INTERNATIONAL CONFERENCE ON SAFETY OF LIFE AT SEA.

COMMITTEE ON SAFETY OF CONSTRUCTION.

REPORT

AND

MINUTES OF PROCEEDINGS.
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CONFÉRENCE INTERNATIONALE POUR LA SAUVEGARDE DE LA VIE HUMAINE À LA MER.

Commission de Sécurité de la Construction.

RAPPORT.

1. La Commission a l’honneur de soumettre à la Conférence le rapport ci-après sur les sujets qui lui avaient été proposés et qui ont fait l’objet d’un examen sérieux. Les conclusions de ce rapport sont données sous la forme de trente-cinq articles numérotés consécutivement que la Commission est d’avis d’insérer dans la Convention.

COMPARTIMENTAGE ET CLOISONS ÉTANCHES

2. La Conférence a posé à la Commission les questions suivantes :

(a.) L’examen des questions de compartimentage et de cloisons étanches est-il suffisamment avancé pour que la Conférence puisse poser des principes, qui devraient être obligatoires pour tous les États signataires, concernant les nouveaux navires transocéaniques à passagers, et s’il en est ainsi, quelle est la nature de ces principes ?

(b.) Est-il désirable et possible de poser des principes généraux en ce qui concerne les navires à passagers existant actuellement et effectuant une navigation transocéanique ?

3. La Commission répond affirmativement à la première question et négativement à la seconde. Pour les navires neufs, les définitions, les principes généraux et les conditions qui en résultent, susceptibles d’une application internationale, sont donnés ci-après ; l’opinion de la Commission et sa conclusion à l’égard des navires existants figurent à l’article 3.

Généralités.

Article 1er.—(1.) Cette Convention ne s’applique, sauf dans les cas où elle en dispose autrement, qu’aux navires de commerce à propulsion mécanique de l’un quelconque des États contractants, portant plus de douze passagers et faisant route d’un port de l’un desdits États vers un port hors de cet État.

(2.) Ne sont pas soumis aux règles de la Convention les navires de l’un des États contractants accomplissant les voyages énumérés dans la cédule qui sera annexée à la Convention au moment de sa ratification, comme étant des voyages que cet État ne considère pas comme des voyages océaniques. Aucun voyage ne pourra être mentionné dans la cédule, si, au cours de leur route, les navires qui l’effectuent passent à une distance de plus de 200 milles de la côte la plus proche.

Tout État contractant aura le droit de réclamer d’un autre État contractant le bénéfice des avantages de la Convention pour une classe quelconque de ses navires accomplissant les voyages mentionnés dans la cédule. À cet effet, l’État qui réclamera ce bénéfice devra imposer auxdits navires les obligations prescrites par la Convention pour les voyages océaniques, pour autant que ces obligations ne seraient pas, eu égard à la nature du voyage, inutiles ou déraisonnables.

Article 2. Les règles suivantes ont été établies en vue d’une application intégrale à tous les navires neufs couverts par la Convention.
Dans l’esprit de ces règles on entend par navire neuf tout navire dont la quille aura été posée trois mois au moins après la date fixée pour la ratification de la Convention et par navire existant tout autre navire couvert par la Convention.

Navires existants.

Article 3. Il n’est pas possible pour la Conférence de poser des principes de compartimentage applicables à tous les navires existants. Par contre, la Conférence estime que, pour chaque navire, l’Administration de l’État dont il relève doit examiner les dispositions existantes en vue des améliorations qu’il serait possible et raisonnable d’apporter dans le sens d’un accroissement de sécurité.

Navires neufs.

Article 4. Les navires neufs doivent être compartimentés aussi efficacement que possible, eu égard à la nature du trafic auquel ils sont destinés.

Définitions.

Article 5. Ci-après les définitions des termes employés dans les questions de cloisonnement :

(1.) La flottaison en charge est la flottaison considérée dans la détermination du compartimentage.

(2.) La longueur du navire est la longueur extrême mesurée au niveau de la flottaison en charge.

(3.) La largeur du navire est la largeur extrême hors membrures mesurée au niveau de la flottaison en charge ou au-dessous de celle-ci.

(4.) Le pont de compartimentage est le pont continu le plus élevé jusqu’auquel s’élèvent toutes les cloisons étanches transversales.

(5.) La ligne de surimmersion est une ligne supposée tracée sur le bordé à 76 millimètres (équivalent à 3 pouces) au-dessous de l’intersection de la surface externe du bordé avec la surface supérieure du pont de compartimentage.

(6.) Le tirant d’eau est la distance verticale mesurée entre le dessus de quille au milieu de la longueur et la flottaison en charge.

(7.) Le franc-bord est la distance verticale mesurée de la flottaison en charge à la ligne de surimmersion au milieu du navire.

(8.) Le creux est la somme du tirant d’eau et du franc-bord.

(9.) La tonte du pont de compartimentage, en chaque point, est la distance verticale mesurée du livet de ce pont à une ligne parallèle à la flottaison en charge, passant par ce livet au milieu.

(10.) Le coefficient de finesse à employer, s’il en est besoin, est le rapport entre le volume de la carcasse hors membrures limité à la flottaison en charge et le produit des trois dimensions : longueur, largeur, tirant d’eau.

(11.) La perméabilité d’un espace s’exprime par la fraction de cet espace que l’eau est susceptible d’occuper. Le volume d’un compartiment qui s’étend au-dessus de la ligne de surimmersion doit être considéré comme limité à la hauteur de cette ligne; les volumes s’entendent hors membrures.

(12.) La tranche des machines s’étend entre les cloisons transversales principales étanches qui limitent les espaces affectés aux machines de propulsion principales et auxiliaires, y compris les chaudières, s’il en existe.

Longueur envahissable.

Article 6. Pour chaque point de la longueur du navire la longueur envahissable doit être déterminée en tenant compte des formes, du tirant d’eau, et des autres caractéristiques géométriques du navire considéré.

Pour un navire dont les cloisons transversales étanches sont limitées par un pont de compartimentage continu, la longueur envahissable en un point donné est la portion maximum, exprimée en centimètres, de la longueur du navire, ayant pour centre le point considéré, et qui peut
être envahie par l'eau, dans les conditions hypothétiques définies à l'article 7 ci-après, sans que le navire s'immerge au-delà de la ligne de surimmersion.

Pour un navire dont toutes les cloisons étanches transversales ne s'élèvent pas jusqu'à un seul et même pont continu, les longueurs envalissables doivent être déterminées de manière à assurer au navire dans toutes les conditions possibles d'assiette après avoirie, une sécurité au moins équivalente à celle établie pour le navire dont toutes les cloisons se limitent à un pont continu.

**Perméabilité.**

**Article 7.** Les hypothèses visées à l'article 6 sont relatives aux perméabilités des volumes en question limitées supérieurement à la ligne de surimmersion.

Dans la détermination des longueurs envalissables, on adopte une perméabilité moyenne uniforme pour l'ensemble de chacune des trois parties suivantes du navire :

1. Tranche des machines ;
2. Portion située à l'avant de la tranche des machines ;
3. Portion située à l'arrière de la tranche des machines.

La perméabilité à attribuer à la tranche des machines, y compris le volume du double-fonds correspondant, est quatre-vingt pour cent pour les navires à vapeur. Pour les navires munis de moteurs à combustion interne, la perméabilité de la tranche des machines est quatre-vingt-cinq pour cent, à moins qu'il ne soit prouvé par un calcul direct qu'une valeur inférieure à ce chiffre peut lui être attribuée ; mais en aucun cas le chiffre adopté ne peut être inférieur à quatre-vingt pour cent.

Les perméabilités à attribuer aux espaces situés à l'avant et à l'arrière de la tranche des machines sont les suivantes :

(a.) Soixante pour cent pour les locaux à marchandises, les soutes à charbon permanentes et de réserve, les soutes à provisions, à bagages et à dépêches, les puits aux chânes, les tunnels étanches des arbres d'hélices et des tuyautages, ainsi que les citernes à eau douce établies au-dessus du double-fonds.

La preuve doit être faite que les espaces énumérés ci-dessus sont appropriés à leur destination et qu'ils y sont réellement affectés. La même perméabilité ne peut être attribuée à aucun espace non spécifié ci-dessus sans autorisation de l'Administration.

(b.) Quatre-vingt-quinze pour cent pour les espaces réservés aux passagers et à l'équipage, les coquiers, les cales servant exclusivement de cales à eau, les double-fonds et tous les autres espaces du navire qui ne sont pas affectés à une des destinations énumérées dans le paragraphe (a) précédent.

Si une partie d'entreponct limitée par les cloisons métalliques transversales permanentes est partiellement affectée au transport des passagers, cet espace doit être considéré comme affecté en totalité aux passagers ; les parties d'entreponct qui peuvent être affectées indifféremment aux passagers ou à la cargaison doivent de même être considérées comme affectées aux passagers.

Si, dans chacune des portions avant et arrière du navire, au-dessous de la ligne de surimmersion, il existe à la fois des espaces appartenant aux catégories (a) et (b) ci-dessus, la perméabilité moyenne pour la portion considérée est donnée en pourcentage par la formule $95 - 55r$, dans laquelle $r$ est le rapport entre le volume des espaces de la catégorie (a) et le volume total de la portion considérée du navire.

**Longueur admissible des Compartiments.**

**Article 8.**—(1.) La longueur maximum admissible pour un compartiment ayant son centre en un point quelconque d'un navire, se déduit de la longueur envalissable (article 6), en multipliant celle-ci par un facteur approprié.
(2.) Ce facteur dépend de la longueur du navire et, pour une longueur donnée, varie selon la nature du service pour lequel le navire est prévu. Ce facteur décroit d'une façon régulière et continue :

(a.) A mesure que la longueur du navire augmente ;
(b.) A mesure que, pour une longueur donnée, le type du navire s'éloigne du type mixte "passagers-marchandises", pour se rapprocher du type essentiellement affecté au transport de passagers.

(3.) Pour chacun des deux types de navires visés ci-dessus, la variation du facteur peut être figurée par une courbe dont les coordonnées représentent les longueurs du navire et les valeurs du facteur ; le tableau suivant définit certains points des deux courbes relatives aux limites de chaque type.

<table>
<thead>
<tr>
<th></th>
<th>A.</th>
<th>B.</th>
<th>C.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mètres</td>
<td>Pieds</td>
<td>Mètres</td>
</tr>
<tr>
<td>1,00</td>
<td>90</td>
<td>295</td>
<td>79</td>
</tr>
<tr>
<td>0,90</td>
<td>114</td>
<td>374</td>
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<tr>
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</tr>
<tr>
<td>0,65</td>
<td>149</td>
<td>489</td>
<td>116</td>
</tr>
<tr>
<td>0,50</td>
<td>174</td>
<td>571</td>
<td>149</td>
</tr>
<tr>
<td>0,38</td>
<td>213</td>
<td>699</td>
<td>209</td>
</tr>
<tr>
<td>0,34</td>
<td>274</td>
<td>899</td>
<td>274</td>
</tr>
</tbody>
</table>

La colonne A indique les valeurs maxima admissibles pour le facteur correspondant aux longueurs données dans les colonnes B et C.

La colonne B est applicable aux navires du type mixte "passagers-marchandises" ; la colonne C est applicable aux navires essentiellement affectés au transport des passagers.

(4.) Pour une longueur donnée, la valeur du facteur correspondant à un navire de type intermédiaire aux deux extrêmes limites, sera comprise entre les valeurs du facteur déterminées par les deux courbes mentionnées ci-dessus, et sera fixée automatiquement, suivant un criterium de service ; ce criterium fera l'objet d'études ultérieures, comme il est dit à l'article 23.

**Article 9.**—(1.) Quand le facteur est égal ou inférieur à 0,5, ce facteur peut être doublé pour donner en un point quelconque du navire la longueur globale de deux compartiments adjacents, mais la longueur du compartiment le plus court de chaque paire ne peut être inférieure au quart de la longueur globale ainsi obtenue. Si l’un des deux compartiments adjacents fait partie de la tranche des machines et si la portion du navire qui comprend l’autre présente une perméabilité différente de quatre-vingt pour cent, les longueurs correspondantes doivent être ramenées aux valeurs convenables par l'application d'une correction appropriée.

(2.) En aucun cas la longueur d’un compartiment ne peut dépasser vingt-luit mètres (équivalent à 92 pieds).

(3.) Quand le facteur est compris entre 0,84 et 0,50 la longueur globale des deux premiers compartiments à partir de l'étrave ne doit pas être supérieure à la longueur envahissable à l'extrémité avant du navire, et la longueur du second de ces compartiments doit être au plus égale à la longueur admissible en vertu de l'article 8 ci-dessus, et non inférieure à trois mètres (équivalent à 10 pieds).

(4.) Quand la longueur du navire est comprise entre 213 mètres (équivalent à 699 pieds) et 251 mètres (équivalent à 823 pieds) la longueur envahissable à l'extrémité avant doit être au moins égale à 20 pour cent de la longueur du navire ; il ne peut y avoir moins de trois compartiments sur une distance, mesurée à partir de l'étrave, au plus égale à la longueur envahissable précitée et non inférieure à 20 pour cent de la longueur du navire.

(5.) Quand la longueur du navire atteint ou dépasse 251 mètres (équivalent à 823 pieds) la règle précédente est applicable sous réserve de remplacer : trois compartiments et 20 pour cent, par : quatre compartiments et 28 pour cent.
(6.) Il peut exister une niche dans une cloison transversale, à condition qu'elle se trouve à une distance suffisante de la muraile.

Lorsque le facteur de cloisonnement est supérieur à 0,50, des baionnettes ne sont pas admises dans les cloisons transversales principales des navires auxquels l'article 4 est applicable, à moins qu'il n'existe un cloisonnement supplémentaire assurant la même sécurité que des cloisons planes. En aucun cas, dans une cloison formant baionnette, la longueur totale des ressauts ne peut dépasser deux centièmes de la longueur du navire, plus trois mètres (équivalent à 10 pieds).

(7.) Les volumes admissibles pour chacun de deux compartiments adjacents déterminés suivant l'article 8 et le présent ne peuvent en aucun cas être affectés par l'existence de niches ou de ressauts dans la cloison qui les sépare.

Article 10. Les exigences des articles 8 et 9 doivent être considérées comme des minima.

Si le compartimentage d'un navire est de nature à assurer à celui-ci un degré de sécurité supérieur à celui que prescrivent les règles de la présente Convention, l'Administration de l'État dont relève le navire doit, à la demande de l'armateur de celui-ci, en faire mention sur le certificat dudit navire. La demande ci-dessus doit être accompagnée de tous les renseignements nécessaires pour en établir le bien-fondé.

En pareil cas cette mention constate que le cloisonnement est égal ou supérieur à celui prévu pour un navire de même longueur appartenant à la catégorie visée dans la colonne C du tableau de l'article 8 ; la mention indique en outre quelle serait la longueur du navire appartenant à cette dernière catégorie et pour lequel la valeur réglementaire du facteur de cloisonnement est précisément égale à celle qui a été employée dans le navire en question.

Les longueurs et facteurs correspondants ne figurant pas explicitement dans les colonnes C et A respectivement du tableau de l'article 8 sont obtenus par interpolation.

Cloisons d'abordage et cloisons limitant la tranche des Machines.

Article 11. Il doit exister à l'extrémité avant de tous les navires une cloison d'abordage s'élevant jusqu'au pont de compartimentage ; sur les navires à superstructure continue cette cloison doit s'élever jusqu'au pont le plus élevé. La distance mesurée à la flottaison en charge de cette cloison à l'étêve ne doit pas être inférieure à cinq pour cent de la longueur du navire.

Il doit exister également une cloison à l'extrémité arrière et des cloisons aux extrémités de la tranche des machines pour en séparer les portions du navire affectées aux passagers et aux marchandises ; toutes ces cloisons doivent s'élever jusqu'au pont de compartimentage. La cloison de l'extrémité arrière peut toutefois être arrêtée au-dessus de ce pont, sous la double réserve que cette cloison s'élève au moins jusqu'au premier pont au-dessus de la flottaison en charge et que ce pont forme plafond horizontal étanche depuis la cloison en question jusqu'à l'étambot ; en aucun cas, néanmoins, la sécurité du navire, au regard du compartimentage, ne doit se trouver diminuée de ce fait.

Cloisons d'incendie.

Article 12. Des cloisons incombustibles doivent subdiviser les parties du navire situées au-dessus de la ligne de submersion en vue d'empêcher la propagation du feu. La distance moyenne entre deux cloisons consécutives de l'espèce est fixée à quarante mètres (équivalent à 131 pieds) au maximum. Les niches dans ces cloisons doivent être incombustibles ; les ouvertures dans ces cloisons doivent être munies de portes incombustibles.

Construction des Cloisons étanches—Épreuves initiales.

Article 13.—(1.) Les cloisons étanches doivent être construites de manière à pouvoir supporter la pression due à une colonne d'eau s'élevant jusqu'à la ligne de submersion avec une marge de résistance convenable.

(2.) Lorsqu'une cloison forme baionnette ou présente des nicher, ces parties doivent être aussi étanches et présenter la même résistance que les parties avoisinantes de la cloison.
Au passage de membrures ou de barrots au travers d'un pont ou d'une cloison étanche, l'étanchéité doit être assurée par des pièces forgées et matées ou bien coulées et fixées avec interposition de mastic de fer à l'exclusion de remplissages en bois ou en ciment.

(3) L'essai par remplissage des compartiments principaux n'est pas obligatoire. Un examen complet des cloisons doit être fait par un expert autorisé; cet examen doit être complété dans tous les cas par un essai à la lance.

(4) Les compartiments extrêmes de l'avant et de l'arrière du navire doivent être soumis à un essai de remplissage sous la pression d'une colonne d'eau s'élevant jusqu'à la ligne de surimmersion.

Les double-fonds, les cales à eau et tous les compartiments destinés à contenir des liquides doivent être soumis à un essai de remplissage sous la pression d'une colonne d'eau s'élevant jusqu'à la flottaison en charge, sans que la hauteur de cette colonne d'eau au-dessus du plafond puisse être inférieure à 2,44 mètres (8 pieds).

(5) Aucune modification ne peut être apportée dans la structure d'une cloison, postérieurement à l'inspection, sans autorisation de l'Administration.

(6) Toutes les prescriptions relatives aux cloisons étanches transversales principales sont applicables dans la mesure du possible aux cloisons longitudinales.

**Ouvertures pratiquées dans les Cloisons étanches.**

**Article 14.**—(1) Le nombre des ouvertures pratiquées dans les cloisons étanches doit être réduit au minimum compatible avec les dispositions générales et la bonne exploitation du navire; ces ouvertures doivent être pourvues de dispositifs de fermeture satisfaits.

(2) Il ne peut exister ni porte, ni vanne, ni trou d'homme, ni aucun orifice d'accès:

(a) Dans la cloison étanche d'abordage, au-dessous de la ligne de surimmersion;

(b) Dans les cloisons transversales étanches séparant un local à marchandises d'un local à marchandises contigu ou d'une soute à charbon de réserve, sauf exceptions spécifiées au paragraphe (6) du présent article.

(3) Dans la tranche des machines, et exclusion faite des portes des soutes à charbon et des tunnels d'arbres, il ne peut exister qu'une porte de communication dans chaque cloison transversale principale; toutefois, s'il y a plusieurs tunnels d'arbres distincts, chacun d'eux peut être muni d'une porte d'accès.

S'il existe un tunnel avant pour la circulation des personnes ou pour le passage des tuyautages, ce tunnel doit être pourvu d'une porte étanche.

(4) Ne sont admises que les portes à charnières et les portes à glissières ou toutes autres d'un type au moins équivalent, à l'exclusion des portes montées simplement sur boulons.

Les portes à charnières doivent être pourvues de loquets commandés par des leviers manœuvrables des deux côtés de la cloison.

Les portes à glissières peuvent être à déplacement vertical ou horizontal.

Celles qui sont actionnées uniquement à bras doivent pouvoir être manœuvrées sur place et en outre d'un point accessible situé au-dessus de la ligne de surimmersion; celles qui comportent l'emploi d'une énergie mécanique doivent pouvoir être manœuvrées:

(a) Mécaniquement de la timonerie;

(b) À bras, sur place et d'un point accessible au-dessus de la ligne de surimmersion.

Est assimilée à une porte employant l'énergie mécanique toute porte munie d'un frein à cataracte ou de tout dispositif équivalent, susceptible d'être libérée d'un point voisin de la timonerie, et, une fois libérée, se fermant sous l'effet de son propre poids.
(5.) Les portes étanches des soutes à charbon doivent être pourvues d'écrans, ou autres dispositifs ayant pour effet d'empêcher le charbon de faire obstacle à leur fermeture.

(6.) Des portes étanches à charnières peuvent être admises dans les parties du navire affectées aux passagers et à l'équipage ainsi que dans les locaux de service, à condition qu'elles soient établies au-dessus d'un pont dont la surface inférieure à son point le plus bas en abord se trouve au moins à 2,13 mètres (7 pieds) au-dessus de la flottaison en charge; de semblables portes ne sont pas autorisées dans ces parties et locaux du navire au-dessous d'un tel pont.

Des portes étanches à charnières d'un type particulièrement robuste peuvent être admises dans des cloisons d'entrepont séparant deux locaux à marchandises, à condition que ces portes se trouvent au-dessus de la flottaison en charge. Elles doivent être fermées à l'aide d'un mécanisme efficace avant l'appareillage, et rester telles pendant la navigation.

Toutefois, il ne pourra être admis de porte étanche à charnières, même aux extrémités du navire, dans un entrepont à marchandises pour la région centrale duquel ces portes seraient interdites en application de la clause précédente.

(7.) Toutes les autres portes étanches doivent être des portes à glissières.

(8.)—(a.) Toutes les portes étanches situées au-dessous de la flottaison en charge doivent pouvoir être fermées simultanément et contrôlées d'un poste unique situé dans la timonerie ou au voisinage immédiat de celle-ci; la fermeture simultanée de ces portes doit être précédée de l'émission d'un signal avertisseur sonore. Toutefois cette obligation ne vaut que pour les navires dans lesquels les cloisons transversales principales portent un nombre supérieur à cinq; les portes portent des accès aux tunnels n'entrent pas en compte.

(b.) L'emploi d'une énergie mécanique est exigé pour les portes établies au-dessous du pont de compartimentage en vue de faire communiquer les portes de charbon des entreponts, s'il est nécessaire, à la mer, de tenir ces portes occasionnellement ouvertes pour l'arrivée du charbon. L'ouverture et la fermeture de ces portes doivent être mentionnées au journal de bord.

(c.) L'emploi d'une énergie mécanique est également exigé pour les portes établies au passage des conduits de refroidissement des cales à marchandises, si ces conduits traversent une cloison transversale principale et si les seuils de ces portes ne sont pas situés à plus de 2,13 mètres (7 pieds) au-dessus de la flottaison en charge.

(9.) L'emploi de panneaux démontables n'est toléré que dans la tranche des machines. Ces panneaux doivent être en place avant l'appareillage; ils ne peuvent être enlevés en cours de navigation si ce n'est en cas d'impérieuse nécessité; les précautions nécessaires doivent être prises pour rétablir la parfaite étanchéité du joint.

(10.) Toutes les portes étanches doivent être fermées en cours de navigation; il ne peut être dérogé à cette règle que lorsque les besoins du service l'exigent; telle porte ouverte doit pouvoir être fermée immédiatement.

(11.) Si des conduits de tirage forcé ou des coursives de communication pour le personnel, notamment entre le poste de l'équipage et les chaufferies, ou tous autres passages similaires, traversent des cloisons transversales principales, ces conduits, coursives ou passages doivent être munis de portes étanches ou d'autres dispositifs équivalents, nécessaires pour rétablir l'intégrité de l'étanchéité de la cloison.

(12.) Si des tuyauteries, des conducteurs électriques, &c., traversent des cloisons étanches transversales au-dessous de la ligne de surmersion, des dispositions doivent être prises pour assurer l'intégrité de l'étanchéité de la cloison.

Évacuation des Compartiments étanches.

Article 15.—(1.) Dans les parties du navire affectées aux passagers et à l'équipage, tout compartiment étanche doit être pourvu d'une échappée offrant aux personnes un moyen de retraite praticable.
(2.) Chaque chambre de machine, chaque chaufferie et chaque tunnel d’arbre doit être pourvu en tout cas d’une échappée offrant au personnel un moyen de retraite qui n’exige pas la traversée de portes étanches.

**Vannes.**

**Article 16.** Le nombre des vannes établies dans les cloisons étanches doit être réduit au minimum. Les vannes ne sont admises qu’en des endroits suffisamment accessibles en tout temps pour que l’on puisse s’assurer de leur bon état d’entretien ; elles doivent être solidement construites, soigneusement montées et périodiquement visitées. Les vannes doivent pouvoir être manœuvrées d’un endroit accessible situé au-dessus de la ligne de surimmersion et leur mécanisme doit comporter un dispositif indiquant si la vanne est ouverte ou fermée.

**Ouvertures dans la Muraille.**

**Article 17.—(1.) (a.)** Au-dessous d’un pont dont la surface inférieure à son point le plus bas en abord se trouve à moins de 2,13 mètres (7 pieds) au-dessus de la flottaison en charge, il ne peut être établi que des hublots fixes ;

(b.) Toutefois des hublots à ouvrir peuvent être établis dans les entreponts visés au paragraphe (a) ci-dessus, s’il est satisfait aux conditions suivantes :

— ces hublots doivent être fermés d’une façon étanche et à clé avant l’appareillage ;
— ces hublots ne doivent pas être ouverts en cours de navigation ;
— mention au journal de bord doit être faite des heures auxquelles ces hublots auront été ouverts dans le port et fermés à clé avant le départ du navire ;
— ces hublots doivent être tels qu’il soit pratiquement impossible à toute personne de les ouvrir sans autorisation du capitaine.

(c.) Les hublots établis dans les entreponts visés au paragraphe (a) ci-dessus doivent être munis de tapes métalliques efficaces.

(2.) Des hublots à ouvrir peuvent être établis au-dessus du pont défini au paragraphe 1 (a) du présent article, excepté dans les locaux affectés exclusivement au transport de marchandises ou de charbon.

(3.) Aucun hublot ne peut être établi dans les locaux affectés exclusivement au transport de marchandises ou de charbon.

(4.) Tous les hublots qui sont inaccessibles pendant le voyage doivent être munis de tapes métalliques efficaces et le hublot ainsi que la tape doivent être tenus fermés pendant la navigation.

(5.) Aucun hublot à ventilation automatique ne peut être établi dans la muraille du navire au-dessous de la ligne de surimmersion.

(6.) Les prises d’eau et décharges dans la muraille doivent être disposées de façon à empêcher toute introduction accidentelle d’eau dans le navire.

(7.) Le nombre des dalots, tuyaux de décharge et autres dispositifs similaires comportant une ouverture dans la muraille, doit être réduit au minimum soit en utilisant chaque orifice de décharge pour le plus grand nombre possible d’installations, soit de toute autre manière satisfaisante.

(8.) Les décharges à la coque, dont l’orifice intérieur se trouve au-dessous de la ligne de surimmersion doivent être munis de dispositifs efficaces et accessibles empêchant l’eau de s’introduire dans le navire. On peut employer soit une soupape manœuvrable à distance, soit deux soupapes ordinaires dont l’une est toujours accessible ; les organes de manœuvrure à distance et les soupapes ordinaires ne sont considérés comme accessibles que s’ils se trouvent au-dessus du pont visé au paragraphe 1 (a) du présent article.

(9.) Les coupées, portes de chargement et sabords à charbon ne peuvent en aucun cas être établis au-dessous de la flottaison en charge ; ils ne sont pas autorisés même vers les extrémités du navire dans un local au-dessous de l’entrepont le plus bas pour lequel ils sont admis au milieu du navire.

(10.) Les coupées, portes de chargement et sabords à charbon situés au-dessous de la ligne de surimmersion doivent être efficacement fermés et
assujettis avant l'appareillage, ils doivent rester fermés pendant la navigation.

(11.) Les orifices intérieurs des déversoirs à escarilles, saletés, &c., ne sont pas admis au-dessous du pont visé au paragraphe 1 (a) du présent article; ils peuvent l'être au-dessus de ce pont s'ils sont pourvus de couvercles installés à la satisfaction de l'Administration. Ces couvercles doivent être étanchès s'ils sont établis au-dessous de la ligne de surmersion; ils doivent être disposés de manière que des corps étrangers ne puissent faire obstacle à leur fermeture. Cette fermeture doit être au moins équivalente en commodité et en efficacité à celle des portes étanches et des hublots.

Construction et Épreuves des Portes étanches, Hublots, &c.

Article 18.—(1.) Les dispositifs adoptés ainsi que les matériaux utilisés pour la construction des portes étanches, hublots, coupées, sabords à charbon, portes de chargement, soupapes, tuyaux, déversoirs à escarilles et à saletés doivent répondre aux exigences de l'Administration.

(2.) Les portes étanches doivent être soumises à un essai hydrostatique sous une pression égale à la pression réglementaire pour la partie correspondante de la cloison. Cet essai doit être fait soit avant, soit après mise en place de la porte à bord, mais en tout cas avant l'entrée en service du navire.

