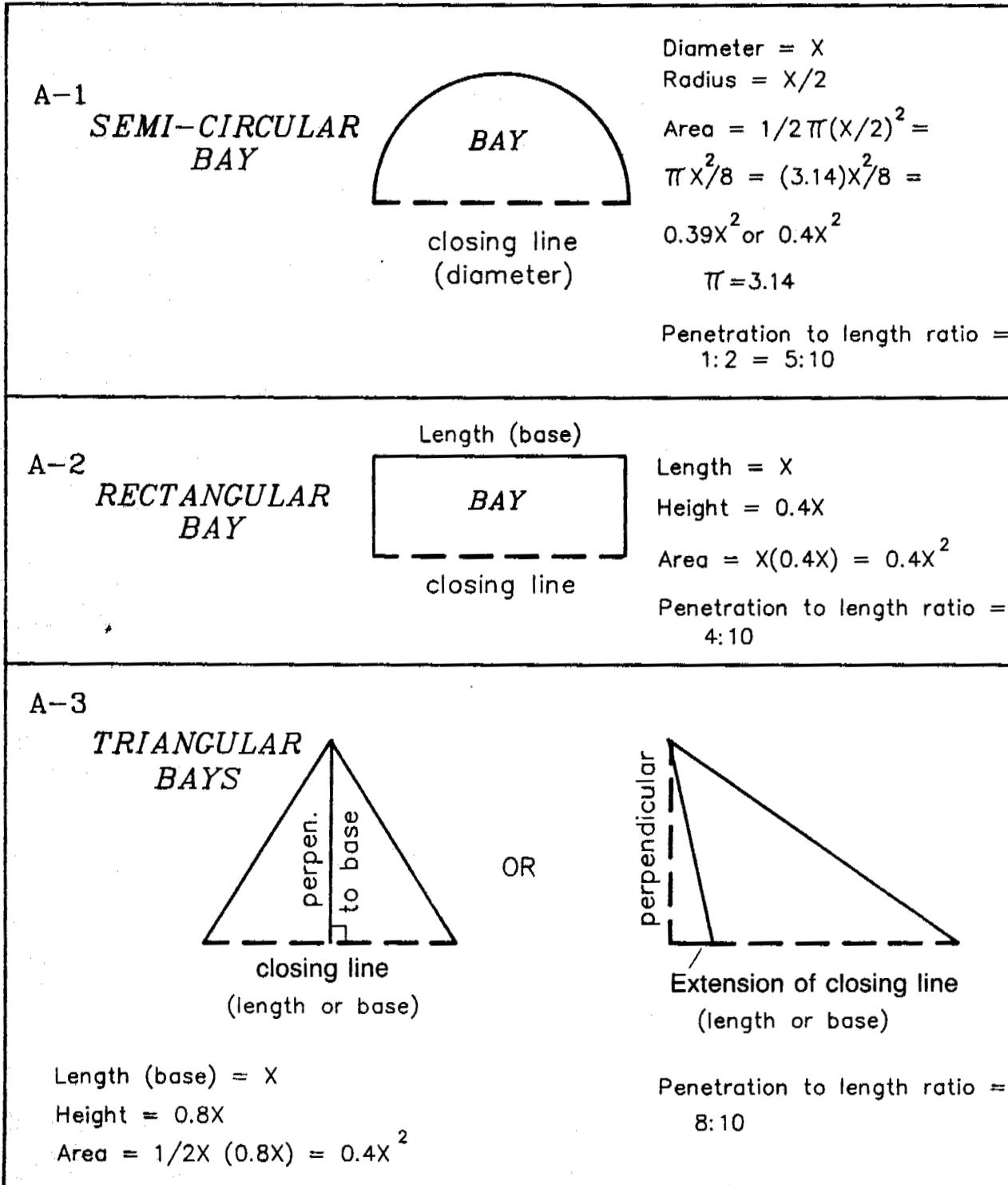
c. Triangle: The area of a triangle is 1/2 base times height, with height defined as the perpendicular drawn from the base to the apex (or from a hypothetical extension of the base if no perpendicular can be drawn from the actual base to the apex). Assuming, again, a base of X, an area of $0.4x^2$ is achieved by a triangle whose penetration (height) is $0.8X$ (Figure A3).

Combination: While the penetration ratio of a semi-circular bay is 1:2 (5:10), the comparable ratio for a rectangular bay is 4:10 and for a triangular bay is 8:10. To

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[*]Robert Hodgson and Lewis Alexander, "Towards an Objective Analysis of Special Circumstances: Bays, Rivers, Coastal and Oceanic Archipelagoes and Atolls," Law of the Sea Institute Occasional Paper No. 13, 1971, p.8.

simplify the concept, it may be possible to average the two
non-semi-circular ratios to derive an approximate minimum
penetration ratio of 6:10.

A-1
SEMI-CIRCULAR BAY

BAY

closing line
(diameter)

Diameter = X
Radius = X/2

Area = $1/2 \pi (X/2)^2$ =

$\pi X^2/8$ = $(3.14)X^2/8$ =

$0.39X^2$ or $0.4X^2$

$\pi = 3.14$

Penetration to length ratio =
1:2 = 5:10

A-2
RECTANGULAR BAY

Length (base)

BAY

closing line

Length = X
Height = 0.4X

Area = $X(0.4X)$ = $0.4X^2$

Penetration to length ratio =
4:10

A-3
TRIANGULAR BAYS

perpen. to base

OR

perpendicular

closing line
(length or base)

Extension of closing line
(length or base)

Length (base) = X
Height = 0.8X
Area = $1/2X (0.8X)$ = $0.4X^2$

Penetration to length ratio =
8:10

Annex Figure