Manipulations et Inspections périodiques des Portes étanches, &c.

Article 19.—(1.) Il doit être procédé périodiquement, en cours de navigation, à des exercices de manœuvre des organes de fermeture étanche des portes, hublots, dalots, soupapes, déversoirs à escarilles et à saletés. Un exercice complet doit avoir lieu avant l'appareillage, un deuxième à la mer le plus tôt possible, et d'autres ensuite pendant la navigation à raison d'un au moins par semaine; toutefois, les portes dont la manœuvre comporte l'emploi d'une énergie mécanique et les portes à charnières des cloisons transversales principales doivent être manœuvrées quotidiennement lorsqu'elles sont utilisées à la mer.

(2.) Les portes étanches, y compris les mécanismes et les indicateurs qui s'y rapportent, ainsi que les soupapes dont la fermeture est nécessaire pour assurer l'étanchéité d'un compartiment doivent être périodiquement inspectées, pendant la navigation, à raison d'une fois au moins par semaine.

Construction des Ponts étanches, Tambours, &c.—Épreuves initiales.

Article 20.—(1.) Les ponts étanches, tambours et conduits de ventilation doivent présenter une résistance égale à celle des parties avoisinantes des cloisons étanches. Les procédés employés pour assurer l'étanchéité de ces éléments, ainsi que les dispositifs adoptés pour les ouvertures qui y sont pratiquées, doivent répondre aux exigences de l'Administration. Lorsqu'il est fait usage d'obturateurs étanches pour ces ouvertures, ils doivent être mis en place avant l'appareillage et rester fermés pendant la navigation.

(2.) Les ponts étanches et les tambours doivent être soumis à une épreuve d'étanchéité à la lance après leur construction; l'essai des ponts peut être effectué en les couvrant d'eau. Les conduits de ventilation et les tambours étanches doivent s'élever au moins jusqu'au niveau de la ligne de surmersion.

(3.) Aucune modification ne peut être apportée dans la structure d'un pont étanche, d'un tambour ou d'un conduit de ventilation postérieurement à l'inspection sans autorisation de l'Administration.

Double Fonds.

Article 21.—(1.) Les navires dont la longueur est au moins égale à 61 mètres (équivalent à 200 pieds) et inférieure à 76 mètres (équivalent à 249 pieds)
doivent être pourvus d'un double-fonds allant au moins de l'avant de la tranche des machines jusqu'à la cloison du coqueron avant ou aussi près que possible pratiquement de cette cloison.

(2.) Les navires dont la longueur est au moins égale à 76 mètres (équivalent à 249 pieds) et inférieure à 91,50 mètres (équivalent à 300 pieds) doivent être pourvus de double-fonds au moins en dehors de la tranche des machines. Ces double-fonds doivent aller à l'avant et à l'arrière jusqu'aux cloisons des coquerons ou aussi près que possible pratiquement de ces cloisons.

(3.) Les navires dont la longueur est égale ou supérieure à 91,50 mètres (équivalent à 300 pieds) doivent être pourvus au milieu d'un double-fonds s'étendant entre les cloisons des coquerons ou s'approchant autant que possible pratiquement de ces cloisons.

(4.) Le double-fonds des navires dont la longueur dépasse 91,50 mètres (équivalent à 300 pieds) doit se prolonger latéralement vers la muraille de manière à protéger les louchains.

(5.) Dans les navires dont la longueur est supérieure à 213 mètres (équivalent à 697 pieds) le double-fonds doit s'élever en abord au-dessus du dessus de quille à une hauteur égale au moins au dixième de la largeur au fort ; cette disposition doit s'étendre au moins sur la moitié de la longueur du navire au milieu ainsi que sur l'avant jusqu'à la cloison du coqueron.

(6.) Les puisards établis dans le double-fonds pour recevoir les aspirations des pompes ne doivent pas avoir une profondeur supérieure à la moitié de la hauteur du double-fonds et l'endroit considéré. Des puisards s'étendant jusqu'à la coque peuvent être admis à l'extrémité arrière des tunnels des navires à hélice.

Mentions au Journal de Bord.

Article 22.—(1.) Les portes à charnières, panneaux démontables, hublots, coupées, portes de chargement, sabords à charbon, et autres ouvertures, qui doivent rester fermés pendant la navigation en application des règles précédentes doivent être fermés avant l'appareillage ; mention doit être faite au journal de bord des heures auxquelles tous ces organes auront été fermés, et des heures auxquelles auront été ouverts ceux dont le Règlement permet l'ouverture.

(2.) Mention doit être faite au journal de bord de tous les exercices et de toutes les inspections prescrits par l'article 19 ; toute défectuosité constatée y est explicitement notée.

Études et Ententes ultérieures.

Article 23. Les États contractants reconnaissant qu'il est désirable de voir fixer par une entente internationale dans le plus court délai possible, le critérium de service visé par l'article 8, paragraphe 4, s'engagent à poursuivre activement leurs études à ce sujet et à s'en communiquer les résultats.

La Conférence émet le vœu que le Gouvernement britannique soit invité à assurer la charge de ces communications et à provoquer par la voie diplomatique l'accord des États contractants au sujet de ce critérium aussi tôt que des résultats définitifs pourront être acquis. Ce critérium une fois admis par chacun des États contractants sera applicable, à partir d'une date et dans les conditions à fixer par l'accord, au même titre que les prescriptions de la Convention elle-même.

La même procédure est valable pour les points suivants :

(1.) Installation de cloisons longitudinales étanches, double coque, ponts et plafonds étanches : majoration éventuelle de la longueur des compartiments protégés par ces dispositifs.

(2.) Navires dont la longueur est inférieure à celle des navires visés à l'article 8, paragraphe 3 : compartimentage propre à réaliser la plus grande sécurité pratiquement possible.

(3.) Détermination expérimentale de la marge de résistance convenable visée à l'article 12, paragraphe 1, pour la construction des cloisons étanches.
4. La Conférence a soumis à l'examen de la Commission les trois questions suivantes, relatives à l'inspection des navires et aux précautions à prendre pour éviter les avaries :

(1.) *Inspection des Navires à Passagers.*—En vue des conditions différentes qui existent dans les divers pays, est-il possible d'assurer un système uniforme d'inspection dans tous les ports des États signataires ? Si non, serait-il suffisant d'exiger que l'inspection doive se faire, soit par des inspecteurs appartenant à l'Administration, soit par des inspecteurs nommés spécialement dans ce but par les Gouvernements, de manière que le Gouvernement en question accepte dans chaque cas la responsabilité complète pour le caractère efficace et complet de l'inspection.

(2.) *Principes qui doivent régir l'Inspection.*—Est-il possible ou désirable que la Conférence pose des règles qui régiraient sous tous les rapports l'inspection des navires à vapeur à passagers ; si non, la Conférence peut-elle poser des principes généraux qui pourraient régir les navires à vapeur à passagers dans les divers États en ce qui concerne la coque, les chaudières, la machinerie et l'équipement ?

(3.) *Mesures à prendre pour éviter les Avaries.*—On a suggéré que, du moins en ce qui concerne les grands navires à passagers à construire, il serait obligatoire que la machinerie et l'équipement soient en partie doublée ou en sections doubles capables de fonctionner indépendamment, afin de diminuer la possibilité d'une avarie. Doit-on laisser cette question à la détermination des Administrations des pays signataires, ou doit-elle être traitée par la Conférence ? Et dans ce dernier cas, la Conférence peut-elle poser des règles ou des principes généraux sur le sujet ?

5. Les conclusions de la Commission sur les points visés ci-dessus sont les suivantes :

(1.) Il n'est pas possible d'établir un système uniforme d'inspection applicable dans les ports des divers États ;

(2.) Il n'est pas possible à la Conférence de poser des règles détaillées qui régiraient sous tous les rapports l'inspection des navires à passagers à propulsion mécanique, mais il est possible et désirable de poser des principes généraux.

(3.) La question du doublement des machines principales ne saurait être traitée par la Conférence ; il est cependant désirable de formuler des principes généraux prescrivant le doublement à bord de certaines catégories de navires de divers appareils auxiliaires, notamment les dynamos, les pompes à incendie et l'appareil à gouverner.

La question du doublement des dynamos et des pompes ayant été traitée par d'autres Commissions, le doublement de l'appareil à gouverner a seul été envisagé.

6. Conformément aux conclusions précédentes, la Commission recommande l'insertion dans la Convention des articles ci-après :

**Article 24.** Les principes généraux qui doivent régir l'inspection des navires à propulsion mécanique, en ce qui concerne la coque, les chaudières, la machinerie et l'équipement, sont énoncés dans les articles qui suivent. Chaque État contractant s'engage (1) à édicter des règles détaillées en conformité de ces principes généraux, ou à modifier sa réglementation existante de façon à la mettre d'accord avec ces principes, (2) à communiquer ces règlements à chacun des autres États contractants et (3) à assurer l'application de ces règlements.

**Article 25.** L'inspection relative aux points traités par la Conférence est effectuée par des agents du Gouvernement. Toutefois, chaque Gouvernement peut confier l'inspection de ses propres navires soit à des experts désignés par lui à cet effet, soit à des organismes reconnus par lui. Dans tous les cas, le Gouvernement intéressé garantit complètement l'intégrité et l'efficacité de l'inspection.

[1244—87]
Article 26. Les inspections visées à l'article 25 sont les suivantes :

(a) Une inspection préalable à la mise en service définie à l'article 27 ;
(b) Des inspections périodiques à raison de une dans le courant de chaque année et définies à l'article 28 ;
(c) Des inspections supplémentaires occasionnelles définies à l'article 29.

Article 27. L'inspection préalable à la mise en service comporte un examen complet de la coque, des appareils mécaniques et des appareils y compris un examen à sec de la carène ainsi qu'une inspection extérieure et intérieure des chaudières.

Cette inspection doit permettre de se rendre compte que le navire répond complètement, aux points de vue des dispositions générales, des matériaux et échantillons de la coque, des chaudières et de leurs accessoires, des machines principales et auxiliaires, des appareils de sauvetage et des autres appareils, aux prescriptions de la présente Convention ainsi qu'aux exigences des règlements de détail édictés par l'État contractant dont il dépend, pour les navires affectés au service auquel le navire est destiné. L'inspection doit également permettre de se rendre compte que le navire et ses appareils sont d'une exécution satisfaisante à tous égards.

Article 28. Une inspection périodique comporte un examen d'ensemble de la coque, des chaudières, de la machinerie et des appareils, y compris un examen à sec de la carène. Cette inspection doit permettre de se rendre compte que le navire est, au point de vue de la coque, des chaudières et accessoires, des machines principales et auxiliaires, ainsi que des appareils de sauvetage et autres appareils, dans un état satisfaisant et approprié au service auquel le navire est destiné, et qu'il répond en outre aux prescriptions de la présente Convention et aux exigences des règlements de détail visées à l'article 24.

Article 29. Une inspection générale ou partielle suivant le cas doit être faite chaque fois qu'il se produise un accident ou qu'il se révèle un défaut affectant la sécurité du navire, soit l'intégrité ou l'efficacité des appareils de sauvetage ou des autres appareils ; il en est de même chaque fois que le navire aura subi une réparation ou que des parties importantes auront été renouvelées. L'inspection doit permettre de se rendre compte que les réparations nécessaires ou les renouvellements ont été effectués dans de bonnes conditions, que les matériaux utilisés ainsi que les procédés d'exécution employés donnent toute satisfaction, et que le navire répond à tous égards aux prescriptions de la présente Convention et aux exigences des règlements de détail visées à l'article 24.

Article 30. Chaque État contractant doit établir des règles prescrivant que la puissance de marche arrière est suffisante pour assurer au navire des aptitudes de manœuvre convenables en toutes circonstances.

Article 31. Les navires doivent être munis d'un appareil à gouverner auxiliaire qui pourra être d'une puissance inférieure à celle de l'appareil principal ; il n'est pas exigé que cet appareil auxiliaire soit actionné par la vapeur ou toute autre énergie mécanique.

Article 32. Les règlements de détail visés à l'article 24 prescrivent notamment la pression d'épreuve des essais hydrostatiques ainsi que les intervalles admissibles entre deux essais consécutifs applicables aux chaudières principales et auxiliaires, leurs accessoires, tuyautages de vapeur, réservoirs à haute pression, réservoirs à combustible liquide pour moteurs à combustion interne.

Les chaudières principales et auxiliaires, leurs accessoires, les réservoirs divers et les tuyautages de vapeur de plus de cent-deux millimètres (4 pouces) de diamètre, doivent subir avec succès une épreuve hydrostatique avant leur mise en service et en outre des épreuves périodiques.

En ce qui concerne les chaudières, l'épreuve initiale et les épreuves subsequentes ont lieu dans les conditions suivantes :

La pression effective d'épreuve doit être au moins égale à une fois et demie la pression effective de régime ; toutefois il n'est pas exigé que la surpression dépasse 5 kilogrammes par centimètre carré. Si la pression de l'épreuve initiale ne dépasse pas de plus de 5 kilogrammes par centimètre
carré la pression de régime, l'intervalle de temps maximum admissible entre deux essais consécutifs est de deux années; cet intervalle peut être plus long lorsque la pression de l'épreuve initiale dépasse la limite précédente; en aucun cas toutefois cet intervalle ne doit dépasser six années, et ce délai extrême n'est applicable que si la pression de l'essai initial atteint une valeur double de la pression de régime.

Article 33. Les règlements de détail visés à l'article 24 doivent être établis de manière qu'au point de vue de la sauvegarde de la vie humaine le navire soit approprié au service auquel il est destiné.

Définition générale.

Article 34. Dans les articles qui précèdent, on entend par navire à propulsion mécanique un navire soumis aux règles de la présente Convention et dont les machines principales sont actionnées par la vapeur ou par toute autre source d'énergie mécanique.

ÉCHANGE DE RENSEIGNEMENTS.

7. Bien que des travaux importants aient été faits sur la question du cloisonnement des navires, par plusieurs des Gouvernements participant à cette Conférence en vue d'augmenter les conditions de sécurité de la vie humaine en mer, les résultats acquis à ce jour ne sont pas suffisamment concluants pour permettre à la Commission de formuler des règles aussi complètes et aussi précises qu'elle le désirait. La Commission a cependant pu énoncer dans son rapport des principes généraux et des exigences minima. Elle espère pouvoir les compléter, avant que des décisions définitives ne soient prises par la Conférence, en déterminant d'une manière encore plus précise la forme des courbes dont il est question au paragraphe (3) de l'article 8.

8. La Commission émet le vœu que les résultats des recherches et expériences qui sont actuellement en cours ou qui viendraient à être entreprises par les États contractants, et d'une manière générale tous les renseignements dont ils pourraient disposer au sujet de l'exécution des prescriptions de la présente Convention, fassent l'objet d'un échange de documentation.

Aux fins de réaliser ce vœu, la Commission propose d'insérer dans la Convention l'article suivant:

Article 35. Les États contractants échangeront dans la plus large mesure possible tous renseignements au sujet de l'application des règles de la présente Convention en matière de sécurité de la construction. Ils se communiqueront mutuellement: les méthodes ou règlements qu'ils adopteraient; les renseignements sur les nouveaux dispositifs ou organes qu'ils agréeraient pour donner une suite pratique aux règles de la Convention; les décisions qu'ils prendraient sur les points de principe non couverts par celle-ci; enfin, les résultats définitifs de leurs études ultérieures sur les questions qu'elle n'a pas traitées.

Signé au nom de la Commission,

W. L. CAPPS, Président.

Ed. W. BOGAERT, Secrétaires.

W. CARTER,

Le 19 décembre 1913.

Le présent tirage de ce Rapport, qui annule et remplace le précédent, contient, à l'article 8 (3), les chiffres complémentaires visés à la dernière phrase du paragraphe 7 ci-dessus, ainsi que quelques corrections de détail dans le texte.

W. L. C.

Le 5 janvier 1914.
REPORT.

1. THE Committee has given careful consideration to the subjects referred to it by the Conference, and has the honour to submit the following report. The conclusions in this report are given in the form of articles consecutively numbered from 1 to 35 inclusive, and these articles are recommended for insertion in the Convention.

BULKHEADS AND WATERTIGHT COMPARTMENTS.

2. The Conference submitted to the Committee the following questions:—

(a.) Whether the study of the subject of bulkheads and watertight compartments is sufficiently far advanced to enable principles of international applicability to be laid down in the case of new ocean-going passenger steamers, and if so, what those principles should be.

(b.) Whether it is desirable and practicable to lay down any general principles with regard to existing ocean-going passenger steamers.

3. The Committee answers in the affirmative the question contained in Section (a) of the foregoing paragraph, and in the negative with respect to the question contained in Section (b). Its opinion and recommendation as to future action with regard to existing ships is given in Article 3 below; and it has laid down, in the case of new ships, definitions, general principles, and specific requirements of international applicability as hereinafter set forth.

General.

Article 1.—(1.) This Convention, except as otherwise provided, shall apply only to merchant steamships registered in one or other of the contracting States and carrying more than twelve passengers on voyages between a port in a contracting State and a port outside that State. 

(2.) Steamships of a contracting State engaged upon voyages specified in the schedule which will be annexed to this Convention at the time of ratification, as voyages which that State does not regard as ocean voyages, are excluded from the operation of this Convention. Provided that no voyage shall be included in the schedule in the course of which a vessel is navigated to a point more than 500 miles from the nearest land.

Provided also that any contracting State shall be entitled to claim from any other contracting State the concession of the privileges of the Convention to any class of its ships engaged on a voyage specified by it in the schedule, on condition that the State making such a claim applies to such ships the regulations prescribed by the Convention for ocean voyages, except so far as the application of such regulations is, having regard to the nature of the voyage, unnecessary or unreasonable.

Article 2. The following rules have been drawn up on the assumption that they will be applied in full to all new ships covered by the Convention. For the purpose of these rules a "new ship" is assumed to be a ship the keel of which is laid three months or more after the date fixed for the ratification of the Convention. The term "existing ship" includes all other ships covered by the Convention.

Existing Ships.

Article 3. It is not practicable for the Conference to lay down definite principles with regard to bulkhead sub-division for all existing ships, but the Conference is of opinion that arrangements on existing ships should be considered on their merits by the Administration of the country to which each vessel belongs, with a view to improvements which provide increased safety where practicable and reasonable.
New Ships.

Article 4. New ships shall be as efficiently sub-divided as is possible having regard to the nature of the services for which they are intended.

Definitions.

Article 5. The following are definitions of terms used in connection with regulations governing sub-division of vessels:—

(1.) The load water line is that used in determining the sub-division of the vessel.
(2.) The length of the vessel is the extreme length at the load water line.
(3.) The breadth of the vessel is the extreme width from outside of frame to outside of frame at or below the load water line.
(4.) The bulkhead deck is the uppermost continuous deck to which all transverse watertight bulkheads are carried.
(5.) The margin line is a line drawn parallel to the bulkhead deck at side line, and three inches below the upper surface of that deck at side.
(6.) The draught is the vertical distance from the top of keel amidships to the load water line.
(7.) The freeboard is the vertical distance from the load water line to the margin line amidships.
(8.) The depth of the vessel is the sum of the draught and freeboard as above defined.
(9.) The sheer of the bulkhead deck at any point is the vertical distance between the beam at side line at that point and a line drawn parallel to the load water line at the height of the beam at side line amidships.
(10.) If block coefficient of fineness of displacement to load water line is used this coefficient shall be determined as follows:—

\[
\text{Volume of displacement to moulded lines} = \text{Length} \times \text{Breadth} \times \text{Draught}.
\]

(11.) The permeability of a compartment in free communication with the sea throughout its volume is the ratio of the volume of water-filled space to the total volume of the compartment.

Note.—In determining the areas of sections for obtaining the total volume of a compartment which extends above the margin line they shall be measured only to a horizontal line through the margin line. In calculating volumes moulded lines shall be used.

(12.) The machinery space is to be taken as extending in length between the extreme main transverse watertight bulkheads bounding the spaces devoted to the main and auxiliary propelling machinery, including boilers when installed.

Floodable Length.

Article 6. The floodable length at any point of the length of a vessel shall be determined taking into consideration form, draught, and other limiting characteristics of the vessel in question. This floodable length for a vessel with a continuous bulkhead deck is the maximum percentage of the length of the vessel (having its centre at the point in question) which can be flooded under the definite assumptions hereafter set forth in article 7 without the ship being submerged beyond a margin line drawn parallel to the bulkhead deck at side line and three inches below the upper surface of that deck at side. In the case of vessels not having a continuous bulkhead deck, the floodable length must be such as to secure to the vessel in question, for each portion of its length, and for all conditions of trim after damage, a measure of safety at least equal in effectiveness to that laid down for the vessel with continuous bulkhead deck.
Permeability.

Article 7. The definite assumptions referred to in article 6 relate to the permeabilities of the spaces in question below the margin line. In determining the floodable length an average permeability shall be used throughout the whole length of each of the following portions of the vessel:—

(1.) The machinery space;
(2.) The portion forward of the machinery space; and
(3.) The portion abaft the machinery space.

For steam vessels the permeability of the machinery space, including the double bottom in wake thereof, is to be taken as 80 per cent. For vessels fitted with internal combustion engines the corresponding permeability is to be taken as 85 per cent., unless it is proved by actual calculation that a lower figure may be adopted, provided that in no case shall that figure be less than 80 per cent.

The permeabilities for spaces forward and aft of the machinery space shall be as follows:—

(a.) Sixty per cent. in cargo spaces, bunkers (permanent or reserve), store-rooms, baggage and mail rooms, chain-lockers, watertight shaft or pipe tunnels, and fresh-water tanks above the double bottom. It must be proved that the spaces just enumerated are practicable for the purpose intended and that they are to be so used. Other spaces shall not be allowed to come under this section unless with the approval of the Administration.

(b.) Ninety-five per cent. in passenger and crew spaces, peaks, trimming-tanks exclusively so used, double bottoms, and other spaces not specifically appropriated as indicated in the foregoing section. If in a 'tween deck space enclosed by complete transverse permanent steel bulkheads any portion thereof is appropriated to passengers, the whole of that space shall be regarded as passenger space; and, similarly, 'tween deck spaces appropriated for the carriage of either passengers or cargo shall be regarded as passenger spaces.

Where the spaces before or abaft the machinery space below the margin line consist partly of spaces mentioned in section (a) and partly of spaces mentioned in section (b), the average percentage of permeability is to be determined separately for each end from the formula $95 - 35 \pi$, where $r$ is the ratio between the volume of the spaces mentioned in section (a) and the total volume of the space in the portion of the ship under consideration.

Permissible Length of Compartments.

Article 8.—(1.) The maximum permissible length of one compartment having its centre at any point in the vessel's length is obtained from the floodable length (Article 6) by multiplying that length by an appropriate factor.

(2.) This factor depends on the length of the ship, and, for a given length, varies according to the nature of the service for which the ship is intended. This factor decreases in a continuous and gradual manner—

(a.) As the length of vessel increases; and
(b.) As, for a given length, the vessel departs from the type of vessel engaged in a mixed cargo and passenger service, and approaches to the type of vessel primarily engaged in the transportation of passengers.

(3.) For each of the two types of vessels referred to in the previous paragraph the variation of the factor may be expressed by a curve, of which the co-ordinates represent the length of the vessel and the value of the factor. The following table gives certain points on the two curves for the limit of each type:
<table>
<thead>
<tr>
<th>A.</th>
<th>B.</th>
<th>C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feet</td>
<td>Feet</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>296</td>
<td>259</td>
</tr>
<tr>
<td>0.9</td>
<td>874</td>
<td>285</td>
</tr>
<tr>
<td>0.84</td>
<td>404</td>
<td>305</td>
</tr>
<tr>
<td>0.65</td>
<td>486</td>
<td>350</td>
</tr>
<tr>
<td>0.5</td>
<td>571</td>
<td>489</td>
</tr>
<tr>
<td>0.39</td>
<td>699</td>
<td>655</td>
</tr>
<tr>
<td>0.34</td>
<td>899</td>
<td>899</td>
</tr>
</tbody>
</table>

Column (A) gives the maximum permissible values of the factor for the length of vessels given in Columns (B) and (C).

Column (B) is applicable to vessels engaged in a mixed cargo and passenger service.

Column (C) is applicable to vessels primarily engaged in the transportation of passengers.

(4.) For a given length the value of the factor appropriate to a vessel between the two extreme limits will be between the values of the factors determined by the two curves before mentioned, and will be automatically fixed by a "criterion of service" which is to form the subject of further study, as indicated in Article 23.

Article 9.—(1.) When the factor is equal to or less than 0.5, it may be doubled in order to give at any point of the vessel's length the total length of two compartments; but, in that case, the length of the shorter compartment of any pair shall not be less than one-quarter of the total length so obtained. If one of the two compartments is situated inside the machinery space and the second is situated outside the machinery space, and the average permeability of the portion of the ship in which the second is situated differs from 50 per cent., a correction shall be made for the purpose of adjusting the length of the pair of compartments so as to ensure that the proper length of the pair of compartments is not exceeded.

(2.) In no case whatever shall the length of any watertight compartment exceed 92 feet.

(3.) When the factor applicable to any vessel is less than 0.84, but more than 0.5, the combined length of the two foremost compartments shall not exceed the floodable length at the extreme forward end, provided also that the length of the second compartment is not greater than that permissible by Article 8 and not less than 10 feet.

(4.) When the length of the vessel is more than 699 feet, but less than 823 feet, the floodable length at the forward end of the vessel shall be at least 20 per cent. of the vessel's length; and the ship, forward of a bulkhead placed either at the distance of the actual floodable length about the stem or not nearer to the stem than 20 per cent. of the vessel's length, shall be divided into at least three compartments.

(5.) When the length of the vessel is 823 feet or over the same method shall be adopted, but the floodable length shall be at least 28 per cent. and the number of compartments at least four.

(6.) A bulkhead may be recessed transversely, provided the sides of the recess are at a sufficient distance from the sides of the vessel. Vertical steps are inadmissible in the main transverse watertight bulkheads of vessels to which the sub-division rules apply where the factor is greater than 0.5, unless such arrangements are made by additional sub-division as shall maintain the same measure of safety as the standard vessel. The total length of the steps in any bulkhead shall not exceed 2 per cent. of the vessel's length, plus 10 feet.

(7.) In the case of all recesses and steps the total volume of the compartment on either side of the position of the bulkhead as determined by this and the preceding article shall be unaffected.
Article 10. The requirements imposed by Articles 8 and 9 are minimum requirements. When the watertight sub-division of a vessel is such as to provide a degree of safety over and above that provided by the sub-division rules prescribed by this Convention, it shall be recorded by the proper Government officials on the certificate of the vessel in question when such record is requested by the owner. An owner claiming such record shall submit all the data necessary to establish his claim.

The degree of increased safety shall be expressed by stating that the sub-division is equal to or more severe than that provided for a vessel of equal length in Column (C) of the table in Article 8, with an additional statement giving the length of the vessel in Column (C) whose degree of sub-division would correspond to that of the vessel in question.

Values of length and factors for lengths not specifically stated in Columns (C) and (A) respectively shall be obtained by interpolation in accordance with Article 8.

Peak and Machinery Space Bulkheads.

Article 11. A firepeak bulkhead shall be fitted in all vessels to extend to the bulkhead deck, and to the weather deck in ships having continuous superstructures. This bulkhead shall be placed at a distance of not less than 5 per cent. of the vessel's length from the stem at the load water-line. An afterpeak bulkhead and bulkheads dividing the machinery space from the cargo and passenger spaces shall also be fitted and carried up to the bulkhead deck. If the afterpeak bulkhead is not carried up to the bulkhead deck, it shall at least be carried to the first deck above the load water-line, and a watertight flat shall be fitted from the afterpeak bulkhead to the stern on the level of the deck at which it stops, provided in this case that the degree of safety of the vessel as regards sub-division is maintained.

Fireproof Bulkheads.

Article 12. In portions of a vessel above the margin line there shall be fitted fireproof bulkheads which will serve to retard the spread of fire from one section of the vessel to another. These bulkheads shall be fitted at a mean spacing not greater than 131 feet. Openings in these bulkheads shall be closed by fireproof doors, and recesses in them shall be made fireproof.

Construction and Initial Testing of Bulkheads.

Article 13.—(1) Watertight bulkheads shall be constructed in such a manner that they shall be capable of supporting, with a proper margin of resistance, the pressure due to the actual head of water up to the margin line.

(2) Steps and recesses in bulkheads shall be made watertight throughout, and each shall be of the same strength as the bulkhead at the place where it occurs. Where frames or beams pass through plating which has to be watertight, the watertightness shall be obtained by caulked angle chocks, or cast iron or steel chocks efficiently secured and rust-jointed, and not by wood or cement.

(3) Testing main compartments by filling them with water is not compulsory. A complete examination of all bulkheads shall be made by a surveyor. Testing by hose shall be carried out in all cases to assist the visual tests.

4) The foremost and aftermost compartments shall be tested with water to a head up to the margin line. Double bottoms, deep tanks, and all compartments intended to hold liquids shall be tested with water at least to a head eight feet above the top of the tank or to the load water line, whichever is the greater.

5) No change shall be made in the structure of the bulkheads after the completion of the survey unless with the permission of the Administration.
(6.) All regulations made for main transverse watertight bulkheads shall apply to longitudinal bulkheads, so far as is practicable.

**Openings in Watertight Bulkheads.**

**Article 14.—** (1.) The openings in watertight bulkheads shall be reduced to the smallest number compatible with the design and proper working of the vessel, and satisfactory means shall be provided for closing them.

(2.) No doors, sluice valves, manholes, or access openings are permitted—

(a.) In the collision bulkhead below the margin line.

(b.) In watertight transverse bulkheads separating two cargo spaces from one another, or a cargo space from a reserve bunker, except as provided in paragraph (6) of this article.

(3.) In the machinery spaces of steamships, and apart from bunker and shaft-tunnel doors, not more than one door may be fitted in each main transverse bulkhead within the machinery space for intercommunication, but where more than one separate shaft tunnel is fitted a door may be cut for each tunnel. If a tunnel is fitted forward either for the purpose of pipes or as a communication passage it must be fitted with a watertight door.

(4.) The only types of watertight doors permissible are hinged doors, sliding doors, and doors of any other equivalent pattern, excluding plate doors secured only by bolts. A hinged door shall be fitted with lever-operated catches workable from each side of the bulkhead. A sliding door may have a horizontal or vertical motion. If hand-operated only, it shall be fitted for operation at the door itself and also from an accessible position above the margin line. If operated by power, it shall be fitted for operation by power from the bridge, and by hand at the door itself and from an accessible position above the margin line. A door dropping by its own weight, and fitted with a cataract cylinder or equivalent arrangement, may be considered as being operated by power, if capable of being released from the bridge.

(5.) In the case of watertight bunker doors, satisfactory arrangements shall be made by means of screens or otherwise, to prevent the coal from interfering with the closing of the doors.

(6.) Hinged watertight doors in passenger, crew, and working spaces are only permitted above a deck, the under side of which, at its lowest point at side, is at least 7 feet above the load water line, and they are not permitted in such spaces below that deck. Hinged watertight doors of especially heavy design may be fitted above the load water line in bulkheads between cargo 'tween-deck spaces, provided they are closed before the voyage commences, and are kept closed during the voyage by efficient closing gear. None of these doors shall be fitted in a cargo 'tween-deck space below the lowest deck space in which, amidships, it is permissible to fit such doors.

(7.) All other watertight doors in the ship located where hinged doors are not permitted, shall be sliding doors capable of being operated locally, and also from an accessible position above the margin line.

(8.)—(a.) When the number of watertight doors in the main transverse watertight bulkheads at or about the stowage level in the machinery space exceeds five, excluding the watertight doors at the entrances of tunnels, all watertight doors situated below the load water line shall be capable of being simultaneously closed from a station situated on the bridge, and their opening and closing shall be indicated at that station. The simultaneous closing of these doors shall be preceded by a warning sound signal.

(b.) If watertight doors which have sometimes to be open at sea for the purpose of trimming coal are fitted between bunkers in the 'tween decks below the bulkhead deck, these shall be operated by power. The opening and closing of these doors shall be entered in the official log.

(c.) When trunkways in connection with refrigerated cargo are carried through two or more main transverse watertight bulkheads, and the sills of the openings are less than 7 feet above the load water line, such openings shall be fitted with doors operated by power.
(9.) Portable plates on bulkheads shall not be permitted except in machinery spaces. If fitted, they shall always be in place before the vessel proceeds to sea, and shall not be removed at sea except in case of urgent necessity. The greatest care shall be taken in replacing them to ensure that the joint shall be perfectly watertight.

(10.) All watertight doors shall be kept closed at sea, except when necessarily opened for the working of the vessel, and shall always be ready to be immediately closed.

(11.) If trunkways for forced draught, for access from crew's accommodation to the hold or for any other purpose, are carried through the main transverse watertight bulkheads, the integrity of the watertight bulkheads shall be maintained by watertight doors or other effective means.

(12.) Where electric-light cables, pipes, &c., are carried through transverse watertight bulkheads below the margin line the bulkhead connections shall be watertight and the integrity of the watertight bulkheads maintained.

**Exits from Watertight Compartments.**

Article 15.—(1.) In passenger and crew spaces a practicable means of escape shall be provided from each watertight compartment.

(2.) There shall be a means of escape from each engine room, shaft tunnel and stokehold compartment independent of the watertight doors.

**Sluice Valves.**

Article 16. Sluice valves shall be reduced to the smallest number possible, and shall not be allowed except in positions where they are readily accessible at all times and can be easily kept in order. They shall be strongly constructed, efficiently fitted, and regularly inspected. Satisfactory provision shall be made for operating them from an accessible position above the margin line. Means shall be provided for indicating when they are open or shut.

**Openings in Ship's Side.**

Article 17.—(1.) (a.) Subject to clause (b) below, when side scuttles are fitted below a deck the under side of which at its lowest point at side is less than 7 feet above the load water line, they shall be permanently fixed.

(b.) Side scuttles which are capable of being opened may be fitted in the positions defined in clause (a), provided that—

1. They shall be closed watertight and locked before the vessel proceeds to sea.
2. They shall not be opened while the vessel is at sea.
3. The time of opening such scuttles in port and of closing and looking them before the vessel proceeds to sea shall be entered in the official log.
4. The construction of such scuttles shall be such as to effectually prevent any person opening them without the consent of the master.

(c.) Glass lights in scuttles, when fitted in the positions defined in clause (a), shall be provided with efficient metal shutters.

(2.) In 'tween decks above the deck mentioned in paragraph (1) (a) of this article opening side scuttles may be fitted except in spaces exclusively devoted to cargo or coal.

(3.) No side scuttles shall be fitted in any spaces which are exclusively devoted to the carriage of cargo or coal.

(4.) All side scuttles which are not accessible during the voyage shall be fitted with efficient metal covers, and both the glass and the cover shall be kept closed during the voyage.

(5.) No automatic ventilating scuttles shall be permitted in the ship's side below the margin line.

(6.) All inlets and discharges in the side of the ship shall be arranged so as to prevent the accidental admission of water into the ship.
(7.) The number of scuppers, sanitary discharges, and other similar openings shall be reduced to the smallest number possible, either by making each discharge serve for as many as possible of the lavatory and other pipes or in any other satisfactory manner.

(8.) If discharges are led through the ship's side from spaces below the margin line, they shall be fitted with efficient and accessible means to prevent water from passing inwards. It is permissible to have either one valve, fitted with a means of working it at a distance, or two valves without such gear, one of them being always accessible. In either case, the accessibility of the valves or of the means of working shall be assured by their being situated not lower than the deck referred to paragraph (1) (a) of this Article.

(9.) Coaling, cargo, and gangway ports shall not be fitted below the head water line. None of these ports shall be fitted in a space below the lowest tween deck space in which, amidstships, it is permissible to fit such ports.

(10.) All coaling, cargo, and gangway ports in the vessel's side below the margin line shall be efficiently closed and made secure before the vessel puts to sea, and kept closed during the navigation of the ship.

(11.) The inboard openings of ash-shoots, rubbish-shoots, &c., shall not be lower than the deck referred to in paragraph (1) (a) of this Article. They may be permitted above this level if fitted, to the satisfaction of the Administration, with efficient covers, which shall be watertight if below the margin line. Such covers shall be incapable of being clogged in any way, and shall be at least as easily and effectually closed as a watertight door or slide scuttle.


Article 18.—(1.) The design and the materials used in the construction of watertight doors, side scuttles, coaling, cargo, and gangway ports, valves, pipes, ash and rubbish shoots shall be to the satisfaction of the Administration.

(2.) Watertight doors shall be tested by a water pressure corresponding to the head pre-ribed for the bulkhead where the doors are located. The test shall be made before the vessel is put in service, and either before or after the door is fitted.

Periodical Operation and Inspection of Watertight Doors, Scuttles, &c.

Article 19.—(1.) Drills for the operating of watertight doors, scuttles, valves, and closing mechanisms of scuppers, ash-shoots and rubbish-shoots, shall take place periodically during the voyage. A complete drill shall take place before leaving port and as soon as practicable after leaving port, and thereafter at least once a week during the voyage. Provided that all watertight power doors and hinged doors in main transverse bulkheads in use at sea shall be operated daily.

(2.) The watertight door system and all mechanisms and indicators connected therewith, and all valves, the closing of which is necessary to maintain the watertightness of a compartment, shall be periodically inspected at sea at least once a week.

Construction of Watertight Decks.

Article 20.—(1.) Watertight decks, trunks, and ventilators shall be of the same strength as the bulkhead at the place where they occur. The means adopted for making them watertight and for dealing with the various openings in them shall be satisfactory to the Administration. If watertight covers are used for the latter purpose, these shall be fitted before the vessel goes to sea, and kept closed during the voyage.

(2.) A hose or flooding test shall be applied to watertight decks and trunks after completion. Ventilators and trunks, where fitted, shall be carried watertight to at least the margin line.

(3.) No change shall be made in the structure of watertight decks, trunks and ventilators after the completion of the survey unless with the permission of the Administration.
Double Bottoms.

Article 21.—(1.) In vessels 200 feet and under 249 feet in length a double bottom shall be fitted at least from the machinery space to the forepeak bulkhead, or as near thereto as practicable.

(2.) In vessels 249 feet and under 300 feet in length a double bottom shall be fitted at least outside of the machinery space and extend to the fore and after peak bulkheads respectively, or as near thereto as practicable.

(3.) In vessels 300 feet and over in length a double bottom shall be fitted amidships and extend to the fore and after peak bulkheads respectively, or as near thereto as practicable.

(4.) In vessels 300 feet and over in length the inner bottom shall be continued out to the ship's side in such manner as to protect the bilges.

(5.) In vessels 699 feet and over in length the double bottom, for at least half the vessel's length amidships and forward to the forepeak bulkhead, shall extend up the vessel's sides to a height above the top of the keel not less than 10 per cent. of the vessel's moulded breadth.

(6.) A well extending to the outer skin is permitted at the after end of the shaft tunnels of screw vessels. If wells or "hats" are constructed elsewhere in the double bottom in connection with the drainage arrangements, they shall not extend downwards from the inner bottom more than half the depth of the double bottom at that point.

Entries in Log.

Article 22.—(1.) Hinged doors, portable plates, coaling, cargo and gangway ports, side scuttles, and other openings, which are required by the preceding rules to be closed during the voyage, shall be closed before the ship puts to sea. The closing and the opening (if permissible under the rules) shall be recorded in the official log.

(2.) A record of all drills and inspections required by Article 19 shall be entered in the official log, with a record of any defects.

Questions for Further Study and Agreement.

Article 23. Recognising the desirability that the criterion referred to in paragraph (4) of Article 8 should be determined and accepted internationally at the earliest possible date, the contracting States agree to press forward the study of the subject forthwith, and to communicate to each other the results of that study with the least possible delay. The Conference recommend that His Britannic Majesty's Government be invited to undertake the duty of circulating this information, and, as soon as a definite result is attainable, of endeavouring to secure through the diplomatic channel the acceptance by the contracting States of the criterion; and upon the acceptance by each of the contracting States, as from a date subject to the conditions to be agreed upon, such criterion shall have effect as if it were prescribed in the Convention.

The above procedure shall also be applied to the following items:

(1.) The fitting of longitudinal watertight bulkheads, double skins and watertight decks and flats, and the question whether there may be allowed any increase in the length of transverse watertight compartments in way of which such longitudinal subdivision is fitted, and, if so, to what extent;

(2.) The method of subdivision for obtaining the highest practicable degree of safety to be applied to vessels of shorter lengths than those covered by paragraph (3) of Article 8; and

(3.) The results of experiments in regard to the proper margin of resistance above the pressure which watertight bulkheads are required to be capable of supporting, as referred to in paragraph (1) of Article 13.
ARRANGEMENTS AS TO THE SURVEY OF STEAMERS BY THE AUTHORITIES OF THE COUNTRIES TO WHICH THEY BELONG

4. The Conference referred to the Committee for consideration the following questions as to survey of passenger steamers and provision against breakdown:

(1.) **Arrangements for Surveying Passenger Steamers.**—In view of the differences in the conditions prevailing in different countries, is it possible to secure a uniform system of survey at all ports? If not, will it be sufficient to lay down that the survey should be carried out either by Government surveyors or by surveyors specially appointed by the Government for the purpose so as to secure that in every case the Government concerned accepts full responsibility for the efficiency and completeness of the survey?

(2.) **Principles which should govern the Survey.**—Is it possible or desirable for the Conference to lay down detailed rules governing the survey of passenger steamers in all respects; and, if not, can the Conference formulate some general principles which should govern the survey of passenger steamers in the different countries as regards hull, boilers, machinery, and equipments?

(3.) **Provisions against Breakdown.**—It has been suggested that, at least in the case of new and large passenger steamers, it should be compulsory that certain portions of the machinery and of the equipments should be in duplicate or in two or more sections capable of working independently so as to provide against breakdown. Is this a question which should be left to the different Administrations, or should it be dealt with by the Conference; and, if the latter, can the Conference formulate some general rules or principles on the matter?

5. The conclusions of the Committee with respect to the foregoing questions are as follows:

(1.) It is not possible to secure a uniform system of survey of steamers at the ports of different States.

(2.) It is not possible for the Conference to lay down detailed rules governing the survey of steamers in all respects, but it is possible and desirable to formulate general principles.

(3.) The question of duplication of main propelling machinery should not be dealt with by the Conference, but it is desirable to formulate general rules requiring the duplication of certain auxiliaries, such as fire pumps, dynamos, and steering apparatus, in certain classes of steamers.

It is the understanding of this Committee that the question of duplication of fire pumps and dynamos has been dealt with by other Committees of the Conference, and this Committee has therefore dealt only with auxiliary steering apparatus.

6. The following are the articles in relation to surveys and provisions against breakdown which are recommended for insertion in the Convention:

**Article 24.** The following are the general principles which shall govern the survey of steamers in the different countries as regards hull, boilers, machinery, and equipments. Each contracting State undertakes (1) to draw up detailed rules and regulations in accordance with these general principles, or to bring its existing rules and regulations into agreement with these principles; (2) to communicate these rules and regulations to each of the other contracting States; and (3) to secure that these rules and regulations shall be enforced.

**Article 25.** The survey in regard to the points dealt with by the Conference shall be carried out by Government surveyors. Each Government may, however, entrust the survey of steamers of its own country either to surveyors nominated by it for this purpose or to organisations recognised by it. In every case the Government concerned fully guarantees the completeness and efficiency of the survey.

**Article 26.** The surveys referred to in Article 25 shall be made—

(a.) Before the steamer is put in service as specified in Article 27;
(b.) Once each year, as specified in Article 28; and
(c.) Between the annual surveys, if required, as specified in Article 29.
Article 27. The survey before the steamer is put in service shall include an inspection of the whole of the hull, machinery, and equipments, including the outside of the steamer’s bottom, and the inside and outside of the boilers. The survey shall be such as to ensure that the arrangements, material, and scantlings of the hull, boilers, and their appurtenances, propelling and auxiliary machinery, life-saving appliances and other equipments, fully comply with the requirements of this Convention and of the detailed rules and regulations adopted by the contracting State to which the steamer belongs for steamers of the service in which she will be employed. The survey shall also be such as to ensure that the workmanship of all parts of the steamer and her equipments is in all respects satisfactory.

Article 28. The annual survey shall include an inspection of the whole of the hull, boilers, machinery, and equipments, including the outside of the steamer’s bottom. The survey shall be such as to ensure that the steamer, as regards the hull, boilers, and their appurtenances, propelling and auxiliary machinery, life-saving appliances, and other equipments, is in satisfactory condition for the service in which she will be employed, and that she complies in all respects with the requirements of this Convention, and of the detailed rules and regulations referred to in Article 24.

Article 29. A survey or inspection, either general or partial, according to the circumstances necessitating such survey or inspection, shall be made when any accident occurs or defect arises which affects the safety of the steamer or the efficiency or completeness of her life-saving appliances or other equipment, or when any important repairs or renewals are made; and the survey or inspection shall be such as to secure that the necessary repairs or renewals have been effectively made, that the material and workmanship of such repairs or renewals are in all respects satisfactory, and that the steamer complies in all respects with the requirements of this Convention and of the detailed rules and regulations referred to in Article 24.

Article 30. Each contracting State shall adopt rules and regulations to provide that steamers shall have sufficient backing power in order to secure proper control of the vessel under all conditions of navigability.

Article 31. Steamers shall be provided with auxiliary steering apparatus, which, however, may be of less power than the main apparatus, and need not be worked by steam or other mechanical power.

Article 32. The detailed rules and regulations referred to in Article 24 shall prescribe the requirements to be observed as to the initial and subsequent hydraulic tests to which the main and auxiliary boilers, connections, steam-pipes, reservoirs which are subjected to high pressure, and fuel tanks for oil motors are to be submitted, as regards the test pressure to be applied, and the intervals between the tests.

Main and auxiliary boilers, connections, tanks, reservoirs, and steam-piping more than four inches in diameter shall be satisfactorily tested by hydraulic pressure when new and thereafter at fixed intervals.

The initial and subsequent test pressures of the boilers shall not be less than one-and-a-half times the working pressure, or five atmospheres above the working pressure, whichever is the less. If the initial test pressure does not exceed five atmospheres above the working pressure, the interval between the subsequent tests shall not exceed two years. With a higher initial test pressure, the interval may be increased, and if the initial test pressure is double the working pressure, the interval may be six years, but it shall in no case exceed that period.

Article 33. The detailed rules and regulations referred to in Article 24 shall be such as to secure, in the interests of safety of life at sea, that the steamer is fit for the service in which she will be employed.

General.

Article 34. For the purposes of the foregoing articles the terms “steamer,” “ship,” and “vessel” shall be deemed to denote a vessel subject to the requirements prescribed by this Convention, and propelled by steam or other mechanical power.
EXCHANGE OF INFORMATION.

7. Although extensive investigation of the subject of bulkhead sub-division of ships with a view to increasing the safety of life at sea has been made recently by several Governments participating in this Conference, the results so far obtained have not been sufficiently conclusive to permit the Committee to formulate as complete and definite rules on this subject as are desirable. The Committee has found it practicable, however, to embody in its report the general principles and minimum requirements relating to bulkhead sub-division as hereinbefore set forth. It also hopes, before final action of the Conference is taken thereon, to fix even more definitely the form of the curves referred to in paragraph (3), Article 8.

8. The Committee recommends that the results of investigations and experiments now in progress or hereafter undertaken by the contracting States, as well as all other information obtained by them in regard to the application of the rules of this Convention shall be exchanged in the freest manner practicable, and recommends the inclusion of the following article in the Convention to give effect to this recommendation:—

Article 35. All contracting States shall exchange in the freest manner practicable information in regard to the application of the rules of this Convention. They shall transmit to each other the methods or rules which each may adopt, and information concerning any new fittings or appliances which they may sanction to give practical effect to the Convention; the decisions which each may make in regard to specific points of principle not covered by the Convention, and the results of such further studies in matters relating to safety of construction as were not definitely determined by the Conference.

Signed on behalf of the Committee,

W. L. CAPPS, Chairman.


December 19, 1913.

Note.—This reprint of the Report, which should be substituted for the preceding issue, contains the additional figures in Article 8 (3) referred to in the last sentence of paragraph 7 on this page; also certain minor corrections in the text.

W. L. C.

January 5, 1914.
Committee on Safety of Construction.

First Meeting.—November 18, 1913, 11 a.m.

ALL the members of the Committee were present except M.M. Wierdema, Wilmink, and Loviaguin.

THE CHAIRMAN, Rear-Admiral Washington L. Capps, opened the proceedings by referring to the informal meeting held at the Foreign Office on the 18th November, at which all the members were present except M. Ripa di Meana, and at which the following business was transacted:—

1. The Chairman expressed his great appreciation of the honour conferred on him in being elected Chairman of the Committee.
2. The Chairman nominated M. Carter, of the Board of Trade, to act as Secretary of the Committee.
3. Reference was then made to the propositions so far submitted, or to be submitted, to the Committee by various delegations. The date of the first formal meeting of the Committee was then discussed, and it was decided that in order to allow some time to study the various papers which had been already issued and were still to be sent out, the Committee should meet on Tuesday, the 18th November, at 11 a.m., and the Secretary should issue all the available papers in advance of the meeting.
4. It was decided that a summary of the proceedings at each meeting should be circulated (in English) as soon as possible after the meeting.

After referring to the above-mentioned meeting, the Chairman next explained the arrangement which had been adopted in seating the members of the Committee round the table, the alphabetical order being observed except in the case of delegations which had submitted definite propositions for the consideration of the Committee. He then proceeded to announce that through the courtesy of M. Pierriard he had secured the services of M. Bogart (one of the secretaries of the Belgian delegation) to act as joint secretary of the Committee with M. Carter, in view of the use of French in the discussions and proceedings of the Committee. It was suggested that the resolutions of the Committee should be circulated in English and French, and that it might be found possible to circulate a French translation of the Minutes after they had been circulated in English and approved by the Committee. This procedure was agreed to.

The Chairman suggested that it would probably facilitate progress and economise time if as many members of the Committee as possible would speak in English, and on his suggestion it was agreed that all the members of the Committee (assessors as well as delegates) should be free to speak if they so desired. It was also agreed that there was no objection to the members of delegations bringing other colleagues with them to act as assistants with whom they could consult.

The Chairman next made the following reference to the recent death of Dr. S. J. P. Thearle, Chief Ship Surveyor of Lloyd's Register, and member of the British Bulkheads Committee:—

"Before proceeding further with the work of the day the Chair has the painful duty of announcing to the Committee the death of Dr. S. J. P. Thearle. While Dr. Thearle was not a member of the Conference his recent and notable work as a member of Sir Archibald Denny's Committee on Bulkheads will, without doubt, be of great value to the Committee in its deliberations on the very important subject to which Dr. Thearle has given so much attention. Dr. Thearle's kindly and attractive personality was familiar to many of us. His conspicuous position as a Naval Architect and as one of the principal heads of the great British Registration Society is well known to all."
While detailed reference to Dr. Thearle's unusual ability and life work would be superfluous in any assemblage of this character, the Chair feels that it merely voices the unanimous sentiment of the Committee in desiring to extend on its behalf to the widow and family of Dr. Thearle, its profound sympathy in their bereavement and its great appreciation of his work.

"May I ask that you express your approval of this suggestion by rising in your places?"

After the suggestion had been approved in the manner suggested the Chairman referred to the terms of reference to the Committee, as printed on page 2, paragraphs 5 to 8, of the document entitled "Questions before the Conference," and put to the Committee the question contained in sub-section (a), paragraph 5, as follows:—

(a.) Whether the study of the subject of bulkheads and watertight compartments is sufficiently far advanced to enable principles of international applicability to be laid down in the case of new ocean-going passenger steamers?

After a pause, the Chairman stated that in the absence of objection it would be assumed that the Committee answered in the affirmative. No objection being made, it was so agreed.

The Chairman then explained that it appeared desirable that before the Committee proceeded to consider what general principles should be laid down, the delegations which had made definite proposals as regards subdivision should be given an opportunity of explaining their proposals, without discussion, so that the Committee might clearly understand the meaning of these proposals and be better able to discuss the general principles involved. This suggestion was agreed to. The Chairman then pointed out that as the proposals of the French delegation dealt to a large extent with general principles without going into details, it was suggested that for this reason the French proposals be first explained, and he therefore called on the senior French delegate to speak.

M. BORIS (France), speaking in French, began by expressing his sense of the honour done to the French delegation by the Chairman in his being invited to speak first at the meeting; and remarking on the great and diverse difficulties of the question which the Committee had to consider, he stated that he would confine himself to submitting some considerations of a very general character which dominate all the work which has been done regarding the subdivision of ships.

In addition to the German, British, and American Governments, many eminent individuals have already made important contributions to the solution of the problem, especially Dr. Bruhn, Professor Pagel, and Dr. Walter.

It is evident from all these works—

1. That ships should be subdivided as closely as possible, having regard to the service for which they are intended.
2. That the subdivision calculations are necessarily based on a certain number of assumptions.

The second point is the most troublesome, because, on the one hand, of the difficulty of selecting any particular assumptions rather than others, and, on the other hand, of the danger that would arise for the Conference if it presented to the public a remedy which was apparently satisfactory, but which might prove ineffective if an accident happened in circumstances where the assumptions which had been made were not actually fulfilled.

Continuing M. Boris said:

May I remind you of the conclusion of M. Bruhn's article:

"Provide as many bulkheads as are practicable transversely and longitudinally. Carry them as high as possible. Extend the double bottom up the sides of the vessel to above the load line. Fit an efficient water-tight deck at the fore part of the vessel. And when that is done, let it be known that even this vessel will founder under unfortunate circumstances."

I do not doubt that all the members present share this opinion.
I propose to deal only with general principles, on which there should be unanimity.
I desire to draw attention to a factor which has only been considered from a very limited point of view, namely, stability. Even for war vessels, where all the conditions of loading are known, the question of stability after damage involves very great difficulties, and for merchant ships the difficulty may appear insurmountable. Still, I think that we must study the point.

I come back to the two principal points which I have already mentioned.

1. Vessels must be subdivided as closely as possible, having regard to the necessities of their service and their commercial role.

I mean by that that the Conference must avoid putting a veto on the construction of certain types of merchant vessels; if any definite type of vessel is necessary it must be subdivided in such manner as to give it a reasonable security. In this matter the German rules and the British proposals furnish strong support to the French suggestions. The former distinguish between "Schnell-Dampfer" and "Fracht- und Passagier- Dampfer." The second make a distinction between "passenger vessels" and "cargo-passenger vessels." The American enquiry also leads to a similar conclusion.

The foregoing indicates the necessity of finding a criterion of classification. A separation between fast ships and slow ships has been the German point of view, and the point of view of the British Committee seems to me to be the same, though it is expressed in different language. Where is the limit between fast and slow ships to be fixed? The Germans leave the distinction to the discretion of the Marine Authority, but this procedure is not practicable for the purpose of an international understanding. The British committee seems to have worked on similar lines in studying separately the "passenger steamers" and the "cargo-passenger steamers" and in attempting to minimize the distinction by establishing a sort of connection between the two classes of ships. The difficulty which I have indicated still exists, however, because the curves for the cargo-passenger steamers include vessels of 500 feet in length and these vessels are also included in the curves for passenger vessels. In which class would any particular vessel of 500 feet in length be placed?

SIR ARCHIBALD DENNY (Great Britain) intervened and explained that the British curves are not complete.

M. BORIS: Our opinion is that it is not necessary to establish between the various classes of ships impassable barriers, but we desire to attain a complete gradation in the requirements when passing from a cargo-passenger vessel of given length to a highest-class passenger-steamer of the same length.

The French delegation has thus been led to the idea of a continuous gradation. How can this be attained? One can class ships which are identical from the geometrical point of view by their non-geometrical elements. Of these the speed is one—not the only one—but it is simple, and we have had an opportunity to discover its advantages. One might equally well take the ratio of the deadweight to the displacement, which a priori may seem more logical; or, again, as Professor Vossack has suggested to us, one might take the ratio of the length of machinery space to the total length of the ship. All these ideas have the same value, and I invite the Committee to consider them.

With reference to the speed, I ought to add that the speed which would be used in applying the tables would be the speed declared by the owner. There is a danger that this speed may be smaller than the actual speed for two reasons (1) because the speed is a factor in the severity of sub-division; (2) because the builder may, as a matter of precaution, fit engines more powerful than he had been asked for. The same difficulty apparently occurs in regard to a ship in light condition, but an increase of freeboard will automatically compensate for the increased speed. The regulations should therefore be such that speed, freeboard and sub-division be closely connected.

2. I pass now to the assumptions which we are condemned to make.

It is necessary to study the safety of a ship at every point of its length, as may be done by the very interesting German curves, and as the appropriation of the respective compartments is different, one is obliged to have recourse to the notion of permeability. The coefficient to be adopted for this permeability should correspond to the most
probable conditions of loading, but as the latter may be very different (rails, salt, sponges, &c.), an average will have no relation to actual conditions. The determination of the weight of water which will enter a flooded compartment depends not only on the permeability, but also on the level to which the water will rise in this compartment, that is to say on the water line after damage. This water line can be determined only after we have made certain fresh assumptions concerning the position of the margin of safety line. In order to fix these two assumptions one may have recourse to certain considerations.

(a.) As regards permeability, one agrees to accept a co-efficient approximating to 100 per cent. for ships of the highest type, but for cargo-ships the co-efficient must evidently be smaller. One may hesitate on its choice, but it seems to us that, in the permeability, should appear that continuously increasing severity to which I have already alluded.

(b.) As to the margin of safety line, this should be a kind of freeboard line after damage. What is the factor which should guide us in fixing the position of this line? In the German system this line coincides with the bulkhead deck-line. According to the recommendation of the original British Bulkhead Committee and the rules of the Bureau Veritas for the issue of a special bulkhead mark, the safety line is fixed at a certain distance from this deck. The distance adopted is arbitrary, and it would evidently be desirable to base it upon a logical consideration, and the consideration of stability immediately occurs to one for this purpose.

It remains to indicate to what final aim our labours should be directed. The adoption of tables or curves seems to be the most practical solution. Experience has shown, especially in regard to freeboard, that the permission given to those interested to submit direct calculations leads to considerable difficulties, and advantage is not, in fact, taken of the permission.

The above-mentioned tables should leave to builders full freedom to construct at their will either long compartments at the cost of high bulkheads or low bulkheads at the price of short compartments. More generally entire freedom must be left to builders and owners to utilise all the resources of naval architecture and to take advantage of its progress without any hindrance. I will mention specially double skins, longitudinal subdivision, and even watertight decks, of which so much has been said.

In our opinion, it is not sufficient to recommend these arrangements, but it is necessary that the regulations should give an advantage to those who try to use them. Shipowners must find personal benefit in doing so. For instance, longitudinal bulkheads should allow the lengthening of the compartments which they protect, and a premium should be given on the length of a compartment or on the height of the transverse bulkheads, when one uses efficient secondary subdivision.

Further, I would draw attention to the connection between the subdivision certificates, which may perhaps be issued in future and freeboard certificates, since any particular arrangement of bulkheads is good for a given freeboard, in the same way as a freeboard is appropriate to only one definite arrangement of bulkheads.

Such are the general ideas which, in our opinion, might be used in connection with an international understanding; if proposals of this nature are agreed to, it will remain to study numerous details and strive after all the possible simplifications. I immediately suggest one, which would consist in dropping the usual notion of the number of compartments flooded, and substituting the only one which really corresponds to reality, namely, the fraction of the length of the hull which can be flooded at each point without immersing the safety line.

M. Boris finished by thanking the members of the Committee for the kind bearing which they had given to his remarks.

THE CHAIRMAN thanked M. Boris for his remarks, and suggested that it would be an assistance to the Committee if M. Boris would prepare a brief summary of them and a brief explanatory statement regarding each paragraph of the French delegation’s Memorandum. This would be circulated by the Secretaries. The Chairman suggested that any member who desired to ask questions or put forward resolutions regarding points dealt with at any meeting should put them in writing and send them to the Secretaries before the following meeting, if possible, so that they could then be dealt with expeditiously.

He also referred again to the inadvisability of undertaking general discussion until
the definite propositions already proposed by the several delegations had been explained to the Committee. This was agreed to.

It was agreed to hold the next meeting on Thursday, the 20th November, at 3 p.m., and to leave the dates of further meetings for future consideration.

SIR ARCHIBALD DENNY thanked the Chairman and members for their expression of sympathy in regard to Dr. Thearie's death. He also complimented M. Boris on his speech.

Adjourned to 3 p.m., the 20th November, 1913.
Second Meeting.—November 20, 1913, 3 p.m.

ALL the members of the Committee were present except MM. Wierdama and Looiaguin.

THE CHAIRMAN asked whether any members had any alterations to suggest in the Minutes of the first meeting, copies of which had been circulated; and he suggested that page 2 of the Minutes should be amended by inserting a record of the fact that the Committee had agreed that—

"The study of the question of sub-division is sufficiently far advanced to enable principles of international applicability to be laid down in the case of new ocean-going passenger-steamers."

This suggestion was concurred in.

M. BORIS (France) suggested, and it was agreed, that the words "may appear" should be substituted for the word "becomes" in the sixth line from the top of page 3.

Subject to these alterations, the Minutes were approved.

THE CHAIRMAN, following out the general procedure agreed on at the first meeting, then called on Professor Pagel to explain the German proposals as to sub-division.

PROFESSOR PAGEL (Germany) began by stating that the German proposals embody the sub-division rules which have been in force in Germany for many years, and explained that these rules were originally put in force in 1898, on the recommendations of a Committee representing the authorities, shipowners, and designers, who based their recommendations on proposals prepared by the Germanischer Lloyd, which proposals were, in their turn, based on the report of the British Bulkheads Committee of 1890–91.

The rules had since been twice revised: first in 1903, when certain shipowners interested in cargo-passenger steamers between 110 and 130 metres long, made representations that the rules for these vessels were too severe and suggested that the deductions prescribed should be increased. These representations were considered by a Committee which, after two years' investigation, decided not to increase the deductions, but to allow certain concessions on the condition (among others) that cargo spaces should actually be stowed with cargo.

The second revision took place after the loss of the steamship "Titanic," at which time the requirements for very large passenger steamers were made more stringent.

Passing to a consideration of the fundamental principles of the German rules, Professor Pagel pointed out that the rules do not deal with vessels engaged in trade along the coasts of the Baltic, or German Ocean, or with cargo-passenger steamers under 90 metres long, or with vessels carrying less than fifty passengers. The rules are based on the principle that unsinkability is unattainable, and that, in making vessels as safe as practicable, they must not be made unserviceable for their intended employment. Floatability is only relative, and the limit of floatability is reached when the vessel is immersed to the bulkhead deck line. The longer the vessel and the higher the bulkhead deck, the greater is the standard of security that can be applied; below a certain size, vessels cannot be sub-divided to float with more than one compartment flooded, but larger vessels can be sub-divided to float with two compartments flooded.

A second principle embodied in the German regulations is the assumption that the amount of cargo in cargo spaces diminishes as the length of the vessel increases, and finally disappears, the minimum deduction of 5 per cent. prescribed in the German rules representing only the structural fittings of any compartment. The machinery spaces, including the coal-bunkers, are in almost all cases assumed to be empty. The deductions therefore do not represent the real water-excluding condition of the spaces concerned, but they are coefficients of safety, and by their means a reserve of safety is introduced into the rules.

The German regulations divide vessels into two classes, viz., fast passenger steamers and cargo-passenger steamers, but the real distinction between these classes
is based not on speed, but on form, and on the ratio of the cargo spaces to the whole volume of the vessel. At the last revision of the regulations, the Committee, after careful consideration, decided not to make these definitions more explicit, as no difficulty had arisen in practice in applying them.

The regulations do not deal with the question of stability:—

1. Because the majority of the vessels dealt with are cargo-passenger vessels carrying widely differing cargoes at different times, and for these it is very difficult to obtain a satisfactory solution of the stability problem; and

2. Because the necessity for a rule as to stability has not hitherto been recognised. Many calculations have been made respecting the stability of damaged vessels, and it has always been found that the vessels possess sufficient stability when flooded. Further, there is no recorded case of a large passenger steamer capsizing.

In these circumstances the German Committee seemed justified in rejecting the proposal that a proof of stability should be required in every case dealt with.

From the beginning great attention had been given to the strength of bulkheads in Germany, and in 1902 a practical test of a main bulkhead was made by filling a compartment of a large vessel. Other tests had been made, and cases of flooding due to accident were also on record. Professor Pagel thought that uniform rules for the construction of bulkheads should be drawn up by this Committee, and hoped that the investigations of the British Committee would be of assistance in this matter, though he admitted that the formulation of such rules might require a very long period. It seemed, however, better to spend more time and arrive at well-established results than to obtain results at an earlier date which might not be reliable.

Remarking that he did not desire to deal with details, such as double bottoms, watertight decks, &c., Professor Pagel pointed out two advantages of the system of curves embodied in the German regulations.

The first advantage was that, as compared with exact calculations, the curves give greater safety, and thus calculations are made only when concessions come into question. Secondly, the curves can be applied very simply and rapidly, and can be used even when the lines of the vessel are not available. They are thus indispensable to designers.

Since the German rules were introduced they have been enforced to the satisfaction of all concerned, but the German Delegates were quite willing to examine all new proposals and to adopt such as might be proved superior to those already in use. Such examination, however, takes much time, and a definite opinion could only be given after long consideration and comparison of the results of applying the different methods to many ships.

He therefore proposed the postponement of the question as to the possibility of drawing up uniform rules, and as to the nature of such rules, whether based on existing regulations or not, and he suggested that the consideration of this question should be resumed after the complete proposals of the various countries had been submitted to examination, at which time it might also be possible to deal with the question of strength of bulkheads. In the meantime Professor Pagel suggested that it would be possible to lay down certain principles common to all the proposals under consideration, and that for this purpose a Sub-Committee of six members (two from the British, two from the French, and two from the German Delegation) should be appointed to deal with this matter before the next meeting of the full Committee. By this procedure the labours of the Committee would best be advanced.

SIR ARCHIBALD DENNY (Great Britain) seconded Professor Pagel’s motion.

THE CHAIRMAN thanked Professor Pagel for his remarks, and said that he felt sure that the idea contained in the suggestion of Dr. Pagel had been in the minds of all, and for the purpose of discovering the general principles common to the German, French, and British proposals as to subdivision, a Sub-Committee representing the Delegations of those countries seemed the most suitable. It having been suggested that the Chairman also serve as a member of this Sub-Committee, he desired to say that he would only allow himself to serve it by so doing he could expeditiously his labours through his position as a member of a Delegation not having a definite scheme of its own.

For the rest of the Committee, he had no doubt that they would find more than enough work to occupy them before the next meeting in studying the various proposals which had been put forward. Professor Pagel’s motion having been seconded would stand as the decision of the Committee if no objection were raised.
No objection being raised, the motion was agreed to.

THE CHAIRMAN proceeded to point out that it would still be advisable to ask the British Delegation to explain their proposals as to sub-division, and he therefore called upon Sir Archibald Denny to speak.

SIR ARCHIBALD DENNY (Great Britain) said he wished to explain clearly and as shortly as possible the views of the British Bulkheads Committee. He would begin by quoting their terms of reference which asked them to advise, "in the interests of safety of life at sea, as to what, in their opinion, would constitute efficient sub-division for all classes of vessels included in the British Mercantile Marine, having due regard to the nature of the services in which they are respectively engaged."

In a Memorandum from the Principal Ship Surveyor, Mr. Archer, the following occurs: "Experience of the working of the present regulations indicates that it is essential that rules or instructions regarding sub-division should be of as simple a character as the nature of the subject permits, so that they can be put in practice by the Board of Trade Surveyors without either making or examining calculations of a very intricate nature. The number of passenger vessels constructed annually exceeds 100, and it would be obviously impracticable for the Surveyors to satisfy themselves by separate calculations in each case that these vessels would float with any given number of compartments in communication with the sea." Further, he says: "It is thought to be a matter of very great difficulty to draw up regulations which shall be equitable as between ship and ship and at the same time easy of application by the Board's Surveyors."

These extracts were the charter of instructions upon which my Committee has been working, and their efforts have been directed not only to making suggestions as to the sub-division of all types of ships, but also to supply clear and simple machinery which would facilitate the work both of the naval architect in designing the vessel and of the Board's staff in checking the results. The Memoranda which have been transmitted to this Committee by the Board of Trade are the results of our work so far as completed up to the present date, but, as you will see, they are incomplete even as regards ocean-going passenger vessels. Before going further, I desire to deal with some general considerations. If you take a vessel of definite form and definite sheer and, say, 800 feet long, which is loaded to any particular draft with any specified cargo, calculation will show that at each point of her length a certain percentage of her length may be flooded without submerging the deck. We will assume that at a particular part of the forebody this floodable length is 15 per cent.—that is, 120 feet—and that this space is divided into two equal compartments, each with a length of 60 feet. If now, without changing any of the other conditions, the dimensions of that vessel be reduced proportionately to 400 feet, the floodable length will also be proportionately reduced, and the length of one compartment will now be 30 feet. If we again halve the length to 200 feet, the compartment will be 15 feet long, and if we again half it, it will be 7½ feet. This is another way of saying that it is practically impossible to apply the same conditions of sub-division to all vessels of whatever length, and is the meaning of the proviso in our terms of reference, "having due regard to the nature of the service in which vessels are respectively engaged." It was our duty then to hold the balance between safety derived from sub-division and trading utility, bearing in mind that vessels would cease to be built and used if the conditions of sub-division were made too onerous.

Broadly, then, there are certain lengths at which it is practically possible to introduce one compartment sub-division, two compartment sub-division, and three compartment sub-division respectively. For the moment I do not profess to go further than that, but the principle can be indefinitely extended.

Now, if you will turn to the Appendix to the Memorandum on Watertight Sub-division, and read Clause 2, you will find these words: "The size and shape of a flooding curve are largely affected both by the ratio which the freeboard up to the prescribed margin line amidships bears to the stated draught, and by the permeability of the flooded volume to water; in a smaller degree by the character of the lines of the vessel and by the shape of the sheer lines at the bulkhead deck or margin lines." I wish you for the moment to confine your thoughts to this question of floodable length. As is stated in that paragraph, this floodable length is largely affected by freeboard, either the height from the load water-line to the deck at side or to a margin line. It is therefore very greatly affected by the bulkhead deck to which the bulkheads are carried, and from which the freeboard or margin is measured. The floodable length towards the ends is largely affected by sheer; and as the sheer is generally less at the
stern than at the bow, you will find, if you study a flooding curve, that the floodable length is greater forward than aft. Amidships, floodable length is practically unaffected by sheer.

A very important factor in increasing or diminishing the floodable length is the permeability of the space assumed to be flooded. For instance, if you assume that the space is quite empty, the floodable length will be short, whereas, if you assume the ship loaded with a material which entirely excludes water, there is no necessity for bulkheads at all, as the ship would remain at the same draught whether her skin was punctured or not. Between these two limits, then, it is the duty of the naval architect to decide upon a criterion of permeability which corresponds to the trading of his vessel. The floodable length so fixed is absolutely unaffected by the number of intermediate bulkheads. It is therefore quite misleading to talk of a vessel being a one, two, three, or even four-compartment vessel without at the same time stating all the assumptions, especially the permeability.

It is true that in this country there have hitherto been no Regulations for the orderly and obligatory sub-division of vessels, but all naval architects owe a debt of gratitude to the work of the 1891 Committee, which, from a scientific point, was largely guided by our lamented colleague, Professor Jenkins. I recognise with gratitude the tribute paid to that work by our German colleagues. While, as I have said, there exist in this country no compulsory Regulations as to sub-division, a certain number of vessels were voluntarily sub-divided in accordance with the 1891 Report, and there has always been consideration given to this question. In many notable cases such sub-division has been carried out to a high degree, as in the "City of Paris" and the "City of New York," designed by my colleague Sir J. B. Sylvestre while he was at Clydebank; and before the "Titanic" disaster there were also a certain number of vessels so treated, notably the "Titanic" herself, which as shown in the evidence before Lord Mersey's Inquiry was most substantially sub-divided and would have remained afloat had not more than the four forward compartments been damaged. Now by what process were these vessels sub-divided? A separate calculation was made for each. Certain assumptions as to permeability were made and certain conditions laid down as to the number of adjacent compartments which could be flooded. To make a calculation for one complete flooding curve with a high degree of accuracy would take a skilled draughtsman 7 to 10 days. It is evident, therefore, that if sub-division rules are to be applied to the numerous passenger vessels building year by year, rapid methods of application are necessary, and our efforts have therefore been devoted for a long time to discovering, if possible, the means by which these flooding curves could be produced in hours instead of in days.

The Appendix to the Memorandum on Watertight Sub-division is the result of our labours and especially of my colleague Professor Welch, assisted by the staff which the Board of Trade placed at our disposal.

The flooding diagram which is in your hands is worked out for one position, namely, 80 per cent. of the ship's length from the after perpendicular and with a permeability of 4. Eventually there will be at least 24 of these diagrams, 12 for permeability 6 and 12 for permeability unity. It is anticipated that by the application of these cross curves and the other diagrams which have been hanged to you a complete flooding curve can be produced in the course of a few hours for any vessel with any permeability between 60 and 100 per cent., with any shear, and of any form, with a very close approach to accuracy.

These cross curves have an additional advantage that for first rapid design a flooding diagram may be taken direct in a few minutes without any other labour than to ascertain the average permeability, the block, the shear, and the freeboard, and it is believed that the diagrams give the most severe flooding curve.

If our belief in the efficiency of these curves is borne out in practice this machinery or apparatus will be of enormous advantage to the designer and of first-class importance to the Surveyors of the Government.

To return to the main Memorandum on Watertight Sub-division and to the diagrams of margin lines, I should like to give you an outline of the considerations which have led us to present our work to you in this shape, and to recommend it for the serious consideration of this Committee. For instance as regards the margins. You will not be surprised that our first instinct was to continue the work of the 1891 Committee, and to work more or less upon their lines. We therefore started what I might call our geometrical investigations at the point where the 1891 Committee had left off, and we decided provisionally that we would adopt their margin of safety line and permeability of cargo spaces (40 per cent.). We endeavoured to find out why that Committee had adopted their particular form of
margin line which was less at the ends than in the middle, being 3 per cent. of the
depth there, but we were unable to obtain any information.

Practical considerations lead to the conclusion that it is not possible to sub-divide
the floodable length always into the same number of compartments; there is a length
below which it is practically impossible to have even a one-compartment ship, another
length below which it is difficult to have a two-compartment ship, and similarly for
three and four compartments. It seemed to us preferable to have the severity of the
sub-division increasing gradually, and not by steps, whether small or large, and we
considered that this could be effected by adopting the principle that the margins
should increase with the increase in length of vessel. It will be clear that with the
gradual increase in the margins, say, for one-compartment vessels, a point will be
reached at which the margins are so great that the vessel may be considered either a
one-compartment ship with these large margins, or a two-compartment ship with no
margin; and similarly, if from this point the margins with two compartments flooded
gradually increase from zero upwards a further point will be reached at which the
vessel may be considered either a two-compartment ship with large margins, or a
three-compartment ship with no margin.

You will now understand why different margins are prescribed for the forward
end, the after end, and amidships. If you take a ship of 950 feet in length with
margins as shown in diagram 1 and flood two of the amidship compartments,
she should float with the water just touching that margin line amidships. If now you
fill a third adjacent compartment the water will just touch the bulkhead deck at side.
Similarly if you flood first two and then three adjacent compartments near either end
of the vessel, but as the filling of the third compartment near the end has much more
effect on trim than the filling of the third compartment amidships the margins forward
and aft must clearly be greater than that amidships for a vessel of given length.

These are the principles on which our conception of margins is based, but I
should mention that our margin diagram No. 1 is not a continuation of No. 2.

As you will see from the Appendix the margin lines are run through the points
amidships, forward, and aft in a manner similar to sheer lines.

For reasons of policy we prefer to use the term "margin lines" rather than
"margin of safety lines," which was the term used by the original British Committee.

Next as to permeabilities. So far as concerned machinery spaces and spaces
occupied by passengers, the permeability was arrived at by taking several typical
vessels in each case, and we came to the conclusion that, broadly speaking, 80 per cent.
would be correct for the machinery spaces in all, or practically all, vessels with the
present style of engines, and that 95 per cent. would be about correct for passenger
spaces. As regards cargo spaces, however, our investigation showed that 40 per cent.
permeability did not give sub-division which, in our opinion, was sufficiently stringent.
We therefore, by evidence and by correspondence, ascertained the permeabilities of
a large number of different cargoes, and finally we came to the conclusion that
60 per cent. permeability was a good average to take. As, however, the spaces in
any particular vessel forward and aft of the machinery may be either exclusively
devoted to cargo or very largely devoted to passengers, it is necessary to get an
average permeability for each end. That is fully described in the memorandum, so
I need not dilate upon it.

I think I have already said that the method adopted by naval architects in
this country at present for sub-dividing vessels is to consider each case on its
merits, by estimating the permeabilities and so arranging the bulkheads that it can
be proved by trim calculations that the original margin of safety line of the
1501 Committee is not submerged. This would be an impossibly slow process if we
have to apply sub-division rules to all passenger vessels, and therefore I again say
that we put forward our apparatus and our memorandum as one solution of the
problem in the belief that our methods show you what you are doing, are easy of
application, and are, in our opinion, a good substitute for the ordinary detailed
calculations.

Now I propose to show that the method we adopt of obtaining the average
permeability fulfills the condition adumbrated by Mr. Archer, namely, that it is
equitable as between ship and ship. Take two ships of any particular length: one,
a high-type passenger vessel carrying only limited quantities of cargo; the other
carrying large quantities of cargo as well as passengers.

Assume that in the first case you have got two or more 'tween decks filled with
passengers, only small holds forward, and tunnels and stores aft. From the study of
certain typical cases, the average permeability forward and aft, obtained by the means
we suggest, would probably be 80 per cent. Suppose the other vessel has only one deck devoted to passengers, not very powerful machinery, and all the rest of the vessel devoted to carrying cargo. Again, from typical examples the permeability of this vessel might be '65 forward and aft.

Assume for the moment that we deal with both these vessels by diagram 1, the length being more than 500 feet, then the application of the same margin lines would not produce the same spacing of bulkheads, because the permeability in the second case being smaller, the bulkheads would be more widely spaced; but this is perfectly legitimate, and it fits the case of the second vessel requiring great facilities for cargo, and hence longer holds and hatches than the other vessel, which is largely a passenger carrier, and only carries a limited cargo.

I simply give you this case to illustrate why we think that the system is fair as between ship and ship of the same length, but I do not bind myself for the moment to applying diagram 1 to both these types of vessels. You will observe that, in our memorandum, we say that proposals for sub-division of the first mentioned type below 500 feet in length, and the latter type above 500 feet in length are not yet available. It may ultimately be found that only one set of margin lines is required for all vessels, and that the derived permeability is the only criterion needed; or rather that with our system no criterion is needed, and hence there need be no discussion as to the class in which the vessel should be placed, length being the deciding factor.

Our general principle is that by means of fixed permeabilities for different types of space, average permeabilities for the spaces forward and aft of the machinery are ascertained, and these reflect the nature of the service in which the vessel is engaged. Then we have margins which increase with the length and thus grade the increasing severity of sub-division.

You will observe from clauses 2 and 5 of our memorandum that we are most insistent that the prescribed permeabilities shall not be varied.

If you begin to allow tampering with your permeabilities, then the quality of your security is really changed though it does not appear to be so.

I venture to refer you to the work of our German colleagues, to give you just one point of comparison.

The German system is to vary the permeability without any further reference to the type of vessel, than that she is either a fast steamer or a cargo-passenger steamer. In both Tables I and II there is no margin prescribed, except the thickness of a wood deck. The vessels are to be so divided that, with the prescribed permeabilities, they float at their deck-lines.

If you will take vessels of from 150 to 180 metres in Tables I and II, you will observe that the permeability in Table I is '83, while in Table II the permeability is '67, and I wish to neglect for the moment that the engine and boiler space is '95.

Now these permeabilities are very close, in both cases, to those which emerge from our system of treating similar vessels, and I may say that this was not done intentionally. It came that way naturally, and hence I am hopeful that an agreement may be come to. It is true our permeabilities are less, but then we have a margin, and very roughly you may say that, at that particular point for these particular vessels, the two systems would produce practically the same results: and the effect of increasing the permeabilities for larger vessels, as is done in the German rules, is really to produce a greater margin of safety in the larger vessels.

I decline, for the moment, to discuss the relative merits of the two systems, except to say this, that if you decide to use fixed permeabilities with the underside of deck as margin line, then I venture to suggest that no alteration of these arbitrary or selected permeabilities should be permitted by special calculation, and that all that special calculation should do is to bring in the effect of form.

As a matter of interest we have made numerous calculations, and we have found that differences of form only, while retaining the same block coefficient, freeboard, sheer, &c., may make (in extreme cases) a difference of 18 to 20 per cent. in the floodable length.

If the cross-curves which we have prepared turn out to be on the average as accurate as we hope, it may be that at a later date such detailed flooding calculations, so far as form is concerned, may be dispensed with altogether, but for the moment, as you will see from paragraph 5 of our memorandum, we have left the option of submitting special calculations, but only under the strict proviso that the average permeabilities are obtained as specified in paragraph 2.

Gentlemen, this subject is the largest and one of the most difficult which has to be dealt with by the naval architect. The machinery for the grading of sub-division must
be totally unintelligible to the man in the street, but, unfortunately, that same man thinks that he knows all about it, and talks glibly of one, two, three, four, and even five compartments flooded.

Whatever decision we may come to, the words of Professor Pagel in December 1912 must always be applicable. He said "The unsinkability which we obtain in our merchant-vessels is, as is well known, only a conditional one." Take a large vessel which, according to the German rules, the French rules, or our rules, can float with two compartments flooded. The vessel would so float provided the permeability of the cargo on board proved to be the same as the permeability used in the calculation; but if, instead of general cargo, iron or any other cargo of greater permeability was being carried, the vessel would at once become a one-compartment ship with a margin, either large or small as the case may be. Therefore, Professor Pagel is right, M. Boris is right; her safety is conditional only.

The object we all have in view is to evolve regulations which will produce the maximum amount of security with the possibility of effective trading, and if I have not made everything clear as regards our suggestions, I shall be happy to give further explanations.

Before concluding, I desire to thank Professor Pagel for his very clear and frank statement as to the genesis of the German rules and their method of application. For international purposes, a rigid system fixing the class to be assigned to any particular vessel is necessary, as this duty cannot well be left to the judgment of any official.

I also wish to deal with two points raised by Professor Pagel.

As to bulkhead scantlings. We anticipate that, as the results of tests on the experimental caisson, my Committee will be able to recommend scantlings for all bulkheads. The caisson was designed after we had tested by very large pressure deep tanks on existing steamers, the bulkheads of which, when so tested, may be considered in the same condition as the lower part of deep bulkheads. These experiments guided us in fixing the size and disposition of the stiffeners on the caisson, and we have many different types of stiffeners. The scantlings fixed as the results of our experiments and calculations will, I have no doubt, be freely communicated to the foreign delegations.

Next as to the necessity for considering stability as a controlling element in the fixing of the margin line. I agree with Professor Pagel that this is not necessary in the meantime nor so long as the present practice in regard to the ratio of beam to draft is maintained. If this ratio becomes very great, it might, I don't say would, be necessary to give the matter further consideration. Like Professor Pagel I have never heard a case of a vessel capsizing after being flooded by accident: the "Titanic," struck forward and gradually flooding aft until she sank, did not, neither did the "Republic," struck nearly amidships and gradually flooding aft. For these reasons I do not think it necessary to introduce the factor of stability.

THE CHAIRMAN thanked Sir Archibald Denny for his remarks, and said that the Committee would no doubt bear in mind his allusion to the advisability of undeceiving the public as to the absolute unsinkability of passenger vessels.

Referring to Professor Pagel's motion the Chairman again emphasised the point that any conclusions arrived at by the Sub-Committee would have to receive further consideration by the whole Committee, and that the work of the Sub-Committee did not, therefore, relieve the other members of the Committee of their responsibility for bringing forward any suggestions which, in their opinion, might be improvements on those already under consideration. For this purpose, the members would no doubt consider it desirable to give careful study to all the material now available.

The Chairman then named the members of the Sub-Committee as nominated by the three Delegations, viz., Professor Pagel, M. Walter, M. Boris, M. de Berlhe, Sir Archibald Denny, and Sir John Biles, together with the Chairman as ex-officio member.

On the Chairman asking for any further suggestions, Sir John Biles stated that he had obtained for each member of the Sub-Committee a copy of a paper on stability recently read before the Institution of Naval Architects. The Chairman then referred to the date of the next meeting of the full Committee, and it was agreed that, as the members would be fully occupied in studying the available papers while the Sub-Committee was at work, the next meeting should be held on Tuesday, the 25th November, at 3 p.m.

Adjourned to 3 p.m., the 25th November, 1913.
SUB-COMMITTEE ON GENERAL PRINCIPLES.

Meetings of Thursday afternoon, November 20, and morning and afternoon of Friday, November 21, 1913.

Present: Admiral Capps (Chairman), M.M. Pagel, Walter, Boris, de Berlhe, Sir A. Denny, and Sir J. H. Biles.

PROFESSOR PAGEL thought the first question dealt with should be the vessels to which any rules as to sub-division should apply, and suggested that in this connection the length, the number of passengers carried, and the route traversed should all be considered.

As regards length, he suggested that cargo-passenger vessels under 90 metres (295 feet) long should not be subject to special regulations as to sub-division. The German authorities had tried to apply the one-compartment standard (with deduction of 40 per cent. outside the machinery space) to cargo-passenger vessels between 80 and 90 metres long, but had found this impracticable. He stated, however, that the one-compartment standard had been applied to certain fast passenger steamers plying in the Mediterranean, the newest of which was 84 metres long.

SIR ARCHIBALD DENNY stated that he did not know of any small foreign-going vessels in the British mercantile marine which could be regarded as fast passenger steamers, but he thought the one-compartment standard could be applied to cargo-passenger vessels down to 275 feet long. He pointed out that the British diagram of margins for the one-compartment standard has not been carried down below 300 feet, but his Committee had suggested that if it were found practicable to carry the line beyond that point a uniform margin of 3 per cent. all fore and aft might be prescribed.

THE FRENCH DELEGATES thought it desirable that the rules should be such that vessels below 300 feet could be dealt with if necessary, as otherwise such vessels, being free from restrictions as to sub-division, would have an unfair advantage over those above 300 feet in length. They explained that their idea was to determine the maximum permissible length of compartment by multiplying the floodable length (calculated for unity permeability) by a factor which would begin at a small figure (say 3 or 33) for the largest and fastest vessels, and would increase with decrease in length and speed. For vessels under 300 feet long this factor might be greater than unity, and in fact, the highest value proposed was 1.6.

PROFESSOR PAGEL, in reply to Sir Archibald Denny, said he did not contemplate that if a lower limit of length for the application of sub-division rules were fixed, the vessels below this limit should be forbidden to carry passengers or have the number of passengers specially limited.

As regards the question of the routes traversed, it was suggested that rules as to sub-division might apply to vessels (1) going more than a certain distance from shore, or (2) going between ports more than a certain distance apart, or (3) going outside certain defined geographical limits. Sir John Biles explained how the matter was being dealt with in another Committee, and that information was being collected which might enable the point to be satisfactorily decided. It was agreed to call attention to the point by appealing to the Sub-Committee's resolutions a note stating that the Conference would define "foreign-going ocean passenger vessels."

As regards the question of the number of passengers which should make a vessel subject to sub-division, Professor Pagel suggested that this number should be fifty. The Chairman explained that, under United States law, a vessel which carries only one passenger became a passenger vessel, and Sir Archibald Denny mentioned that in the United Kingdom steamers carrying over twelve passengers must have the Board of Trade passenger certificate, but this had not, up to the present, involved compliance with special rules as to sub-division.
It seemed to be generally agreed that, for the purpose of applying rules as to sub-division, it would be possible, and might be desirable, to fix a different number from the number characterising a passenger steamer for other purposes, but Sir Archibald Denny pointed out that this might have a detrimental effect on existing ships if not sub-divided to comply with the new regulations.

THE CHAIRMAN read a paragraph he had drafted respecting existing vessels, and after discussion it was agreed to redraft this and consider it at a later meeting. Sir Archibald Denny expressed the opinion that it would be impracticable to alter the sub-division of existing vessels, but that in points such as watertight doors, pumping arrangements, &c., improvements might be effected. Professor Pagel suggested that something could be done as regards strengthening bulkheads in existing vessels.

It was agreed to be desirable that no Government should interfere with non-national existing ships, but that each Administration should be responsible for its own vessels in this respect. The meaning of the term "existing vessels" was discussed, and it was agreed that this should include vessels under construction at the time any rules came into force.

It was decided to call attention to the point by appending to the Sub-Committee's resolution regarding existing vessels a note stating that the Conference would define the term "existing vessels."

THE CHAIRMAN read the paragraphs which he had drafted in regard to new vessels, and explained that, while it might not be possible for the Conference to work out in detail the principles expressed in these paragraphs, he thought a basis for further advance would be secured if agreement on these fundamental principles could be attained.

After discussion, it was agreed to alter the paragraphs in some respects and consider them further at another meeting.

During the meeting the question of the application of sub-division rules to vessels carrying large numbers of coolies, pilgrims, or passengers transported under similar conditions was discussed, and it was agreed that, on account of local conditions, economic and other reasons, this presented a serious difficulty which would require careful consideration.

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**MEETING OF SATURDAY MORNING, NOVEMBER 22, 1913.**

All the members were present.

THE CHAIRMAN's suggested general principles, as amended at the previous meeting, were considered. It was agreed to postpone consideration of the general question of laws and regulations governing construction and tonnage measurement of vessels, and their relation to the height of bulkheads and other structural arrangements providing increased safety, and the paragraph on this point was therefore omitted from the list under immediate consideration.

The remaining paragraphs were discussed, altered, and approved for submission to the Main Committee, the Chairman explaining that in working them out in detail the various questions which had been raised as to the limitations of length, number of passengers, &c., would have to be considered, and he would make this clear to the Main Committee.

THE CHAIRMAN asked for suggestions as to subsidiary or supplementary questions for consideration in connection with those already agreed to. Several suggestions were made, and the Chairman asked that the members should send him any others that occurred to them.

During the discussion PROFESSOR PAGEL mentioned that he would be glad if he could substitute one table for the two now embodied in the German regulations, and said that the British method of assessing the permeability might enable this to be done, though he could not say definitely.

MM. BORIS and DE BERLHE gave further information as to the French proposals, and explained that the element of speed was introduced as it was an index
of the nature of the service in which a vessel was engaged, but they admitted that a better criterion in this respect might possibly be discovered.

A statement of the general principles involved in the British proposals as to sub-division was furnished to each member of the Committee.

The Sub-Committee adjourned sine die.
ALL the members of the Committee were present, except MM. Kersey, Höst, Wierdema, Wilmink, and Loviaguin.

THE CHAIRMAN referred to the work of the Sub-Committee appointed at the second meeting, and reported that the Sub-Committee had agreed on certain general principles for foreign-going ocean passenger steamers. These general principles included elements common to the proposals as to sub-division submitted by the German, French, and British Delegations respectively, and he thought they would form a basis for the further work of the Committee as regards sub-division. For this purpose he thought it would be well to refer them to a Sub-Committee, which would consider, among other things, the best method of carrying these general principles into effect. He also thought it would be well to form two other Sub-Committees, one of which would consider the construction of bulkheads and watertight decks, openings in bulkheads and in ship’s side, double bottoms, &c. The other would consider the questions mentioned in paragraphs 6, 7, and 8 of the document entitled “Questions before the Conference,” i.e., arrangements for surveying passenger steamers, principles which should govern the survey, and provisions against breakdown. In order to facilitate the consideration of these suggestions, the Chairman had drafted lists of points which might be considered by each of the three Sub-Committees, and he had also drafted provisional lists of the members who might be appointed on each Sub-Committee. He desired to say, however, that while he had attempted to allocate to each Sub-Committee those members of the main Committee who seemed specially suitable in view of the subjects to be dealt with, he desired that the Delegations concerned should feel entirely free to suggest such changes in distribution as might seem to them desirable. He also desired to emphasise the point that any member of the Committee would be at liberty to attend the meetings of any of the three Sub-Committees should his Delegation so desire, bearing in mind, of course, the requirements of the Sub-Committee to which especially assigned.

SIR JOHN BILES (Great Britain) moved the adoption of the “General Principles” recommended by the Sub-Committee. He thought that these, if adopted as the basis of further discussion as regards sub-division, would enable all the necessary points to be discussed with complete freedom.

M. BORIS (France) seconded the motion, which was then put to the meeting by the Chairman, and, in the absence of objection, agreed to.

SUGGESTED GENERAL PRINCIPLES FOR FOREIGN-GOING OCEAN PASSENGER STEAMERS.

For New Vessels.

1. Ships should be as efficiently subdivided as is practicable, having regard to the nature of the services for which they are intended.

2. It is necessary to have a system of curves or tables or a combination of curves and tables which shall enable the height and spacing of bulkheads to be determined according to permeability for vessels of all practicable dimensions, proportions of freeboard, sheer, block coefficient, &c.

3. It is necessary to determine the permeability which should be assumed in all cases in order to provide a height and

PRINCIPES GÉNÉRAUX PROPOSÉS POUR LES NAVIRES INTERNATIONAUX TRANS-OCÉANIQUES À PASSAGERS.

Navires à Construire.

1. Les navires doivent être compartimentées aussi efficacement que possible, en regard à la nature du trafic auquel ils sont destinés.

2. Il est nécessaire d’avoir un système de courbes ou de tables, ou une combinaison de courbes et de tables pour permettre de déterminer, suivant la perméabilité, les hauteurs et espacements de cloisons des navires présentant toutes les dimensions, francs-bords, tontures, coefficients de volume, &c., pratiquement employés.

3. Il est nécessaire de déterminer, dans chaque cas, la valeur qui sera supposée à la perméabilité, pour prévoir les hauteurs
spacing of bulkheads which shall ensure that a vessel, when flooded in some prescribed way, shall not be submerged beyond some definite floating line.

4. It is necessary to determine in all cases what is the proper definite floating line beyond which a vessel shall not be submerged when flooded in some prescribed way.

5. It is necessary to determine in all cases what is the permissible extent of flooding which shall be provided for by the bulkhead sub-division.

For Existing Vessels.

It is not practicable for the Committee to lay down definite principles with regard to bulkhead sub-division for all existing foreign-going ocean passenger vessels, and the Committee is of opinion that arrangements on existing ships should be considered on their merits by the Administration of the country to which each vessel belongs with a view to improvements which provide increased safety where practicable.

* The Conference will define the meaning of the terms "existing" and "foreign-going ocean."*  

et espacements de cloisons d’un navire telles que celui-ci, dans certaines conditions d’envahissement réglementaires, ne s’immerge pas au delà d’une ligne de flottaison fixée.

4. Il est nécessaire de déterminer, dans chaque cas, la ligne de flottaison convenable au delà de laquelle un navire ne doit pas s’immerger lorsqu’il se trouve envahi dans certaines conditions réglementaires.

5. Il est nécessaire de déterminer, dans chaque cas, sur quelle portion du navire s’étend l’envahissement admissible, en prévision duquel le cloisonnement doit être établi.

Navires en Service.

Il n’est pas possible à la Commission de poser des règles fixées en ce qui concerne les principes de cloisonnement de tous les navires internationaux trans-océaniques* à passagers en service,* et la Commission emet l’avis que les dispositions de ces navires doivent faire l’objet pour chacun d’eux d’un examen de la part du Gouvernement de son pavillon, en vue des améliorations qu’il serait possible d’apporter pour accroître la sécurité.

* La Conférence devra définir le sens des expressions "en service" et "internationaux trans-océaniques."*  

The division of the work of the Committee into three parts, as shown in the lists appended to these Minutes, and the establishment of three Sub-Committees to deal with these, as suggested by the Chairman, were then agreed to, and the membership of the Sub-Committees fixed as follows:—

1st Sub-Committee (on Sub-Division).

Admiral Capps (Chairman).  
Professor Pagel.  
M. McBride.  
M. Palm.  
M. Pierrard.  

M. Boris.  
Sir Archibald Denny.  
General Meana.  
M. Bruhn.  
Professor Vossnack.

2nd Sub-Committee (on Strength of Bulkheads, &c.).

Sir John Biles (Chairman).  
M. Walter.  
M. Ferguson.  
M. Machay.  
M. Duguid.  

M. Höst.  
M. Grojons.  
Colonel Bonfiglietti.  
M. Wiljink.  
M. Nilsson.

3rd Sub-Committee (on Survey of Passenger Steamers, &c.).

M. Rasmussen (Chairman).  
M. Smith.  
M. Kersey.  
M. de Berlhe.  

M. Archer.  
M. Barroccellii.  
M. Wierdsem.  
M. Laviaguin.

Dr. Riess (Germany) had been suggested as Chairman for the third Sub-Committee, but, in view of pressure of work on other Committees, he requested to be
relieved of Sub-Committee work. M. Steinacker (Hungary) also requested to be relieved of Sub-Committee work on account of necessary absence.

SIR ARCHIBALD DENNY (Great Britain) asked the Chairman for information as to the second paragraph of the Chairman’s list of suggested items for the consideration of No. 1 Sub-Committee. This paragraph related to initial stability of ships.

THE CHAIRMAN explained that the Australian Delegate at the Conference had written to Lord Mersey, the President, asking that the question of initial stability might be considered. Lord Mersey had referred the matter to the Committee on Safety of Construction, and the Chairman had therefore included this item in his list in order that it might be considered, so far as time and other circumstances would allow.

M. BORIS (France) was of opinion that it would not be possible to assign a definite initial stability to every ship, but he desired to emphasise the facility with which stability could be taken into consideration in fixing the sub-division of ships. In this connection, he referred to the German curves based on the consideration of trim only, which, if applied without correction, would lead to very long compartments amidships. If flooded, such compartments would entail the capsizing of the ship; but, to guard against this, the German rules limited the length of compartments to 28 metres. He then explained that the length of compartments could be limited by the consideration of transverse stability, as well as trim, and the combination of the two results showed that the final flooding curve should be deduced from the curve based on trim considerations only, by the reduction of its ordinates in the middle part. In conclusion, he invited the Committee, in drawing up principles of sub-division, not to condemn the consideration of stability before they had examined the French proposals.

After a short discussion of various points regarding the work, composition, and meetings of the Sub-Committees, the Committee adjourned on the understanding that the members would be notified of the date of the next meeting in due course.

Appendix to Minutes of Third Meeting.

**Items for consideration of First Sub-Committee.**

1. In the sub-division of vessels into watertight compartments, latitude to be given in the use of transverse and longitudinal bulkheads and combinations of same, in order that the prescribed requirements as to buoyancy under damaged conditions may be met in the most advantageous manner in any particular design. Where longitudinal bulkheads are introduced, provision of adequate transverse stability under damaged conditions to be secured.

2. Stability calculations to be made for all vessels constructed, and stability curves furnished to masters and owners of vessels with full explanatory notes indicating condition of vessel when light and loaded under certain definite conditions, and safe limitations of loading with cargoes of various densities.

3. Definitions.—Length; breadth; depth; freeboard; draught; sheer;

\[
\begin{align*}
\text{Margin of safety line;} \\
\text{Floating line;} \\
\text{Margin line;} \\
\text{Coefficient of permeability;}
\end{align*}
\]

and any other terms of which the exact meanings may be of importance in the principles enunciated.

4. **Limit of size of Ships to which Rules shall be applied.**—What is the smallest length or least size of foreign-going ocean passenger vessel which can be so sub-divided that under average conditions of loading she will not be submerged beyond the bulkhead deck with any—

(a.) Three adjacent compartments;
(b.) Two adjacent compartments;
(c.) One compartment;

in free communication with the sea?

* See page 191.
§ 5. Permissible extent of Flooding.

(See item 4 above.)

§ 4. Floating Line.

Should the floating line be fixed at some definite distance, or distance-ratio, below the bulkhead deck, for all ships, and, if so, what should this distance or distance-ratio be? If not, on what basis should the distance of the floating line from the bulkhead deck be determined in the various cases to be dealt with?

§ 3. Permeability.

Should the permeability assumed be based on the water-excluding properties of the various spaces, and, if so, can average coefficients of permeability be assigned to the different classes of spaces, and what should these average coefficients be? If the permeability assumed has some other basis than that described above, what should that basis be?

§ 2. System of Curves or Tables for determining Spacing and Height of Bulkheads.

If the system of curves or tables provided is such as to take into account all the geometrical characteristics of a vessel, should direct calculations be permitted, and, if so, under what conditions and limitations.

7. General requirements for spacing and height of transverse bulkheads, and location and extent of longitudinal bulkheads and watertight decks.

8. If the permeability assumed for spaces forward and abaft the machinery spaces is such as to take correct account of the amount of cargo space and passenger space respectively in any vessel, is it necessary that the other two elements in sub-division (viz., distance of floating line from bulkhead deck, and number of compartments into which the loadable length is divided) should vary for vessels of the same length but of different type or engaged in different service?

9. Should rules as to sub-division be prescribed for vessels below the smallest length or least size covered by the questions and conditions set forth in preceding paragraphs?

ITEMS FOR CONSIDERATION OF SECOND SUB-COMMITTEE.

Bulkheads.

Character and construction of watertight bulkheads...[Transverse."
Longitudinal."
Wing."
Stepped."

Physical tests to be applied to same while under construction.

Prohibition of changes in, except when authorised.

Double Bottoms.

Character and extent of double bottoms.

Wells.

Openings in Watertight Bulkheads below Bulkhead Deck.

Watertight bulkheads below bulkhead deck. Watertightness not to be impaired by openings, except when absolutely necessary—

1. Doors.
2. Scuttles and bolted plates.
4. Trunks (for passage of crew, forced draught, refrigeration, &c.)
5. Openings for drainage pipes, electric wires, &c.

**Watertight doors—**

Type, hinged or sliding.
Location. (Are they absolutely necessary in any main transverse watertight bulkhead below bulkhead deck; if so, where, and with what restrictions?)
Material used in their construction.
Operation (hand, mechanical, automatic).
Stations from which operated.
Necessary general features of design.
Indicating and alarm system and emergency control.
Character and frequency of inspection and tests of watertight-door system, and all mechanism and indicators connected therewith.
General watertight-door-closing drills.
Record of all tests and drills to be entered in log, and note made where doors or mechanism are out of order.
Are they to be kept closed except when opening necessary for working of vessel?
Shall watertight doors be closed at night, in foggy weather, and when in vicinity of icebergs?

**Watertight Decks.**

Location, character, strength, and tests.
Location and method of closing openings in same.
Scuppers.
Preservation of watertight integrity by prohibiting unauthorised changes in same, and note made in ship's log of all changes affecting watertight integrity.

**Openings in Side.**

Side scuttles, chutes, scuppers, &c.—When permissible, and location with respect to water-line.
Air ports.—When permissible, and location with respect to water-line.

**Machinery Spaces.**

Division by bulkheads.
Grouping of boiler rooms with respect to watertight compartments.
Maximum length of watertight compartments in machinery space.
Practicability and desirability of wing bulkheads in vessels of broad beam.

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**Items for Consideration of Third Sub-Committee.**

Questions contained in paragraphs 6, 7, and 8 of "Questions before the Conference."

1. Establishment of uniform code of general requirements.
2. Possible inclusion in the "National Certificate" referred to in section (a), paragraph 4, of "Questions before the Conference," of items which will cover the specific requirements as to hull, machinery, fittings, &c., which may be adopted by the Conference.
3. In large new passenger steamers, engineering considerations will possibly control and compel duplication of propelling machinery. General rules for duplication of pumps, dynamos, steering engines, and other auxiliaries to be considered.
Committee on Safety of Construction.

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SUB-COMMITTEE No. 1 (SUB-DIVISION).

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First Meeting.—November 26, 1913, 3 p.m.

Present: Admiral Capps (Chairman), M.M. Pagel, McBride, Palm, Machay, Pierrard, Boris, de Berlhe, Grolous, Sir A. Denny, Sir J. Biles, Meana, Bruhn, and Vossnack.

THE CHAIRMAN referred to the list of items for consideration which had been referred to the Sub-Committee, and, on his suggestion, it was agreed to postpone consideration of paragraph 1 (sub-division generally) and 2 (stability) in order that the more fundamental questions might be dealt with.

As regards paragraph 3, the Chairman asked the members to draw up definitions of the various terms mentioned in the paragraph, and of any other terms which they thought should be defined. The suggested definitions would then be considered at a further meeting.

The Sub-Committee then considered paragraphs 4 and 9 (lower limit of size for the various standards of sub-division), and after discussion it was decided that it would not at present be advisable to prescribe the lower limit of size of vessel which could be so sub-divided that, under average conditions of loading, she would not be submerged beyond the bulkhead deck when one compartment was flooded. It was suggested that the definition of "foreign-going," when framed, might exclude the smaller vessels and thus solve the difficulty.

DR. BRUHN (Norway) asked whether, if a lower limit of size was fixed for the application of the one-compartment standard, the Committee would suggest regulations for the sub-division of vessels below this limit, e.g., as regards the fitting of peak and machinery bulkheads.

It was agreed that this should be considered, and the Chairman asked Dr. Bruhn and the other members of the Committee to draw up suggestions as to the regulations which might be recommended in this connection, these to provide as great security as, and, as far as practicable, greater security than that provided by existing regulations on the subject. It was pointed out that the case of vessels with their machinery aft should be provided for. Attention was also called to the possibility of dealing with the matter by fixing the maximum size of compartments, it being stated by representatives from France and Italy respectively that a limit of 90 feet is now the rule in France, and 70 feet the rule in Italy for emigrant ships.

The question of the upper limit of size for the application of the one-compartment standard was then dealt with. It was pointed out that the German rules apply the two-compartment standard to fast passenger vessels over 120 metres long with a permeability of 47 throughout, but the British memorandum, using average permeabilities depending on the appropriation of the spaces in the vessels dealt with, does not apply the two-compartment standard to passenger vessels of the highest type under 500 feet in length, and Sir Archibald Denny said his Committee had experienced difficulty in applying it to cargo-passenger steamers (as at present designed) below 600 feet in length. MM. Boris and de Berlhe (France) advocated their system of multiplying the floodable length by a varying factor, which they thought got over or lessened the difficulty.

A prolonged discussion took place, but no definite conclusion was arrived at.

The hour of meeting of the second Sub-Committee having arrived, the first Sub-Committee adjourned until 2:15 p.m., the 27th November, 1913.

[1244—87]  
* See page 44.
Second Meeting.—November 27, 1913, 2:45 p.m.

Present: Admiral Capps (Chairman), MM. Pagel, McBride, Palm, Machay, Pierrard, Kersey, Boris, de Berlhe, Grolins, Sir A. Denny, Sir J. Biles, Meana, Bonfiglietti, Barricelli, Bruhn, and Vossack.

THE CHAIRMAN stated that, in accordance with his request made at the previous meeting, Dr. Bruhn had handed in suggestions as to definitions of terms, and as to minimum requirements as regards number of bulkheads in small passenger vessels. It was agreed to have copies of these made for each member of the Sub-Committee, and to consider them at a subsequent meeting together with any other suggestions submitted by other members.

The Sub-Committee then proceeded to consider certain general principles representing the views of Professor Pagel (which coincided to a certain extent with Sir A. Denny's statement of the general principles involved in the British proposals as to sub-division). The first of Professor Pagel's general principles, relating to strength of bulkheads, was referred, on Sir John Biles' suggestion, to Sub-Committee No. 2.

The second general principle, providing that in the smallest vessel to which any given standard of sub-division applied, the bulkhead deck should not be immersed when the prescribed number of compartments were flooded under average conditions of loading, was then considered, and a long discussion ensued on the term "bulkhead deck," the French Delegation explaining that they preferred to avoid the use of this term, and to refer only to the margin line, or floating line, which in their system was measured for each compartment from the top of the lower of the two bulkheads bounding the compartments, thus allowing greater latitude in the design of a vessel by providing for bulkheads of different heights. Sir A. Denny (Great Britain) agreed with the French delegates on the desirability of the acceptance of this principle, but pointed out that it would necessitate great care in the placing of openings through the ship's side.

DR. BRUHN (Norway) suggested that the condition enunciated in the general principle under consideration would apply, not only to the smallest vessel, but to any vessel to which the standard in question applied; but it was pointed out by Professor Pagel (Germany) and Sir A. Denny that the reason for referring to the smallest vessel was to indicate that the larger vessels would have a margin, and would not be immersed so far as to the bulkhead deck. It was, however, agreed, on Professor Pagel's suggestion, to substitute the words "even in the smallest vessel" for the words "in the smallest vessel" in Professor Pagel's suggested general principle.

Finally, the Chairman asked the members to put in writing and hand to the Secretaries their suggestions as to the form of expressing the general principles which had been under discussion, also to put in writing and hand to the Secretaries the draft of any other general principles which should, in their opinion, be adopted by the Sub-Committee. These would be copied and considered at a subsequent meeting.

Adjourned to 3 p.m., the 28th November, 1913.
Third Meeting.—28th November, 1913, 3 p.m.

Present: Admiral Capps (Chairman), MM. Pagel, McBride, Palm, Machay, Pierrard, Dugnud, Rasmussen, Boris, de Berlhe, Grolous, Sir A. Denny, Sir J. Biles, Meana, Bonaglletti, Barcelli, Bruhn, and Vossnack.

THE CHAIRMAN referred to the request which he had made at the previous meeting for suggestions as to definitions and general principles, and as it was understood that some members of the Sub-Committee were still engaged in preparing definitions, it was agreed to postpone this subject to a subsequent meeting.

THE CHAIRMAN then announced that Sir Archibald Denny, M. Pierrard, and M. Boris, had prepared material for consideration as regards general principles, and he called on Sir Archibald Denny to speak.

SIR ARCHIBALD DENNY (Great Britain) suggested to the Sub-Committee the desirability of going back to the general principles adopted by the main Committee at their third meeting, and he pointed out that, apart altogether from the various proposals as to sub-division which had already been drawn up, there were three, and only three, elements to be decided in determining the sub-division of any particular vessel, viz., (1) the permeability, (2) the number of compartments into which the floatable length should be divided, and (3) the margin.

As regards permeability, a naval architect working independently of regulations would probably fix the permeabilities of the machinery spaces (including bunkers) and the passenger and empty spaces, by calculation, and would probably arrive at about 95 per cent. for passenger and empty spaces and 80 per cent. for machinery spaces (including bunkers). These were the figures adopted in the British memorandum as to sub-division, and Sir Archibald Denny considered they were supported by the figures in the German regulations also. As regards permeability of cargo spaces it was necessary to assume an average based on investigations and on judgment. The figure of 60 per cent. adopted by the British Committee was supported by the lengthy enquiries of a German Committee, and Sir Archibald Denny thought it was also supported by the provisions of the German regulations.

As regards number of compartments flooded, if only fast or exclusively passenger vessels were considered, it seemed that the German regulations required effective two-compartment sub-division for vessels over 150 metres (say 500 feet) long; the French requirements seemed to be the same, and the British Committee had made no proposals for this type of vessel below 500 feet. Similarly the lower limit of the one-compartment standard seemed to be 285 or 300 feet, and the British Committee had suggested 350 feet for the three-compartment standard.

As regards margin lines, the principle that safety should increase with increase in length required that, instead of all vessels between 300 and 500 feet being subdivided so as to float with the deck line at the water when one compartment was flooded (and similarly for two compartments flooded between 500 and 950 feet), the longer vessels should float with a margin of safety, and the change from one to two compartments floatable, and from two to three compartments, should be made more or less gradually.

The three questions before the Committee were thus: (1) What permeabilities should be assumed as standards for the different spaces? (2) At what lengths should a change be made from one to two compartments, and from two to three compartments floatable? and (3) Should the change be made by continuous and imperceptible gradation, or by sudden jumps? These points being decided, each country could (if it were found impossible to attain a common set of rules) amend its own proposals to meet the case.

In conclusion, Sir Archibald Denny suggested that the question of permeability should first be studied, but again emphasised that the three elements he had named were not divorcible but closely bound up one with another.

THE CHAIRMAN thanked Sir A. Denny for his remarks and called on M. Pierrard.

M. PIERRARD (Belgium) said he had endeavoured to study fully the proposals of the British, German, and French Delegations and he must admit that he had found
himself confronted with three systems between which a choice was extremely difficult. At the same time no one of the three systems could, in his opinion, be adopted in its entirety for the purpose of international rules.

There being usually only one solution of an accurately stated problem, as was the one before the Committee, it seemed likely that the three proposals differed only in their method of attaining their results, and M. Pierrard was pleased to know that his old friend Sir Archibald Denny was of a similar opinion.

The previous discussions had shown the difficulty of correctly taking account of the three elements of permeability, margin, and length of compartment. The ideal should be to have one formula combining all three elements.

At the preceding meeting the difficulty had been found of coming to an understanding as regards the line beyond which the vessel should not be submerged, but it would be generally agreed that the water should in no case come above the top of a bulkhead. It would also be agreed that the severity of the rules should increase in passing from short to long vessels, and certain inconveniences arising from this increase in severity (viz., sudden jumps in the number of bulkheads) had been partially compensated for by prescribing a varying margin line or by assuming a varying permeability. In his suggested system M. Pierrard had tried to attain complete continuity, and he was glad to find himself in agreement with his French colleagues in this aim.

His first rule defining a flooding curve embodied a general definition on which agreement would be easy, while leaving freedom for each country to adopt such method of constructing the curve as might seem most suitable.

The assumptions referred to in the first rule must next be dealt with, and in this connexion M. Pierrard thought the coefficients of permeability determined by the British Bulkheads Committee might be accepted, as proposed in his second suggested rule.

The object of the third rule was to attain the complete continuity of severity to which he had already referred, and for this purpose he proposed that the floodable length should be multiplied by a certain varying fraction. The fraction according to which this fraction should vary might be adjusted so as to give results satisfactory to any of the members. He did not advocate any definite formula, and it was only as an illustration that he had given a set of values of that fraction, in terms of the length. The values had been selected so as to give approximately the same results as the German curves.

The fraction might, if considered preferable, be based on other elements than the length only.

The third rule did not exclude the possibility of correcting the length of a compartment if protected by lateral or other secondary sub-division, as suggested in the French memorandum.

As for the fourth rule, concerning special sub-division at the forward end, this was in agreement with all the proposals before the Committee.

M. Pierrard concluded by remarking that his proposals seemed of such a character that they might be accepted by many of the members, and he therefore suggested that they might be submitted to the consideration of the Committee.

THE CHAIRMAN thanked M. Pierrard for his remarks, and called on M. Boris.

M. BORIS (France) said he had been reconsidering the French proposals in order to see what alterations would be necessary to meet objections which had been raised, and as an example he mentioned that the word "service" ("travaux") might be substituted for "speed" ("vitesse") in paragraph 3 of the French memorandum. He had intended to suggest other alterations that might be made, but he was so much in accord with M. Pierrard’s views that he would base his remarks on them. Regarding M. Pierrard’s proposals, he had one or two remarks to make, the most important being as regards the criterion of the ship’s service. M. Pierrard’s formula of permeability was the same as the British formula, but M. Boris had examined this, and was afraid that in some cases it might not be sufficiently accurate or effective. The French criterion was the speed, but he recognised that this might be modified to meet the objections which had been made, and he proposed to suggest a new criterion which combined several elements, viz.:

1. Speed, as used in formula \( \frac{V}{\sqrt{L}} \) (Froude, Rota.)
2. Ratio between cargo space and passenger space or total space, or ratio between deadweight and displacement, \( \frac{\dot{d}}{p} \).
3. Ratio between length of machinery space to total length of ship, \( \frac{L}{L} \)

4. Fineness, measured by the formula—

\[
\frac{W}{T^2} \quad (W = \text{volume of hull}, \quad T = \text{draught}). \quad \text{(Bertin.)}
\]

Substituting for \( P \) in No. 2 its equivalent of \( W \times (\text{density of water}) \), and combining the four formulas, M. Boris arrived at the expression of rating:—

\[
R = \left[ \frac{\sqrt{\frac{L}{W}}}{\sqrt{\frac{Q}{W} \times \frac{T^2}{Q}}} \right] \text{ or } V \sqrt{\frac{P}{Q}};
\]

and he suggested that this formula would form a good criterion of the ship’s service. In conclusion, he stated the result of applying the formula to certain ships as follows:—

<table>
<thead>
<tr>
<th>Country</th>
<th>Name</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>A. de Genouilly</td>
<td>21.6</td>
</tr>
<tr>
<td></td>
<td>Rochambeau</td>
<td>44.7</td>
</tr>
</tbody>
</table>

M. DE BERLHE (France) expressed the opinion that as a whole M. Pierrard’s suggestions were very logical. He thought it was not sufficiently accurate to accept the British figures for permeability, for instance, when there was cargo below passenger accommodation. He observed that M. Pierrard had suggested a fraction varying with the length. He was of opinion that in selecting a criterion one must take care not to produce too great severity, and he thought the figures given in M. Pierrard’s example were rather severe, but as M. Pierrard himself had said, the figures were only illustrative. He specially approved the proposals of M. Pierrard on account of his having altogether given up the ideas of one, two, and three compartments and having considered only the floodable length.

SIR ARCHIBALD DENNY (Great Britain) congratulated M. Pierrard on his proposals, which might form a basis of agreement, but speaking on details and on the question of criterion raised by M. Boris, he said that as the question now stood before the Committee, the first thing which the Committee had to decide was whether they wished to have the same measure of safety for all ships of the same length. If so, no further criterion would be necessary.

PROFESSOR PAGEL (Germany) stated that as a method of introducing the three fundamental elements mentioned by Sir Archibald, the use of the German curves possessed the maximum simplicity. He said that when the results given by the use of the German curves had been compared with those of direct calculation, the former were always on the safe side, so that their use, in fact, involved a certain margin.

As to permeability, he wished to add that an enquiry made in Germany came to the following results:—

Out of twenty voyages examined the average permeability of cargo spaces for eleven of the voyages was found to be 61, and 407 for the remaining nine voyages. As an average, 6 seemed to him a very good one, and he would personally make no objection to its adoption.

For engine rooms, the German enquiry came to the conclusion that 8 is, perhaps, rather a low coefficient.

The method suggested by the British Delegation for finding the average permeability of a compartment containing cargo and accommodation seemed to him, speaking for himself, a very good one, specially because, by using that method, the distinction between fast passenger and cargo-passenger steamers might automatically disappear.

Adjourned to 10 A.M., the 1st December, 1913.
Fourth Meeting.—1st December, 1913, 10 a.m.

Present: Admiral Capes (Chairman), MM. Pagel, Walter, McBride, Palm, Pierrard, Boris, de Berlihe, Sir Archibald Denny (accompained by Professor Welch), MM. Meana, Bonfiglietti, Barricelli, Bruhn, and Vossnack.

The Minutes of the first and second meetings of the Sub-Committee were approved, subject to slight alterations suggested by the Chairman and by Dr. Bruhn.

The Chairman referred to the points under discussion at the previous meeting of the Sub-Committee, and thought that the Sub-Committee should now consider the question suggested by Sir A. Denny, namely, whether there should be only one standard of subdivision for all ships of the same length, or whether different standards should be prescribed for different classes of ships. He stated that on the previous Saturday he had attended a meeting of Chairmen of Committees, presided over by Lord Mersey, at which the definitions of certain terms applicable to the work of the whole Conference had been discussed, e.g., as regards the meaning of the term "foreign-going passenger vessel," from the point of view of size, routes traversed, &c. These suggested definitions, when agreed upon, would have a bearing on the work of the Committee, but he thought the Committee might profitably consider now whether different standards of subdivision should be prescribed for vessels whose service was not of the same character.

Professor Pagel (Germany) said that he thought the British method of calculating permeability might enable the two classes of steamers in the German regulations to be amalgamated, but it was impossible to speak definitely as to this until further investigation had been made.

Sir Archibald Denny (Great Britain) said that his Committee came to the conclusion that the German regulations do not require different measures of safety for passenger vessels and cargo-passenger vessels over 500 feet, but they thought that for vessels below 500 feet the respective standards were somewhat different. His Committee found difficulty in applying the two-compartment standard to cargo-passenger vessels between 500 feet and 600 feet in length, and he thought the French proposals indicated the same difficulty. He had reason to believe that the views of prominent British shipowners were widely divergent on the question whether different standards should be prescribed for different classes of ships.

M. Boris (France) said that the view of the French delegates was that steamers devoted exclusively to passengers should be much more effectively subdivided than cargo-passenger steamers. The British method of calculating permeabilities did not attain this result, but merely produced an equal measure of safety with different spacings of bulkheads, according to the appropriation of the spaces in the ships dealt with. He referred to the suggested "criterion of service" which he had explained at the previous meeting, and it was arranged that the paper which he had prepared explaining the basis of this criterion and showing its application to a number of different ships should be circulated among the members of the Committee.

The Chairman deprecated any attempt to include in any general treatment all the possible exceptional cases, as he feared such an attempt would only lead to difficulty and prevent the Committee reaching any conclusions whatever. He thought that it would be better for the present to consider the ordinary ocean-going passenger steamers, and he suggested that the Committee should consider the question whether any distinction need be made between the different types of such vessels over 500 feet in length, or whether one standard could be laid down which would apply to all.

Professor Pagel (Germany) agreed that M. Boris’ idea was a scientific one, but in practice the spacing of bulkheads was determined by many different considerations, e.g., length and arrangement of machinery-space, superstructures, &c., and as a rule the question of floodable length arises in each vessel only for one compartment or group of compartments, the others being smaller than the permissible maximum. Hence an exact criterion might be found unnecessary for practical purposes.

Sir Archibald Denny (Great Britain), referring to the Chairman’s question, said that he was prepared to agree in applying one standard to all vessels above 600 feet in length.
THE CHAIRMAN thought the Committee should be careful not to give too much weight to considerations based on previous practice in designing ships, and should make every effort to secure in new passenger vessels the maximum of safety consistent with the service upon which employed. He thought that an agreement confined to vessels over 600 feet in length would only cover a very small proportion of cargo-passenger vessels.

M. DE BERLHE (France) said that, while it might be possible to have only one standard for the large vessels, he did not think this was so as regards smaller vessels, say between 500 and 600 feet. For such vessels a distinction must be made according to the nature of the service in which the vessels are engaged. This distinction could be brought about by slightly varying M. Pierrard’s factor and providing different factors for ships of the same length but engaged in different services.

M. PIERRARD (Belgium) said that, when he had first read the French regulations and observed that speed was used as a criterion, he was not in agreement with the proposal, as the risks to which ships are exposed do not vary with their speed. He now understood, however, that speed was introduced only or mainly as an index to the service in which vessels were engaged, and in drawing up his suggested general principles he had avoided stating or implying that the length of a ship was the only feature to be taken into account when determining the appropriate coefficient.

Other features characteristic of the services of vessels might be introduced for the purpose of determining the coefficients, but he suggested that it might be found profitable and possible to come to an agreement as regards the first two of his suggested general principles, and to postpone until later the question as to the basis on which the coefficients should be determined.

M. BORIS (France) said he did not dispute M. Pierrard’s figures, but he thought that different figures should be used according to the nature of the services in which vessels of the same length are engaged.

DR. BRUNIN (Norway) said that, as the aim was to reach definite conclusions, it seemed inadvisable to attempt to include more elements than were absolutely necessary, as this would only complicate the discussion. Whatever rule might be arrived at, it was certain that amendment would be necessary, and therefore it seemed sufficient at present only to aim at rules of the simplest possible description. He suggested that the Committee should for the present take account only of the elements on which they were generally agreed, as it was impossible in the time available to determine the effect of more complicated formulae, and therefore there was no chance of a definite decision being arrived at regarding such formulae within a reasonable time. There seemed no reason, however, why the Committee should not arrive at simple rules applicable to all vessels.

After some further discussion the Chairman suggested that M. Pierrard’s suggested principles might form the basis of further discussion, and that for this purpose it was desired that the members of the Committee should put in writing before the next meeting any suggestions they might desire to submit as to the general principles which, in their opinion, should be considered in connection with or in substitution for M. Pierrard’s suggested rules.

THE CHAIRMAN then put to the meeting M. Pierrard’s first resolution as follows:

The flooding curve for a given vessel is a curve giving, for any particular point of the vessel’s length, the maximum percentage of the length of the vessel (having its centre at the point in question) which can be flooded under definite assumptions explained hereafter, without the ship being exposed to the danger of sinking.

SIR ARCHIBALD DENNY (Great Britain) pointed out that the phraseology of the resolution might have to be made more explicit as regards the extent of submersion of the vessel, but the general principle involved in the resolution was agreed to by the Committee.

THE CHAIRMAN then read M. Pierrard’s second resolution as follows:

The assumptions referred to concern the articles within the vessel representing non-permeable obstructions. It is assumed that these non-permeable volumes
represent 5 per cent. of the volume of compartments devoted to passenger accommodation, 20 per cent. for engine and boiler room, for peaks and coal bunkers, and 40 per cent. for cargo spaces.

He pointed out that in this case it was impossible to separate details from general principles, and suggested that the members should be prepared at the next meeting to state whether they could accept the resolution as it stood; and if not, what alterations they desired to make in it. The Chairman also suggested that the same course should be followed as regards M. Pierrard's third and fourth resolutions, which were as follows:

"3. Every vessel should be divided into a number of transverse compartments of such length that the length of any compartment does not exceed a fraction of the floodable length given by the flooding curve. That fraction should depend on the length of the vessel; it decreases when the length increases. The function of the vessel's length, according to which the above fraction varies, is to be determined. For instance, it might work out to the following results:

"Lengths: 260 300 400 420 500 600 700 800 850 900 feet.
"Fraction: 0·9 0·75 0·5 0·46 0·4 0·36 0·34 0·33 0·33.)"

"4. Besides the subdivision, as it results from the above rules, supplementary bulkheads must be provided at the forward end of the vessel."

Adjourned to 11 a.m., the 2nd December, 1913.
Fifth Meeting.—December 2, 1913, 11 a.m.

Present: Admiral Capps (Chairman), MM. Pagel, Walter, McBride, Palm, Machay, Pierrard, Boris, de Berlhe, Sir Archibald Denny (accompanied by Professor Welch), MM. Meana, Bonfiglietti, Barricelli, Bruhn, and Vossack.

THE CHAIRMAN announced that the Minutes of the two previous meetings would be circulated as soon as possible and considered at the next meeting of the Sub-Committee.

Referring to the subject under discussion at the time of adjournment of last meeting, the Chairman asked whether any member had any comments to make regarding the first of M. Pierrard’s general principles.

SIR ARCHIBALD DENNY (Great Britain), before dealing with M. Pierrard’s motion, mentioned that the German, French, and British delegates had had an informal conference on the previous day to elucidate points under discussion, and though they might not have reached any conclusions they had got to know each others’ difficulties, and obtained valuable information, especially from Professor Pagel as to the working of the German rules.

Regarding M. Pierrard’s suggested general principles, Sir A. Denny thought it would be advisable to confine the discussion for the present to vessels of the simplest type with a continuous bulkhead deck and with no erections. Consideration could later be given to the special case of vessels with erections or stepped bulkhead decks. He read a new resolution which he had drafted on these lines, and which he had endeavoured to frame in such a manner that it could be accepted by all the delegations. He also read, with the Chairman’s permission, the second resolution which he had prepared on the basis of M. Pierrard’s second suggested principle, but with alterations in details. After these new suggested resolutions had been discussed and amended, it was ordered that copies should be prepared for distribution to the members and for consideration at the next meeting.

On the suggestion of Professor Pagel it was agreed to draw up a definition of “volume,” and Sir A. Denny handed in a definition prepared by Professor Welch which appeared to meet the conditions, but was ordered to be printed for consideration with other definitions at a future date. It was also agreed to define the expression “machinery space” for the purposes of computing permeabilities, the British definition being used as a basis, and this definition also to be considered finally at a subsequent meeting.

M. DE BERLHE (France) pointed out that M. Pierrard’s first general principle and Sir A. Denny’s suggested amendments to that general principle both referred to flooding curves, whereas the French proposals were in the form of tables and not curves; and it was agreed that provision should be made for meeting this point when putting the Committee’s resolutions into final form.

In connection with M. Pierrard’s third suggested general principle, Sir A. Denny again mentioned that the British Bulkheads Committee had found considerable difficulty in applying the two-compartment standard to cargo-passerger vessels between 500 and 1000 feet long, and he understood that the French experts had found a similar difficulty. He also understood that the manner in which the difficulty had been got over in a number of cases under the German rules was to reduce the draught of the vessels dealt with below the draught permitted by the freeboard tables. He believed, however, that British cargo-passerger ships, except the very largest, were sometimes loaded down to the full draught allowed by the freeboard tables.

PROFESSOR PAGEL (Germany) confirmed Sir A. Denny’s statement, and said that the difference between the freeboard allowed by the freeboard tables and that required by the bulkhead spacing was in some cases as much as 3 or 4 feet.

M. WALTER (Germany) gave an instance of a vessel 463 feet long, the draught of which under the freeboard tables and under the bulkhead rules for cargo-passerger vessels was 29 feet 8½ inches, while the draught under the bulkhead rules for fast passenger steamer was 27 feet 6 inches. In the case of another vessel 524 feet long,
the bulkhead draught under both tables in the sub-division rules was the same as the draught in accordance with the freeboard tables.

M. BORIS (France) said that in practice the large passenger liners under the French flag sail with a much less draught than that allowed by the freeboard tables, the draught being in many cases limited by the position of the lowest tier of the side scuttles.

SIR A. DENNY (Great Britain) said that the calculations of the British Bulkheads Committee were based in most cases on the draught allowed by the freeboard tables, and that these draughts, in many cases, were necessary for ships under 500 feet in length when carrying certain classes of cargo.

THE CHAIRMAN invited particular attention to the importance of sub-division of passenger ships, and stated that such sub-division should not be unduly controlled by considerations based on the carriage of certain classes of cargo; and he suggested that if the Sub-Committee would try to break away to a certain extent from previous practice and confine their attention to what was possible in new ships, they could probably lay down minimum standards which would make a distinct advance over previous standards, and would be found quite practicable. The laying down of such standards would compel shipowners and shipbuilders who had not hitherto used their utmost endeavour to secure reasonable safety by sub-division, to comply with the conditions laid down in the same manner as had already been done by those owners and builders who had voluntarily adopted the standards laid down in the report of the British Bulkheads Committee of 1891. Even if the standards finally adopted represented minimum requirements, and were less severe than some members might consider practicable, the recommendations of the Committee might make provision for the adoption of more severe standards if found practicable after further investigation. He desired to emphasise the importance of agreeing on the main principles as a starting-point, and he again desired to raise the question whether it was necessary to have more than one standard for all vessels above a certain length.

SIR A. DENNY (Great Britain) said that he was prepared to agree that one standard was sufficient for all vessels over 600 feet in length, but he thought that for vessels below this length the question was not so easy. While he did not know of any British foreign-going vessels below 500 feet in length which could be described as pure passenger vessels, the British Mercantile Marine included vessels below this length of various types from the pure cargo vessel to vessels on which the carrying of passengers was of great importance, and his Committee had not at present decided whether it would be practicable to make one standard cover all these vessels. He pointed out that if one were to take the figures suggested in the British memorandum for the beginning of the one-compartment standard (300 feet), the change from one to two compartments (500 feet), and the change from two to three compartments (950 feet), it would be observed that, whereas the change from one to two compartments was a change of 100 per cent., and from two to three was a change of only 50 per cent., the former change took place within limits of 200 feet, and the latter within limits of 450 feet. Thus the increase in margin was clearly more rapid, and the effect of that increase was bound to be much more severe, for a small change of length in the former case than in the latter case.

THE CHAIRMAN then asked the Committee to direct their attention to M. Pierrard’s second suggested rule with the amendments suggested by Sir A. Denny, and asked whether any member had any objection to offer to the adoption of 5 per cent. deduction for passenger spaces and the forward and after peaks.

PROFESSOR PAGEL (Germany) explained that the German delegates were not authorised to alter the German bulkhead regulations or to commit their Government to accept resolutions involving alterations. They could only express their personal opinions and recommend their Bulkheads Committee to adopt the conclusions of the Conference. Subject to this condition he, personally, agreed with the deduction of 5 per cent. as proposed, and was prepared to recommend the German Committee to adopt it for use in conjunction with the other elements of sub-division.

M. BORIS (France) said that the French Delegation agreed with the figures of deduction suggested by M. Pierrard, and had used similar figures in determining the ratios embodied in their proposals.

No delegation offering any objection to the adoption of the deduction in question,
the Chairman announced that this would be considered as agreed to, subject, as regards the German Delegation, to the condition mentioned by Professor Pagel.

THE CHAIRMAN then put to the meeting the proposal that a deduction of 20 per cent. should be adopted for engine and boiler rooms, including coal bunkers within the machinery spaces, and this was agreed to in the same manner and subject to the same reservation on the part of the German delegates.

THE CHAIRMAN then put to the meeting the deduction of 40 per cent. for cargo spaces and other spaces not already provided for, and this was agreed to in the same manner and subject to the same reservation on the part of the German delegates.

DR. BRUHN (Norway) raised the question of trimming tanks other than peaks, and Sir A. Denny said that these should be taken as cargo spaces and have a deduction of 40 per cent.

SIR A. DENNY (Great Britain) pointed out that the British memorandum provides for the use of average permeabilities based on the actual or probable permeabilities of the various spaces in a vessel up to the margin line, whereas under M. Pierrard's resolution the average permeability would be based on the permeabilities of all the spaces up to the bulkhead deck. As the latter method would include a greater volume of passenger spaces (at a permeability of .35) than the former method this would mean that under M. Pierrard's resolution the permeabilities would be higher than was contemplated by the British Bulkheads Committee. The effect of these higher permeabilities could, however, be taken into account in fixing the margins, and in order to maintain the results intended by the British Committee it would be necessary to reduce the margin by some amount which could only be determined by investigation.

After some further discussion of the possibility of prescribing one uniform standard for all vessels over a certain length, the Chairman, in view of the hour, suggested that the discussion should be adjourned, and that the members should endeavour before the next meeting to formulate proposals as to the minimum standards which should be laid down. It might be possible to provide that ships complying with standards higher than these minima should have this stated in their certificates.

SIR A. DENNY reported that he had obtained certain particulars which would enable proposals to be drawn up as regards the minimum number of bulkheads in small vessels, and he proposed to confer regarding this matter with Dr. Bruhn, who had raised the point at a previous meeting.

THE CHAIRMAN said that the results of Sir A. Denny's and Dr. Bruhn's labours would be circulated among the members when available.

Adjourned to 10 a.m., the 5th December, 1913.
Sixth Meeting.—December 5, 1913, 10 a.m.

Present: Admiral Capps (Chairman), MM. Pagel, Walter, McBride, Palm, Machay, Pierrard. Boris, de Berlhe, Sir A. Denny, Meana, Bonfiglietti, Barricelli, Bruhn, and Vossnack.

The minutes of the third, fourth, and fifth meetings were brought up for consideration, and, subject to corrections by Professor Pagel, M. Boris, and Sir A. Denny in the minutes of the third meeting, and by Sir A. Denny in the minutes of the fifth meeting, these were approved.

With reference to the minutes of the fifth meeting, Sir A. Denny reported that he had sent further information to Dr. Bruhn respecting sub-division of small vessels, and he proposed that Dr. Bruhn and he should confer together with Professor Welch and draw up proposals.

This was agreed to.

The Chairman announced that, on account of the enforced absence of several members, no Sub-Committees would meet on the following day (Saturday), and that a schedule of the meetings of all Sub-Committees for the following week would be issued shortly. The next meeting of No. 1 Sub-Committee would be on Tuesday, the 9th December, at 10 a.m., and he proposed to circulate certain resolutions in advance of that meeting, and hoped that it would be possible to come to a definite agreement regarding some of these on Tuesday.

The Chairman reported that, at the meeting of Chairmen of Committees which had been held under the presidency of Lord Mersey, provisional agreement had been reached as to a general definition of the ships which would be affected by the provisions of the Convention, this agreement being subject to confirmation by each Committee. The general effect of the provisional agreement was that vessels whose route did not take them more than 150 miles from land could be excluded from the requirements of the Convention, and that at the time of the ratification of the Convention each signatory State should submit a schedule of the local international trades which they proposed to exempt under this provision. This agreement, if accepted, would free the Committee from the necessity of considering the requirements applicable to small vessels engaged in short distance international traffic, and would enable them to concentrate their attention on the larger ocean-going vessels without making it necessary for them to give any further definition to the term “foreign ocean-going.” The lower limit of the number of passengers for a vessel subject to sub-division rules under the terms of the Convention had been provisionally fixed at twelve. This, however, could be given further consideration by this Committee, having regard to the special requirements of bulkhead sub-division.

The Chairman then reminded the members that they had been furnished with copies of amended resolutions based on those originally proposed by M. Pierrard, and asked whether any member had any observations to make regarding these.

The first of these resolutions was:

"The flooding curve for a given vessel, with a continuous bulkhead deck, is a curve giving, for any particular point of the vessel's length, the maximum percentage of the length of the vessel (having its centre at the point in question), which can be flooded under definite assumptions explained hereafter, without the ship being submerged below the margin line defined by the beam at side line of the bulkhead deck. If this deck is not wholly sheathed the margin line should be the usual thickness of a wood deck below the beam at side line.

"In view of the stability conditions after damage it may be necessary to lower this margin line in the case of vessels of unusual proportions of beam to draft. Stepped bulkhead decks will require special consideration, but must provide an equal measure of safety, as laid down for the vessel with continuous deck, for each length of vessel and at all positions."

Professor Pagel (Germany) in connection with the second paragraph of this Resolution, said that he was not convinced of the necessity of referring to the question
of stability in connection with sub-division, but he would be glad to hear the views of
the French Delegation on the matter.

M. BORIS (France) said that he thought the question of stability required serious
consideration, and should be dealt with in a definite manner, avoiding arbitrary
treatment if possible. While it was true that the initial stability and the curve of
stability of a vessel leaving port were as a rule unknown, it was possible to secure that
the vessel, if damaged, should still maintain stability of the same order as that which
she had on starting out. The modulus of stability \( S = \Delta S \) has a certain value
before damage. If the ship is damaged the stability increases by \( \Delta S \):

\[
\Delta S = \frac{\pi}{2} \alpha \text{ LBT}^3 \left( A_s - A_t \frac{B^3}{T^2} \right).
\]

In this formula \( A_s \) and \( A_t \) contain all the coefficients of the fineness of the hull
and of the water-line, the permeability, and the length of the flooded part of the vessel,
assumed to be amidships. Actual calculation had shown that the quantity between
brackets in the formula is always positive. Thus the stability always increases, and
the question is to determine what becomes of the reserve of stability.

If the curve of moment of stability is drawn, the abscissa are proportional to
freeboard, and the ordinates proportional to the modulus of stability. If we denote
the freeboard before damage by \( F \) and the freeboard after damage by \( F_0 \), and if we
adopt the condition that the area of both curves of stability before and after damage
be of similar value, we may express that condition by the equation: \( F S_0 = \lambda FS \)
where \( \lambda \) is a constant multiplier. Introducing that condition in \( \Delta S = S_1 - S \), we
obtain, after transformation:

\[
F_1 = \lambda^3 F \left( 1 - A_s \frac{B^3}{T^2} \right),
\]

where \( \lambda^3 \) and \( A_s \) are constant for a given ship.

This formula gives the freeboard after damage in terms of the initial freeboard
and of the transverse proportions of the ship, and it enables a comparison to be made
between two vessels differing only by their transverse dimensions.

Instead of flattening the flooding curve in an arbitrary way, the French Delegation
thought that the matter should be dealt with in an exact and definite manner.
M. Boris added that he was quite satisfied with the text of the suggested resolution as
it stood, and he did not desire to put forward a detailed proposal on the subject, his
remarks being directed entirely to explaining the subject to Professor Pagel and the
Committee with a view to demonstrating the necessity and possibility of taking
stability into account.

A prolonged discussion ensued as regards not only the question of stability after
damage, but also the subject of initial stability, and the question whether the
Committee should require shipmasters to be furnished with information as to the
stability of their vessels: also what this information should be.

DR. BRUHN (Norway) agreed with Professor Pagel that it would be well to
omit all reference to stability. He thought that it would be impracticable for the
Committee to lay down definite conditions, and that if stability calculations were
furnished, shipmasters would not always understand their meaning and would in
many cases consider that they were relieved of their responsibility for the proper
loading of their ships; and as the question of stability must always depend on the
way in which a ship is loaded, the action of the Committee might thus lead to increased
danger rather than to increased safety as intended.

GENERAL MEANANO (Italy) suggested that even if information as to stability
was not useful to shipmasters, it might be of value to owners and their advisers.

M. PIERRARD (Belgium) asked Professor Pagel if he thought the German
Government would agree to alter their rules and allow compartments longer than
28 metres (the limit fixed in the present German regulations) if the Conference
adopted a formula such as M. Boris', which might be found to allow compartments
longer than that figure; and on Professor Pagel answering in the negative, M. Pierrard
suggested that in these circumstances it seemed clear that the economic aspect of the
question was of secondary importance, and that the matter must be left to each
administration to deal with. He thought, however, that the general principles drawn
up by the Committee should state the necessity for each administration to make rules
upon the subject.

[1244—87]
THE CHAIRMAN thought that the question of stability after damage would have to be dealt with by the Committee at least in general terms. As a general rule, he deprecated leaving important fundamental questions to be disposed of by individual administrations if they could be dealt with by the Conference.

M. BORIS (France) thought the Committee should keep in mind the distinction between initial stability and the question dealt with in the formula which he had explained, namely, stability after damage. As regards initial stability, he was largely in agreement with Dr. Bruhn, but as regards stability after damage he thought it must be dealt with, and he pointed out that as his suggested formula contained two constants these could be adjusted to give such results as might be found most suitable.

PROFESSOR PAGEL (Germany) reminded the Committee that, while it is desirable to limit as much as possible the length of midship compartments, such limitation must have regard to practical considerations; and the limit of 28 metres in the German regulations represents what was considered practicable, though it might possibly be somewhat reduced.

SIR ARCHIBALD DENNY (Great Britain) said that all the delegations which had submitted schemes seemed to be agreed that the length of midship compartments should be specially limited, the Germans doing this by fixing the maximum length, the French by a formula, and the British by increasing the margin so as to introduce the three-compartment ship at a length of 950 feet.

He admired M. Boris' scheme in many ways, and thought it advisable, if possible, not to leave the matter entirely to the individual administrations, but to limit their action in some way so as to prevent undue interference.

He desired to point out, however, that the floodable length of a given ship could not be reduced, and that a ripping blow resulting in the flooding of several adjacent compartments amidships might have a very serious effect on stability which could not be entirely guarded against by reducing the length of the individual compartments.

THE CHAIRMAN pointed out that the Committee's conclusions should be as precise and definite as possible, in order that the subsequent work of the Conference in such matters should be reduced to a minimum. He requested that those members who had proposals to make should draw them up in as definite and concise a form as possible, in order that, if adopted, they could be translated into French and embodied in the Convention with no alteration in substance and as little alteration in form as possible.

He suggested that this course should be followed as regards the subject then under consideration, and that the members should prepare and send to the Secretaries not later than Monday their suggestions in the form of paragraphs which could form part of the Convention if agreed to.

THE CHAIRMAN then asked the Committee to consider the last sentence of Resolution No. 1 relating to stepped bulkheads. He said that he thought this might be improved, and that this and other paragraphs would be submitted in revised form before the next meeting.

THE COMMITTEE then considered the second resolution, reading as follows:

"The assumptions referred to concern the articles within the vessel representing non-permeable obstructions. It is assumed that these non-permeable volumes represent 5 per cent. of the volume of compartments devoted to passenger accommodation and forward and after peaks; 20 per cent. for engine and boiler rooms (including the coal bunkers within the machinery space); and 40 per cent. for cargo and all other spaces outside machinery spaces not already provided for."

THE CHAIRMAN suggested that this might be altered in some respects, and mentioned that the question of the permeability of double bottoms could, if necessary, be dealt with in connection with the definition of "volume," which would be considered later.

SIR ARCHIBALD DENNY (Great Britain) thought that the paragraph should be made more precise on the lines of the definition contained in the British memorandum on sub-division, which he read. He undertook to draw up a new paragraph for consideration.
DR. BRUHN (Norway) raised the question of the permeability of trimming tanks, and Sir Archibald Denny said these should be taken at 95, if not available for cargo.

THE CHAIRMAN then asked whether any member was prepared to make any definite suggestions regarding paragraph 3 of M. Pierrard’s original general principles, which was as follows:

“Every vessel should be divided into a number of transverse compartments of such length that the length of any compartment does not exceed a fraction of the floodable length given by the flooding curve. That fraction should depend on the length of the vessel; it decreases when the length increases.”

M. DE BERLIE (France) thought the paragraph should be more general, and should provide that the ratio between the length of compartment and the floodable length in vessels under 600 feet in length should depend not only on the length of the vessel, but also on a coefficient of traffic to be determined. Above 600 feet no distinction need be made between vessels of the same length as regards traffic.

GENERAL MEANA (Italy) did not see how it would be possible at present to introduce a coefficient of traffic.

M. DE BERLIE (France) pointed out that the German regulations do in effect embody a coefficient of traffic, and that the British memorandum distinguishes between different types of vessels.

SIR ARCHIBALD DENNY (Great Britain) did not think it would be possible within the time available to agree on a coefficient of traffic, and said that he, personally, was not in a position to do so. He had put forward all the proposals he could, but the investigations of his Committee were not complete.

THE CHAIRMAN stated that certain members of the Committee had other engagements which would prevent giving further consideration to this subject at this meeting. He then announced that at the next meeting he proposed to ask the Committee to come to definite decisions for or against certain definite propositions which would be laid before them on the basis of the discussions up to date. The real issue seemed to be whether the Committee was going to take definite action on certain important fundamental questions. If action involving general principles was taken it was still necessary to decide how far the Committee could reasonably go in fixing minimum standards.

He again emphasised the desirability of members putting their views into the form of definite proposals expressed in language suitable for embodiment in the Convention and, so far as possible, sending these to the secretaries for circulation before the meeting on Tuesday, in order that the Committee, with all the available information before it, might then be in a position to reach definite decisions.

Adjourned to 10 a.m., the 9th December, 1913.
Seventh Meeting.—December 9, 1913, 10 a.m.

Present: Admiral Capps (Chairman); MM. Paged, Walter, McBride, Palm, Machay, Pierrard, Boris, de Berlhe, Sir A. Denny (accompanying by Professor Welch), MM. Meana, Bonfiglietti, Barricelli, Bruhn, and Vossman. (In the afternoon session MM. Ferguson and Duguid were also present.)

The minutes of the sixth meeting were approved, subject to corrections intimated by MM. Pierrard, Boris, Meana, and Bruhn.

The CHAIRMAN stated that there had been placed before the members of the Committee a draft of proposed wording to cover certain of the general principles already adopted by the Committee at its previous meetings. With unanimous consent this draft was made the order of business before the Committee.

The first paragraph was agreed to as follows, subject to possibly necessary changes in verbiage:—

"Article 1.

"Ships hereafter built should be as efficiently sub-divided as is possible, having regard to the nature of the services for which they are intended."

It was agreed, as regards the vessels to be included in the recommendations as to sub-division, that the questions of lower limit of size and number of passengers could be dealt with later if necessary. It was also pointed out that the Convention would contain a clause fixing the date on which the requirements of the Convention would come into force. Dr. Bruhn suggested that the date for enforcing recommendations as to sub-division might have to be later than for recommendations on other subjects, and it was agreed that the Committee might make a recommendation on this point if found necessary.

The second article was discussed at considerable length, and was revised in order to avoid possibility of an interpretation requiring the use of some specific method in obtaining the floodable length. The article as finally agreed to, subject to possibly necessary changes in verbiage, was as follows:—

"Article 2.

"The floodable length at any point of the length of a vessel shall be determined. This floodable length for a vessel with a continuous bulkhead deck is the maximum percentage of the length of the vessel (having its centre at the point in question) which can be flooded under definite assumptions, hereafter set forth in article 3, without the ship being submerged beyond a margin line drawn parallel to the bulkhead deck at side line and three inches (3"") below the top of that deck. In the case of vessels having a non-continuous bulkhead deck, the floodable length must be such as to secure to the vessel in question, for each portion of its length and for all conditions of trim after damage, a measure of safety at least equal to that laid down for the vessel with continuous bulkhead deck."

The third paragraph, relating to the assumptions as to permeability, was next discussed. It was decided that the forward and after peaks should be included, at a permeability of "0.5, in calculating the average permeabilities of the spaces forward and aft of the machinery space; it was also decided that a permeability of "0.5 should be assigned to trimming tanks and to the double bottom outside the machinery space. The paragraph was then agreed to as follows, subject to possibly necessary changes in verbiage:—

"Article 3.

"The definite assumptions referred to in article 2 relate to the permeabilities of the spaces in question below the margin line. In determining the floodable length uniform permeabilities are to be used throughout the whole length of—

"1. The machinery space;
"2. The spaces forward of the machinery space; and
"3. The spaces abaft the machinery space."
"The permeability of the machinery space including the double bottom is to be taken as 50 per cent.

The permeabilities for spaces forward and abaft the machinery spaces will be as follows:

1. 60 per cent. in cargo spaces, bunkers (permanent or reserve), store rooms, baggage and mail rooms, watertight shaft or pipe tunnels, and fresh-water tanks above the double bottom; the spaces just enumerated and any other spaces claimed to come under this clause must be proved to be practicable for the purpose intended, and that they are to be so used.

2. 95 per cent. in passenger and crew spaces, peaks, trimming tanks, double bottoms, and other spaces not specifically appropriated as indicated in the foregoing section. If any portion of a 'tween decks space enclosed by watertight bulkheads is appropriated to passengers, the whole of that space is to be regarded as passenger space; and similarly 'tween deck spaces appropriated for the carriage of either passengers or cargo are to be regarded as passenger spaces.

Where the spaces before or abaft the machinery space below the margin line consist partly of spaces mentioned in section 1, and partly of spaces mentioned in section 2, the permeability is to be determined separately for each end from the formula \[ \frac{95}{2} - \frac{35}{2} r \], where \( r \) is the ratio between the volume of the spaces mentioned in section 1 and the total volume of the space in the portion of the ship under consideration."

During the discussion on this paragraph, Sir A. Denny gave the following particulars as to the actual permeability of the machinery spaces in vessels of different type:

1. High-class vessel, 480 feet long, engaged in trans-oceanic traffic, with a large proportion of passenger accommodation in way of the machinery space below the bulkhead deck. Permeability of machinery space '78.7.

2. Passenger and cargo vessel, 450 feet long, engaged in long distance coastal trade, with a small proportion of passenger accommodation in way of machinery space below bulkhead deck. Permeability of machinery space '77.

3. Vessel almost exclusively of the cargo type (eighty passengers), 440 feet long, with no passenger accommodation in way of machinery space below the bulkhead deck. Permeability of machinery space '78.

He also mentioned that in the case of a highest-class passenger vessel over 700 feet long, the permeability of the machinery space was found to be '75, excluding the double bottom, and '76 including the double bottom.

The paragraph defining the length of the machinery space was discussed, and, subject to possibly necessary changes in verbiage, agreed to as follows:

"The 'machinery space' is to be understood to extend between the after main engine room watertight bulkhead and the forward boiler room watertight bulkhead."

Sir Archibald Denny (Great Britain) suggested a definition of "volume," which was ordered to be copied for consideration at the next meeting.

M. Pierrard (Belgium) raised the question of vessels propelled by internal combustion engines, and said he thought some mention of these should be made so as to show that they had not been overlooked. After some discussion as to whether an attempt should be made to fix provisionally the permeability of the machinery spaces of such vessels, the Chairman suggested that any members who had definite proposals to make should bring these forward at the next meeting.

Adjourned to 10 A.M., the 10th December, 1913.
Eighth Meeting.—December 10, 1913, 10 a.m.

Present: Admiral Capps (Chairman), MM. Pagel, McBride, Palm, Machay, Pierrard, Duguid, Boris, de Berlhe, Sir A. Denny (accompanied by Professor Welch), MM. Meana, Bonfiglietti, Barricelli, Bruhn, and Vossmack.

THE copies of the articles approved at the previous meeting were distributed to the members and considered with a view to clarifying the language, if possible.

Article 1 was accepted without change as follows:—

"Ships hereafter built should be as efficiently sub-divided as is possible, having regard to the nature of the services for which they are intended."

Article 2 was discussed, amended, and agreed to as follows:—

"The floodable length at any point of the length of a vessel shall be determined taking into consideration form, draft, and other limiting characteristics of the vessel in question. This floodable length for a vessel with a continuous bulkhead deck is the maximum percentage of the length of the vessel (having its centre at the point in question) which can be flooded under the definite assumptions hereafter set forth in Article 3, without the ship being submerged beyond a margin line drawn parallel to the bulkhead deck at side line and three inches (3") below the upper surface of that deck at side. In the case of vessels having a non-continuous bulkhead deck, the floodable length must be such as to secure to the vessel in question, for each portion of its length and for all conditions of trim after damage, a measure of safety at least equal in effectiveness to that laid down for the vessel with continuous bulkhead deck."

Article 3 was then considered, and the Chairman, referring to M. Pierrard's suggestion that some reference should be made in this paragraph to the fact that the permeability of the machinery space of a vessel with internal combustion engines would be different from that of a vessel with steam engines, suggested that this matter should be dealt with at a later stage, and asked the members to consider whether they would have any objection to specifying provisionally a permeability of 85 per cent. for machinery spaces in vessels propelled by engines other than steam.

M. BORIS (France) suggested that a clause might also be inserted allowing the builders to use a different permeability than 85 per cent. in the case of vessels with internal combustion engines should they be able to justify this different permeability by actual calculations.

The final disposition of this question was deferred to a later meeting.

Article 3 was then agreed to as follows:—

"The definite assumptions referred to in article 2 relate to the permeabilities of the spaces in question below the margin line. In determining the floodable length an average permeability will be used throughout the whole length of each of the following portions of the vessel:—"

"(1.) The machinery space;
(2.) The portion forward of the machinery space; and
(3.) The portion abaft the machinery space.

"The permeability of the machinery space, including the double bottom in wake thereof is to be taken as 80 per cent.
"The permeabilities for spaces forward and aft of the machinery space will be as follows:—"

"(1.) 60 per cent. in cargo spaces, bunkers (permanent or reserve), store rooms, baggage and mail rooms, watertight shaft or pipe tunnels, and fresh water tanks above the double bottom. It must be proved that the spaces just enumerated are practicable for the purpose intended, and that they are to be so used. Other spaces shall not be allowed to come under this clause unless with the approval of the Administration."
"(2.) 95 per cent. in passenger and crew spaces, peaks, trimming tanks exclusively so used, double bottoms, and other spaces not specifically appropriated as indicated in the foregoing section. If any portion of a ‘tween deck space enclosed by complete transverse permanent steel bulkheads is appropriated to passengers, the whole of that space is to be regarded as passenger space; and similarly ‘tween deck spaces appropriated for the carriage of either passengers or cargo are to be regarded as passenger spaces.

"Where the spaces before or abait the machinery space below the margin line consist partly of spaces mentioned in section (1), and partly of spaces mentioned in section (2), the average permeability is to be determined separately for each end from the formula \( \frac{95 - 3r}{2} \), where \( r \) is the ratio between the volume of the spaces mentioned in section (1) and the total volume of the space in the portion of the ship under consideration."

The definitions of "machinery space" and "volume" were reserved for further consideration.

THE CHAIRMAN then asked that consideration be given to the question of fixing the fractions by which the floodable length should be multiplied in order to obtain the maximum permissible lengths of compartments.

M. BORIS (France) stated that he had been investigating the requirements of the German subdivision rules with a view to ascertaining what fractions, according to M. Pierrard’s expression, would have to be prescribed for vessels of different length and type, in order to obtain the same results as those given by the German rules. For this purpose he had used the following procedure: If \( l \) denotes the floodable length at any point of a vessel on the assumption that the compartment is empty; if \( \mu_p \) is the coefficient of permeability corresponding to the requirements of the German rules; if \( \mu_e \) is the coefficient of permeability corresponding to the assumptions accepted by the Committee, and if \( p \) is the “Pierrard coefficient,” then the actual length of a compartment at any point of a ship in accordance with the German rules might be denoted by \( \frac{l}{\mu_p} \). Under the Committee’s assumptions as to permeability and multiplying factor, the actual length of the same compartment could be expressed in the form \( p \frac{l}{\mu_e} \) and hence the equation could be derived \( l = p \frac{l}{\mu_e} \) or \( p = \frac{\mu_e}{\mu_p} \). Thus, the value of \( p \) could be found for each portion of the length of a vessel, and M. Boris exhibited a diagram indicating graphically the values of \( p \), first for fast passenger steamers, and second for cargo-passenger steamers in accordance with the German rules. On the same diagram had been shown the values of \( p \) suggested as an example in M. Pierrard’s original proposals; and the diagram showed that the German rules required more severe subdivision in the case of fast passenger vessels than in the case of cargo-passenger vessels for all lengths, and that M. Pierrard’s suggested values would require more severe subdivision than either.

M. Boris explained that his diagram was based on the application of the three standards to the most difficult section of the ship, namely, No. 2 hold, and on assumptions as to appropriation of the various spaces below the bulkhead deck which gave a permeability of \( \frac{l}{\mu_e} \) for the cargo-passenger vessel and \( \frac{s}{\mu_p} \) for the fast passenger vessel. His investigations showed that the German rules would produce an effective two-compartment fast passenger steamer for lengths about 600 feet, and an effective two-compartment cargo-passenger steamer for lengths about 700 feet. It was the case that, under more favourable assumptions, the German rules might produce two-compartment vessels of smaller lengths, but he thought the Committee must deal only with minima, and with normal assumptions. He suggested that provision should be made for interpolation in the case of intermediate types. He thought the fractions should be fixed on the basis of the requirements of the existing German rules, and added that it would probably be sufficient to fix only the positions at which the governing factors of unity, \( \frac{1}{3} \) and \( \frac{3}{3} \) should be introduced.

M. Boris concluded by suggesting that, after further investigations had been made, it might be found possible to introduce more stringent standards, and he desired his suggestions to be considered only as minima which should be improved upon, in future, if possible. He announced that he had prepared a definite proposal on the lines of his suggestions and he would hand this to the secretaries for circulation if the Committee so desired.
PROFESSOR PAGEL (Germany) thanked M. Boris for his interesting comparison and acknowledged that the task before the Committee was to find out the average influence of the assumptions which had been adopted on the existing or proposed standards of sub-division.

He confirmed M. Boris’s view that the German regulations embodied two different standards of sub-division for vessels of the same length according to type, but in practice the difference between the standards works out as a difference in draught. As regards the values of the factors to be determined, he agreed that these should be based on the existing rules, as far as possible, and in this connection, he pointed out that, as the German rules have steps or sudden breaks in them, the tendency has been to build vessels of lengths just below the points where the steps occur, and to avoid building them of lengths slightly greater than the lengths at which the steps are introduced. This must be borne in mind in expressing the German rules in the form of multiplying factors, and he would personally object to recommending a factor which would involve an excessive increase of the stringency of sub-division as compared with that secured in practice under the operation of the German rules. He thought the matter was a very difficult one, and should be very cautiously dealt with.

SIR A. DENNY (Great Britain) reminded the Committee that he had already stated the provisional conclusions of his Committee as to the feasibility of applying the two-compartiment standard to pure passenger vessels over 500 feet in length and the difficulty of applying it to cargo-passenger vessels below 600 feet in length; and in this point M. Boris’s investigations seem to confirm his Committee in their opinion.

M. PIERRARD (Belgium) pointed out that the results of transforming the German rules into multiplying factors would have been different if different assumptions had been made as to the appropriation of the spaces at the point of the vessel considered. He thought that M. Boris would probably agree as to the desirability of examining and carefully investigating the conclusions he had arrived at as to the effect of the German rules, and he suggested that a sub-committee might be appointed for this purpose. He again wished to emphasise that the factors given in his original proposal were only illustrative and not definitive.

M. BORIS (France) thanked the speakers for their remarks, and expressed his gratification at the large measure of agreement which his suggestions had met with.

THE CHAIRMAN said he thought the Committee was in a position to fix certain minimum requirements as to sub-division which should be met by all the signatory States. These minimum requirements might, and should, be exceeded to such extent as might later be found practicable. While they would thus be minima as regards future advance, they should be maxima as regards the state of the Committee’s investigations—that is, they should embody the highest standard which the Committee found practicable to impose. At a later date (perhaps on the occasion of the forthcoming International Conference on Load Line) it might be possible, as the result of investigations still to be made, to impose higher standards. He hoped that the present Conference would take such action as would insure that all future passenger vessels would be up to as high a standard of sub-division as practicable, and he saw no insuperable difficulties in the way of doing this. He suggested, and it was agreed, that M. Pierrard, Professor Pagel, M. Boris and Sir A. Denney should meet in the afternoon, and prepare a scheme for consideration at the meeting on the following day.

Adjourned to 11 a.m., the 11th December, 1912.
Ninth Meeting.—December 11, 1913, 11 a.m.

Present:—Admiral Capps (Chairman), MM. Pagel, Walter, Ferguson, McBride, Palm, Machay, Pierrard, Duguid, Rasmussen, Boris, de Berlhe, Grolous, Sir A. Denny, Sir J. Biles, Meana, Bonifetti, Barricelli, Bruhn, Vossack, and Nilsson.

THE members of No. 2 Sub-Committee, which was meeting in another room, were invited by the Chairman to sit with No. 1 Sub-Committee, in view of the importance of the business to be discussed. A suggestion was made that the meeting should be considered as a meeting of the main Committee, but the Chairman pointed out that the members of No. 3 Committee had not been invited to attend. He ascertained, however, by calling the roll, that the meeting included a member of each delegation represented on the Committee.

THE CHAIRMAN reported that at the meeting of No. 1, Sub-Committee on the previous day representatives of the Belgian, German, French, and British Delegations had been asked to confer together and prepare a proposal as to sub-division for the consideration of the Sub-Committee. The proposals suggested by the representatives of those four delegations, who had conferred together, were in the hands of those present, and the Chairman asked M. Pierrard, who had acted as chairman at the meeting of the four representatives, to explain the proposals to the meeting.

M. PIERRARD (Belgium) (speaking in French) began by paying a tribute to the conciliatory spirit which had animated the conference between the representatives of the four delegations and the broad-minded way in which the problem had been dealt with. The method suggested by M. Boris at the previous meeting for finding the value of the multiplying factor had been employed, but M. Boris’s assumptions of 7 permeability for the cargo-passenger vessels and 3 permeability for the fast passenger vessels had not been adhered to. The assumptions which had been made as to permeability were based on the knowledge and investigations of the representatives who drew up the proposals. The permeability of the forward end had been considered, and account taken of the fact that in any given type of vessel the permeability will probably vary to some extent with variations of length—e.g., a small cargo-passenger vessel would probably have no passenger accommodation below the bulkhead deck, and the permeability would therefore be small; while a larger cargo-passenger vessel would almost certainly have some accommodation below the bulkhead deck, and thus a higher permeability. Working on lines such as these, the four representatives had arrived at results which differed from those previously reached by M. Boris, and on the basis of these results they had formulated their proposals as to the length of ship at which the multiplying factors of unity, 5 and 34, should be introduced. This had been done separately as regards the vessels exclusively devoted to carrying passengers and the vessels chiefly devoted to carrying cargo with few passengers. After these fundamental points had been fixed, figures of intermediate lengths had been tentatively filled in. The four representatives were of opinion that the Committee should not be asked to pronounce a definite opinion regarding these, as a further investigation would have to be made and some method of interpolating between the two types of vessels would have to be determined. The four representatives thought that it would be sufficient to fix the fundamental points as already explained, and they submitted their suggestions regarding these points for the consideration of the Sub-Committee. These suggestions were as follows:

"Article 4.—The maximum admissible length of one compartment having its centre at any point in the vessel's length is obtained from the floodable length (article 2) by multiplying that length by an appropriate factor.

"This factor depends on the length of the vessel and the nature of the service for which it is intended. The factor decreases as the length of the vessel increases, and as the type of the vessel departs from the cargo type of vessel and

[1244—87]"
approaches that exclusively devoted to the carriage of passengers.

"The maximum admissible values of the above-mentioned factor for vessels devoted exclusively to the carriage of passengers are given in the second column of the annexed table. For other vessels higher values may be used, provided the figures adopted do not exceed those given in the third column of the table in question.

"When the factor is equal to, or less than, 5, it may be doubled, thus giving at any point of the vessel's length the total length of two compartments; but, in that case, the length of the shorter compartment of any pair must not be less than one-quarter of the total length so obtained."

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**Tableau.**

**Table.**

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<th>Longueurs des Navires.</th>
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<td>Vessels exclusively devoted to the Carriage of Passengers.</td>
<td>Other Vessels.</td>
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SIR ARCHIBALD DENNY (Great Britain), after giving a summary in English of M. Pierrard's remarks, added that he did not at present know what method should be adopted of determining the figures for vessels between the two extreme types, and he did not think this could be determined in the time available. The delegations which had made definite proposals as to sub-division seemed to recognise the necessity of discriminating between the cargo-passenger steamer and the pure passenger steamer within certain limits. Whether some method could be adopted by which this distinction could be eliminated he did not know, and he did not think it would be politic at present to deal with the matter further than suggested in the proposals submitted to the Committee by M. Pierrard.

THE CHAIRMAN said he felt sure he was speaking for the Committee in expressing appreciation of the work done by the four representatives in drawing up these proposals, and the spirit in which they had approached their work. In saying
this he did not desire to commit himself as expressing concurrence with the results of their meeting, and he thought it would be valuable if Professor Pagel would explain the relation between the existing German rules and the proposals now before the Committee.

PROFESSOR PAGEL (Germany) stated that, as he had explained on the previous day, the German regulations involve steps or sudden breaks in the severity of sub-division, and for this reason German ships have, as a rule, been built of such length as to be just below where the steps occur. Thus, to produce a set of multiplying factors equivalent to the practical results of the German rules, it would be necessary to consider the application of those rules to vessels slightly smaller in each case than the lengths at which steps in the rules occurred. As a matter of fact the four representatives had considered vessels about midway between the steps, and hence their proposals would secure a greater margin and more effective sub-division than that attained in the majority of existing German vessels built under the German rules. He feared that his colleagues in Germany might think such proposals required careful consideration before they could be adopted, and though he personally would do his best to persuade them that it was a good basis for international agreement he had already explained that he had no authority to commit them.

GENERAL MEANA (Italy) asked whether Professor Pagel's remarks applied also to the machinery spaces, where the German rules prescribed a permeability of 95 per cent. as against the figure of 80 per cent. adopted by the Committee.

PROFESSOR PAGEL explained that in all lengths and types of vessels the German curves and regulations produced such a reserve of safety in the machinery spaces that this difference in permeability would not be in effect detrimental. He explained this by reference to a diagram showing the flooding curves derived from the German rules and the curve arrived at from direct calculations.

DR. BRUHN (Norway), speaking on invitation of the Chairman, pointed out that the proposals now under consideration related to the most important part of the Committee's work, and it was very difficult to express a definite opinion at short notice without investigating the effect of the proposals when applied to particular vessels. In view, however, of Professor Pagel's statement as to the relation of the proposals to the existing German rules, he thought it would be possible to accept the proposals for a limited period, say, one year, until further investigation had been made into the matter.

SIR J. BILES (Great Britain) stated that he was prepared to support the proposals of Sir A. Denny, but he found it somewhat difficult to give a definite opinion on the subject in view of its complexity, and he expressed surprise that the proposals under consideration did not involve the application of the two-compartment standard to passenger vessels below 520 feet in length, or cargo-passenger vessels below 570 feet in length. M. Wairer had pointed out to him that greater safety could be obtained by carrying bulkheads higher, but this involves increasing the number of scuppers and other outlets through the sides of the vessel, and therefore adds to the danger. This must be taken into account in estimating the increase of safety due to the higher bulkheads, though he admitted that the two matters were not readily comparable.

SIR A. DENNY (Great Britain) pointed out that the principles involved in the proposals under consideration would be satisfactory in this respect, that they would allow any nation to retain its existing methods or to draw up new rules on any method it thought best, provided in all cases it was proved that the methods or rules adopted produced results not less effective than those embodied in the proposals.

THE CHAIRMAN desired to make it clear to the members that the proposals meant that it was necessary to go to a length of 520 feet for the highest type of passenger steamer, and 570 feet for other vessels, to reach the two-compartment standard under ordinary conditions of loading and with a margin which was practically zero. From an examination of a British Parliamentary Return of passenger steamers, dated May 13th, 1912, he had ascertained that there were at that time 391 British foreign-going passenger steamships between 300 and 500 feet in length, and only 87 longer than 500 feet. If the lower limit for the two-compartment cargo-passenger vessels were made 570 feet, it would include as two-compartment ships only 25 vessels built at the date given by the above-noted report. Using these figures as an
index of future construction, it appeared that the overwhelming proportion of cargo-passerger vessels, including many of large size, would not be two-compartment ships. Was this a decision which the Committee were prepared to accept and recommend to the Conference? As regards the point raised by Sir John Biles respecting scupper outlets, the Chairman did not think that this was an insuperable objection to carrying bulkheads higher, as such outlets could be effectively dealt with so as to prevent flooding through them. He desired to point out that the fixing of the lower limit of length for the two-compartment vessel was a matter of the gravest importance, as accidents have occurred, and doubtless will continue to occur, whereby two adjoining compartments of a vessel are flooded. Putting aside the long ripping blow against which provision cannot be made satisfactorily in all cases, a casualty involving the flooding of two compartments was, in his opinion, one which should be provided for in the greatest possible number of vessels. He therefore wished the Committee to weigh very carefully the proposals under consideration. M. Pierrard's original suggestion appeared to involve a greater severity than any proposition previously suggested, and for this reason the Chairman had been reluctant to ask the Committee to express a definite opinion upon it until it had been carefully considered. He was equally reluctant to ask the Committee to express a definite opinion at this meeting on the new proposals, as he wished them to have an opportunity of realising all the conditions and the small number of vessels which would be safeguarded against a certain possible kind of accident if the proposals were finally adopted. From this point of view the responsibility placed on the Committee was very grave. He fully realised that as practical men they must impose such conditions as could be met, but he was disposed to think that if higher conditions than those under consideration were imposed they could be met with great advantage to the passengers and without serious disadvantage to owners and builders.

SIR ARCHIBALD DENNY (Great Britain) expressed his concurrence with the Chairman's remarks as to the grave responsibility resting upon those present in deciding this matter. He desired only to call attention to one matter which he had referred to at a previous meeting, viz., the inseparability of the three elements of sub-division, viz., the margin, the permeability, and the number of compartments floodable. If it was borne in mind that the permeabilities adopted by the Committee were very severe, the reason why the two-compartment standard was not applied to ships below the lengths named in the proposals under consideration might become clearer. From a polite point of view it might have been better to adopt easier assumptions as to permeability and to apply the two-compartment standard to vessels of smaller length; but the effectiveness of the sub-division would not have been altered, and if the Committee did not wish to leave room for doubt as to the meaning of their proposals, he thought that the suggestions under consideration would achieve this object.

After some discussion raised by Sir J. Biles as to the relation between the new proposals and the original suggestions of M. Pierrard, and as to the procedure which should be followed in discussing them, the Chairman explained that strict Parliamentary procedure need not be adhered to at the meetings of the Sub-Committee if better results could be obtained otherwise, and said he thought it would be best, in order to continue on the same lines as had been followed hitherto, if the proposals put forward by the four representatives were adopted as the basis of present discussion and considered in conjunction with any alternative suggestions on the same lines or such further modifications as any member might wish to propose.

He desired the members to consider the matter carefully, and to come to the meeting on the following day prepared to submit any definite suggestions which they might consider necessary in order to arrive at a definite decision on the points under consideration.

Adjourned to 10 A.M., the 12th December, 1913.
Tenth Meeting.—December 12, 1912, 10 a.m.

Present: Admiral Capps (Chairman), M.M. Pagel, Walter, Ferguson, McBride, Palm, Machay, Pierrard, Duguid, Rasmussen, Boris, de Berlhe, Sir A. Denny (accompanied by Professor Welch), M.M. Meana, Bonfiglietti, Baricelli, Bruhn, Vossman and Nilsson.

The draft minutes of the seventh and eighth meetings of the Sub-Committee were distributed to the members.

The Chairman asked whether any member had any proposal to submit to the meeting. No proposals were submitted. The Chairman then stated that he had been requested by M. Pierrard to announce that he desired to withdraw his original proposal in order to clear the ground, and for the purpose of discussion M. Pierrard gave his adherence to the proposals put forward by the small Sub-Committee. These proposals were before the meeting for discussion or amendment and the Chairman would be glad to hear the views of the members regarding them.

No member offered any remarks.

The Chairman then called attention to the observations he had made on the previous day as to the importance of fixing the lower limit of length for the application of the two-compartment standard of sub-division as low as practicable in order to include the greatest possible number of vessels. The American Delegation would have preferred to find their colleagues in as close agreement as possible with the figures originally submitted by M. Pierrard and that those figures could be embodied in the Convention. Though M. Pierrard had withdrawn his original proposal, the Chairman hoped the Committee would be able to increase the requirements suggested by the small Sub-Committee. The natural conservatism of ship designers and builders might not be in entire harmony with the latest demands as regards safety, but if there was any doubt the benefit of the doubt should be given to the requirements of safety. He had concurred in the arrangement that one of his delegation move an amendment which embodied proposals less stringent than he had hoped would be practicable, and he felt sure that these proposals would receive the earnest consideration of the Sub-Committee.

M. Ferguson (United States of America) began by thanking the small sub-committee, and especially M. Pierrard for his original work. With reference to Professor Pagel’s remarks as to the greater stringency of the Sub-Committee’s proposals than the existing German rules, M. Ferguson pointed out that as the German rules involved steps an exact comparison seemed difficult. Factors based on the German rules would vary according as the curve representing those factors was drawn through the extreme upper or lower end of each step. The proposals which he was about to submit on behalf of the American Delegation embodied factors which corresponded with the most severe interpretation of the German rules. If the suggestions of the small Sub-Committee were accepted, and the two-compartment standard were not applied to cargo-passenger vessels smaller than 570 feet long, sea-going would be much more dangerous than some members of the Sub-Committee imagined, and some of the nations represented would have no practical interest in the proposals. It had been said that the Committee’s assumptions as to permeability were very severe, but he thought they were deliberately adopted as representing the real average conditions, and he imagined a naval architect would readily achieve the two-compartment standard for vessels below 570 feet in length. The Sub-Committee’s proposals involved practically no margin, whereas the British Committee had suggested a margin of about 3 per cent. for a vessel of 500 feet long. M. Ferguson then referred to the American proposal, copies of which had been distributed to the members, and which provided, as regards pure passenger vessels, for a factor of 9 at 250 feet, 3 at 450 feet, and 33 at 713 feet; and for cargo-passenger vessels a factor of 95 for 295 feet, 3 at 492 feet, and 33 at 723 feet. Proceeding, M. Ferguson said that the pure passenger vessel hardly exists, the greater proportion of vessels being cargo-passenger ships. If the limit of the two-compartment standard were lowered as he suggested, much greater number of vessels would be dealt with. He wished to point out that a great proportion of the emigrant trade is carried on by ships under 570 feet in length, and these ships he considered should have the maximum protection. He did not think
the limits he proposed would inconvenience naval architects. The values of the factors proposed by M. Ferguson on behalf of the American Delegation were as follows:

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<th>Length of Ship.</th>
<th>Passenger Vessel</th>
<th>Cargo-passenger Vessel</th>
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He desired to express appreciation of the work done by the German authorities in preparing and enforcing effective rules as to sub-division during the period when no other nation had such rules, and in face of keen international competition the German Mercantile Marine had not suffered by the application of these rules. If another step were now taken and international standards of greater stringency introduced, he failed to see how any objection could be raised. The governing consideration in their minds must be the safety of life at sea.

PROFESSOR PAGEL (Germany) said he was quite prepared to go as far as possible in the direction of greater safety, and the proposals of the small Sub-Committee were, in his opinion, rather more stringent than the existing rules. The permeability suggested by the Committee was, for the limits of two-compartment vessels, materially more severe than those prescribed in the German rules, and he was not quite sure what exactly the result of this change might be. Since the proposals of the small Sub-Committee had been drawn up he had independently prepared another curve, which gave exactly the same limits for the different standards as were embodied in those proposals. The situation seemed to him very difficult, and great caution was necessary in adopting any figures. Personally he could not agree to the application of the three-compartment standard to ships of 723 feet long, and he thought it unwise and unreasonable to introduce the three-compartment standard, it being sufficient, in his opinion, to apply the two-compartment standard with more stringent sub-division at the forward end in the case of the larger vessels.

SIR ARCHIBALD DENNY (Great Britain) expressed his sympathy with M. Ferguson’s proposals. He fully recognised the bearing of M. Ferguson’s reference to the fact that there were no American vessels exclusively devoted to carrying passengers, and that if the two-compartment standard for cargo-passenger vessels was fixed at 570 feet, some of the nations represented would have no practical interest in the proposals. If the two-compartment standard were the only thing aimed at, M. Ferguson was right in his contentions, but Sir Archibald Denny wished to point out that there were at present numerous vessels below 450 or even 500 feet in length which did not comply with the one-compartment standard, and if the result of the Conference was to introduce sub-division on an orderly and methodical basis, this would be a great achievement in itself.

As regards M. Ferguson’s comparison between the Sub-Committee’s proposals and the British memorandum on sub-division he pointed out that this memorandum was incomplete and dealt only with certain specified types and lengths of vessels, and that in any case the margin amidships proposed for vessels of 500 feet in length was only 3 per cent. It should also be remembered that the permeability of the double bottom was now assessed at .95 as compared with .6 in the British proposals, and this would make a considerable difference in the smaller vessels. He admitted that the crucial question was the cargo-passenger vessel, but he pointed out that the proposals of the Sub-Committee for “other vessels” were intended to apply only to the extreme type where passengers were merely an adjunct and cargo was the main consideration. As there would be comparatively few of such vessels the average cargo-passenger vessels
would under the Sub-Committee's proposals be sub-divided by means of a factor intermediate between those stated in the two columns, and the two-compartment standard would thus in reality be reached for cargo-passenger vessels less than 570 feet long.

He fully agreed that the sub-division of future ships must be improved as much as possible, but he did not think it would be wise to impose conditions of greater stringency at the present moment. The British Bulkheads Committee had examined the sub-division of numerous vessels, and had found that vessels claimed to be four-compartment ships were not so throughout. If the permeability of each separate compartment was used in fixing sub-division, results could be obtained which would be very different from those based on the average permeability, but average permeabilities were the only possible basis for an international agreement. He thought that the vessels claimed to be better sub-divided than in accordance with the proposals of the small Sub-Committee were of considerable size and special type, in which the height of the bulkheads could be increased, but in the majority of vessels such extension of the bulkheads would not be practicable.

M. BORIS (France) said that after the authoritative pronouncements of Professor Faged and Sir Archibald Denny he hesitated to speak. As had already been remarked it was impossible to refer to the two-compartment standard without at the same time specifying the assumptions upon which that standard was based, and these assumptions had been revolutionised by the adoption of real permeabilities.

The French Delegation had at first considered the British assumptions as to permeability exaggerated and had not wished to go as far as proposed, but gradually they had seen their way in reliance on the extensive investigations of the British Committee, to adopt its proposals, instead of their original "fictive" permeabilities. The French Delegation had made large concessions by consenting to that, and their desire had been to prevent by this concession further delay in the work of the Committee.

The French Delegation were pleased to note the full adoption of their ideas of continuously increasing severity, and of taking into account the traffic of the ship, and to see seriously considered the results of their investigations as to the influence of stability on the length of compartments.

When they saw some of the calculations by M. McBride, who had tried to express the severity of the German rules by Pierard coefficients, the French Delegation had endeavoured to go further in this way, and to draw up curves allowing a complete and accurate determination of M. Pierard's coefficients with regard to the actual knowledge of the Committee. For this purpose they had deferred to the experience accumulated in Germany during the period of 17 years, and to the large amount of information collected by the British Committee. They could do this more easily, as they were not bound to existing rules. He had taken the most impartial part in the work of the small Sub-Committee which had drawn up the proposals under consideration, and, on examining the results, he found them even more severe than what the French delegates had expected to attain. He did not think it would be advisable to go further at present, as the problem was of such dimensions, and it was necessary to take account of physical conditions and difficulties. He thought they might lay down minimum requirements on which all could agree, and that possibly, after some time, experience would show that the stringency of these requirements could be increased. He had consulted his colleagues, and was empowered to say that the French Delegation could accept the proposals of the small Sub-Committee, being confident that the final result would be an important and efficient increase of safety.

M. PIERRARD (Belgium) said that he feared he could add nothing material to what had already been said. His aim in putting his original proposals before the Sub-Committee had been to secure, if possible, that some results should be arrived at, but as for the figures that were now under discussion the experience in Belgium was not sufficient to enable him to speak with the same authority as his German, French, and British colleagues. He had examined the proposals of the small Sub-Committee from an entirely independent standpoint and with equal sympathy for all the three countries represented. He had observed with great satisfaction the complete spontaneity with which the three delegates had endeavoured to come to conclusions, and he thought he would fail in his duty if he supported any different figures from those which they had suggested.

GENERAL MEANA (Italy) said that the Italian Delegation had carefully considered the proposals of the small Sub-Committee, and thought them in accordance
with facts and ascertained data. While he agreed with the intention of the American proposals, he would like to be informed whether they were based on other data not available to the Committee or to the four representatives who had submitted the joint proposals.

PROFESSOR VOSSNACK (Netherlands) stated that he thought the proposals of the small Sub-Committee could be accepted.

DR. BRUHN (Norway) asked whether it was contemplated to fix any limit of time for the operation of these proposals, so that at the end of that time they might be reconsidered. He thought this was an important factor in considering the question.

THE CHAIRMAN stated that he had drafted a paragraph bearing on this point, which he would read in due course. Replying to General Meana, he said that the proposals of the American Delegation embodied a lower standard of sub-division than had been found entirely practicable in a recent design for an American transport of moderate speed, a vessel quite comparable to the cargo-passenger vessel type. The proposals were also based on comparisons with the German rules, and on calculations which Sir Archibald Deuny had kindly made as regards certain vessels now being built in this country. He wished to emphasise the fact that the American proposals were not introduced haphazard, or with a view to forcing compromise, but as a straightforward proposition meriting earnest consideration. In this connection he felt confident there had been equal earnestness on all sides.

M. NILSSON (Sweden) said that so far as he could judge he preferred the proposals of the Sub-Committee.

DR. BRUHN (Norway) said that provided the figures were not binding for more than 12 months, and were subject to reconsideration at the end of that period, he would prefer to adopt the proposal of the Sub-Committee, with a view to investigations being made within the next 12 months to see whether higher standards could be adopted.

GENERAL MEANA (Italy) agreed with Dr. Bruhn as to accepting the proposals as a minimum for 12 months.

THE CHAIRMAN said that he feared this would place the Conference in a difficult position, as it could act only for itself, and could not determine what a future Conference might do. The Convention, when ratified, would be binding until denounced or superseded. A recommendation as to further investigation could be made in the report of the Committee, but there was nothing to ensure that its recommendations would be put into effect or have practical results. Rules now laid down would continue in force until properly annulled. The great difficulty in accepting conditions which all the delegations would agree upon as a minimum was that although these conditions were adopted as a minimum they might subsequently be used as a maximum as regards their practical application. Whatever the Committee did, however, he felt sure their action would be based upon frank expressions of opinion after the best consideration possible. As a member of the American Delegation he felt bound to announce his conviction that the proposals of the Sub-Committee were not high enough to stimulate the best endeavour of designers of ships in increasing safety at sea in future, and he thought that actual knowledge as to the possibilities in ship design was sufficient to justify M. Ferguson's suggested amendment, on behalf of the American Delegation. If, however, his colleagues on the Committee thought differently he had as great a respect for their sincerity of opinion as for his own. He thought it unnecessary to say more except to emphasise that the effect of the proposals of the Sub-Committee would be to allow cargo-passenger steamers under 570 feet in length to be below the two-compartment standard. He therefore thought that 570 feet was an unwise limit of length. To a lesser degree, the same was true as regards vessels classed as pure passenger vessels.

PROFESSOR VOSSNACK (Netherlands) explained that when he spoke he had assumed that the proposals of the Sub-Committee would be coupled with the requirement that ships below the two-compartment ships and above 120 metres in length should remain afloat with the two forward compartments flooded, and that the very large ships should be sub-divided at the forward end in excess of the two-compartment standard.

M. BORIS (France) pointed out that this was a part of the French proposals.
SIR ARCHIBALD DENNY (Great Britain) said that in general, it was the intention of the Sub-Committee also.

M. DUGUID (Canada) said that previous to the meeting he had undertaken to second the amendment proposed by M. Ferguson, but in view of the enlightenment he had received during the discussion he would like to ask M. Ferguson's permission to withdraw from that undertaking. He was quite satisfied with the proposals of the Sub-Committee.

M. MACHAY (Hungary) agreed that all possible safety should be secured, but he thought that the American proposals might cause difficulty, and until investigation had been made he could not pronounce definitely in favour of either of the proposals under consideration.

THE CHAIRMAN said that, if it was subsequently found in actual practice that the requirements of the rules for sub-division laid down by the Conference could be exceeded, those vessels which attained the higher standard should have this fact noted in some official manner.

M. PALM (Austria) agreed with the proposals of the Sub-Committee, subject to the proviso mentioned by Professor Vossack. It was impossible to know what the effect of the American proposals would be, and for the present he thought it impracticable to go beyond the Sub-Committee's proposals.

SIR ARCHIBALD DENNY (Great Britain), referring to Dr. Bruhn's suggestions, reminded members that the British Committee had not yet completed their work, especially as regards cargo-passenger steamers; his idea before the Conference had been that the meeting of representatives of all countries would probably lead to modifications in the ideas of all of them, and their combined experience would enable them authoritatively to formulate standards not necessarily for immediate enforcement, but as a basis for further investigation. He thought the Conference would give instructions that the minimum standards prescribed should be bettered if possible, but he wished to remind the members that the shipowners were anxiously awaiting the results of the investigations now proceeding and as soon as any results were published they would proceed to design their vessels in accordance with these results, and might feel aggrieved if more severe requirements were laid down after a short interval. From this point of view it seemed desirable that the Conference should lay down rules which would probably not be materially altered in the direction of greater stringency.

He desired again to emphasise that as the lower standard proposed by the Sub-Committee applies to the extreme type of cargo-passenger vessel, the two-compartment standard would in practice be reached in vessels under 570 feet long, though it was not possible to speak precisely on this point until the coefficient of traffic had been determined, a work which would require time.

With some hesitation he asked whether it would be profitable to have a short recess in which the authors of the proposals might consult together.

M. HANSMUSSEN (Denmark) agreed with the proposals of the small Sub-Committee in the hope that they would be revised at the forthcoming International Load Line Conference.

THE CHAIRMAN agreed with Sir Archibald Denny as to the difficulty of revising rules within so short a period of their enforcement. He thought it would be wise for the Committee to make some reference to revision by a future Conference, and perhaps it might be well to consider whether the standards laid down by this Conference should be enforced at some date later than the date of the proposed Load Line Conference for instance. If, however, the conclusions of some future Conference should be that this Conference had laid down standards which could be very readily exceeded, any present action which provided unnecessarily low standards would be most unfortunate. It would also be undesirable to lay down standards which a future Conference might find it necessary to lower. A just mean was most desirable. Referring to Sir Archibald Denny's remarks he said he would be glad to have the Sub-Committee take a short recess if this was desired.

The Sub-Committee accordingly took a short recess.

On the resumption of the meeting, M. PIERRARD (Belgium) said that after consultation with his German, French, and British colleagues who had been responsible with him for the proposals under consideration, he was authorised to state that in order to meet the views expressed they were willing to modify their proposals so
that, in the case of pure passenger vessels the factor unity would correspond to a length of 260 feet, the factor 5 to a length of 490 feet and the factor .34 to a length of 900 feet. As regards cargo-passenger vessels the factor unity would correspond to 295 feet, the factor .5 to 570 feet, and the factor .34 to 900 feet.

M. FERGUSON (United States of America) said that as it was not at present known how the grading between the two types would be done, the limits for the cargo-passenger vessel were in his opinion more important than all the others put together, and he thought the limit of 570 feet for the two-compartment standard, to which the four delegations still adhered, would have the inevitable result of forcing owners to build larger ships. Public opinion would disconrntenance large vessels not capable of floating with two compartments flooded.

SIR ARCHIBALD DENNY (Great Britain) pointed out that the alternative would be to apply the two-compartment standard to such vessels below 570 feet in length as public opinion might require to be sub-divided in that manner.

M. FERGUSON (America) responded that public information would be that the limit of the two-compartment standard was 570 feet, and this would outweigh the fact that some of the ships below that length conplied with that standard. He thought it very important that as many ships as possible should be built to comply with that standard, and especially those carrying on the emigrant and other similar trades.

THE CHAIRMAN stated that, as the delegations had apparently made up their minds, a vote might now be taken. He considered it his duty before taking a vote to state that the two-compartment proposals of the small Sub-Committee, if made applicable to British passenger vessels now built and noted in the Parliamentary Return of the 13th May, 1912, would apply to 29 vessels out of 405. The proposals of the American Delegation embodied requirements which they regarded as practicable. As these proposals had not been seconded, the only course left was for the American delegation to request that they be recorded in the Minutes of the meeting. If any Delegation desired to modify its complete acceptance of the four delegates' proposals as now modified in accordance with M. Pierrard's declaration the Chairman would have their modifications recorded; in the absence of further comment he would proceed to take the vote.

SIR ARCHIBALD DENNY (Great Britain) thought he must intervene and protest against the statement as to the number of vessels affected. According to the British Parliamentary Return for 1912 there were 100 vessels over 500 feet and 50 between 300 and 550 feet in length. As the extreme limit of the two-compartment standard was proposed at 570 feet he thought it probable that some of the vessels below 550 feet would be two-compartment vessels, and the number affected would therefore be greater than stated by the Chairman.

THE CHAIRMAN said he must have been misunderstood. He stated that the figure he meant to give was 29 and if he had inadvertently said 19 he desired to correct it. He would have the figures verified.

SIR ARCHIBALD DENNY (Great Britain) said that he felt that there must be some misunderstanding and emphasised the fact that under the suggestions which had been made vessels between 400 and 570 feet in length would be dealt with according to the nature of their service and that the application of the two-compartment standard would in practice be below 570 feet in the average case. If this was not clear in the text of the proposals, he suggested that steps should at once be taken to make the meaning clear.

THE CHAIRMAN read the proposals and said that he thought they required further explanation in view of Sir Archibald Denny's statement as to their real intention.

M. BORIS (France) agreed that they might be amplified so as better to express the original real intention.

After some further discussion, it was agreed that the authors of the proposals should again meet together and prepare a text expressing clearly their intention and that this should be circulated before the next meeting of the Committee, and considered at that meeting.

Adjourned to 10 A.M., the 13th December, 1913.
Eleventh Meeting.—December 13, 1913, 10 a.m.

Present: Admiral Capps (Chairman), MM. Pagel, Walter, Ferguson, McBride, Palm, Machay, Pierrard, Rasmussen, Boris, Sir A. Denny (accompanied by Professor Welch), MM. Meana, Bonfiglietti, Barricelli, Bruhn, Vossnack, and Leman.

THE minutes of the seventh and eighth meetings were approved, subject to a correction suggested by Professor Pagel in those of the eighth meeting.

Copies of the definitions submitted by Professor Pagel, Sir Archibald Denny, and Dr. Bruhn were distributed.

THE CHAIRMAN suggested that these definitions should be referred to the three delegates just named, together with a representative of the French Delegation and the Chairman, to consider the suggestions and prepare a revised text for submission to the full Committee.

DR. BRUHN (Norway) said he desired to withdraw the first part of his suggestions, in view of the action which had been taken by the Committee since they had been drawn up.

THE CHAIRMAN said that the whole matter would be gone into by the small Sub-Committee he had named. The formation of this Sub-Committee was agreed to. The Chairman reminded the members that the questions of extra sub-division at the forward end of vessels and the maximum length of compartments had still to be considered, and he would be glad if members who had any suggestions to make regarding these points would send them in before 9 o'clock the following morning, in order that they might be considered by the small Sub-Committee just agreed to. It would also, he thought, be advantageous for the members to glance through the minutes of previous meetings and forward any suggestions they might have for dealing with any points which had been reserved for consideration.

He desired to emphasise that the formation of small sub-committees for the consideration of specific points was not intended to exclude, and would not exclude, any member of the Committee from the consideration of all the questions before them, but was merely to facilitate progress and to prepare the questions for consideration in such a form as would permit final conclusions to be readily attained.

Referring to the subject under discussion at the conclusion of the previous meeting, the revised text of the proposals as to sub-division was not available, and the matter would therefore be postponed until the meeting of the main Committee on Monday, when final action would be taken. In this connection he would like to state that there would be no more meetings of No. 1 Sub-Committee as a separate Committee. The unfinished work of that Sub-Committee could now be undertaken to advantage by the Main Committee, which could now hold frequent sittings with a full membership, as No. 2 and No. 3 Sub-Committees had submitted their reports.

Adjourned sine die.

* For next meeting of Main Committee, see page 131; and for meeting of Main Committee, at which the work of Sub-Committee No. 1 was considered, see page 134.
Committee on Safety of Construction.

SUB-COMMITTEE No. 2 (STRENGTH OF BULKHEADS, &c.).

First Meeting.—November 25, 1913.

Present: Sir John Biles (Chairman), MM. Walter, Ferguson, Machay, Duguid, Grolous, Bonfiglietti, and Nilsson.

THE Sub-Committee considered the list of points for consideration which had been referred to them by the main Committee.* They agreed that they could not, with their present information, draw up detailed rules as to the construction of bulkheads, but three resolutions, dealing respectively with the strength of bulkheads, the tests to be applied, and the prohibition of changes, were drawn up for further consideration.

Adjourned to 4:30 p.m., the 26th November, 1913.

* See page 45.
Second Meeting.—November 26, 1913, 4:30 p.m.

Present: Sir John Biles (Chairman), MM. Walter, Ferguson, Palm, Machay, Pierrard, Duguid, Boris, de Berlhe, Grolous, Sir A. Denny, Meana, Bonfiglietti, Barricelli, Vosnack, and Nilsson.

THE general principles drafted at the previous meeting were considered, and several suggestions for amplifying the first (relating to construction of bulkheads) were made.

M. DE BERLHE pointed out that, unless the principles were made quite complete and all the assumptions stated, it would not form a criterion which the respective Administrations could satisfactorily apply to existing rules.

THE CHAIRMAN stated that, in his opinion, only three courses were open: (1) To confine themselves to very general principles and to say that the detailed rules must be drawn up later; (2) to accept the rules of the classification societies; or (3) to lay down conditions as they were at present endeavouring to do. He realised that there were difficulties as regards each of these courses, and he suggested that further discussion of the matter be postponed until the next meeting.

The other two resolutions (relating to tests, and changes in the construction of bulkheads) were considered and amended.

Adjourned to 4:30 p.m., the 27th November, 1913.
Third Meeting.—November 27, 1913, 4:30 p.m.

Present: Sir John Biles (Chairman), MM. Walter, Ferguson, Palm, Machay, Pierrard, Duguid, Boris, de Berlhe, Grolous, Sir A. Denny, Meana, Bonfiglietti, Barricelli, Vossmack, and Nilsson.

THE minutes of the first and second meetings of the Sub-Committee were read and approved.

THE CHAIRMAN referred to the resolution drafted at the second meeting respecting the strength of bulkheads, and said that since that meeting he had discussed the matter with Sir Archibald Denny, and, in view of the experiments about to be made by Sir Archibald Denny’s Committee as regards the strength and scantlings of bulkheads, he desired to remind the Sub-Committee of the three courses open to them, as stated at the last meeting, viz.: (1) To confine themselves to very general principles and to say that the detailed rules must be laid down later; (2) to accept the rules of the classification societies; or (3) to draw up requirements, as they had been endeavouring to do. The Chairman added that, in order to bring the matter more clearly before them, he had drafted a new alternative resolution, which might be considered if the Sub-Committee decided to adopt course No. 1.

The Chairman then read the draft resolution referred to, and, after a short discussion, this was agreed to as follows:—

Watertight bulkheads must be constructed in such manner that they shall be capable of supporting, with a proper margin of resistance, the pressure due to the prescribed head of water.

With reference to the proper margin of resistance, experiments are being carried out to determine this, and it is not desirable to come to a final conclusion until the results of these experiments are available.

M. BORIS (France) raised the question of fixing the head of water referred to in the resolution.

THE CHAIRMAN said that Sir A. Denny would make a proposal as to this at a later meeting.

The resolutions drafted at the previous meeting respecting the tests of bulkheads and the prohibition of unauthorised changes were then considered, amended, and agreed to as follows:—

It is not considered that testing main compartments by filling them with water should be made compulsory. A complete examination of all bulkheads should be made by a surveyor. Testing by hose should be carried out in all cases to assist the visual tests. The foremost and aftermost compartments of the ship, and all compartments intended to hold liquids, should be tested with water to a prescribed head.

With a view to maintaining strength and watertightness, no change shall be made in the condition of the bulkhead after the completion of the survey, unless with the permission of the Administration.

Les cloisons étanches doivent être construites de manière à pouvoir supporter la pression due à la hauteur d’eau prescrite avec une marge de résistance convenable.

Des expériences actuellement en cours ont en vue la détermination de cette marge de résistance, et il n’est pas désirable d’adopter une limite précise avant que les résultats de ces expériences ne soient connus.

Il n’est pas jugé nécessaire de rendre obligatoire l’essai par remplissage des compartiments principaux. Un examen complet des cloisons doit être fait par un expert, et cet examen doit être complété dans tous les cas par un essai à la lance.

Les compartiments extrêmes de l’avant et de l’arrière du navire ainsi que tous les compartiments destinés à contenir des liquides seront soumis à un essai de remplissage sous une pression hydrostatique déterminée.

Après que l’inspection d’une cloison sera terminée, afin de maintenir son étanchéité et sa résistance, aucun changement ne pourra être apporté à sa construction sans autorisation de l’Administration.
It was agreed to postpone the determination of the "prescribed head" mentioned in the first of the two foregoing resolutions.

M. DE BERLHE (France) suggested deleting the words "the Administration" in the second of the two resolutions, and substituting the words "the surveyor" or "the organisation by which the survey was made," but on the Chairman's suggestion it was agreed to postpone the consideration of the point until No. 3 Sub-Committee had reached some conclusions as to the general questions of survey.

The question of the construction of steps in bulkheads, and of watertight decks, was next considered, and after discussion a resolution was agreed to as follows:

Steps and recesses in bulkheads must be made watertight throughout, and each must be of the same strength as the bulkhead at the place where it occurs. Where frames or beams pass through plating which has to be watertight, the watertightness must be obtained by caulked angle chocks or cast-iron or steel chocks efficiently secured and rust-jointed, and not by wood or cement.

Lorsqu'une cloison forme baionnette ou présente des niches, ces parties doivent être aussi étanches et présenter la même résistance que les éléments avoisinants de la cloison.

Au passage de membrures ou de barrots au travers d'un pont ou d'une cloison étanche, l'étanchéité doit être assurée par des cornières forgées et matées, ou par des collerettes en acier ou en fonte efficacement appliquées avec interposition de mastic de fer; l'emploi de bois ou de ciment est proscri. 

The question of double bottoms was then considered, particularly as to whether a complete double bottom should be required in all foreign-going ocean passenger steamers, or whether a lower limit of size should be fixed. It was agreed to consider the matter further at the next meeting, and also to consider further at that meeting the question which was raised as to whether the line of the inner bottom should be continued out to the ship's side.

Adjourned to 4:30 P.M., the 28th November, 1913.
Fourth Meeting.—November 28, 1913, 4:30 p.m.

Present: Sir John Biles (Chairman), M.M. Walter, Ferguson, Palm, Duguid, de Berlhe, Grolous, Meana, Bonfiglietti, Barricelli, Bruhn, Vossnack, and Nilsson.

THE Minutes of the third meeting of the Sub-Committee were read and, after slight amendments at the instance of the Italian Delegation, approved.

The question of double bottoms considered at the last meeting was resumed, and the Chairman said that the first question for the Sub-Committee to consider was whether the double bottom should be carried right out to the ship’s side, the difficulty being to fit the double bottom so as to secure efficient drainage arrangements.

DR. BRUHN (Norway) said it seemed to him very desirable to carry out tank tops to the sides, but he suggested limiting that requirement to vessels above a certain beam. In this respect he suggested the following limits:—

From 40 to 60 feet beam: The tank top should be carried out to 5 feet from the sides of the vessel.
From 60 to 80 feet beam: The tank top should be carried right to the sides of the vessel.
Above 80 feet beam: The double bottom should be carried up the side to a height equal to one-tenth of the beam, above the keel.

Dr. Bruhn added that the limits he had suggested could perhaps be slightly altered.

After discussion of the limits of 60 and 80 feet, the Chairman submitted Dr. Bruhn’s motion to the vote.

The vote was negative.

THE CHAIRMAN then submitted a general motion based on the suggestions of the British Bulkheads Committee:—

“In order to protect the bilges, the line of the inner bottom should be carried right out to the ship’s side for ships over 60 feet beam.”

This was not agreed to.

M. BONFIGLIETTI (Italy) thought the Conference ought not to make an absolute rule on a matter where different systems may in the future prove more efficient; it would be better to make only a recommendation.

The idea of making a simple recommendation was not supported by other members, and it was decided to defer the question.

Adjourned until 3 p.m., the 2nd December, 1913.
Fifth Meeting.—December 2, 1913, 3 p.m.

Present: Sir John Biles (Chairman), M.M. Walter, Ferguson, Palm, Machay, de Berlhe, Grolous, Duguid, Sir A. Denny, Meana, Bonfiglietti, Barricelli, Bruhn, Vossack, and Nilsson.

The minutes of the fourth meeting of the Sub-Committee were approved.

The Chairman invited the Sub-Committee to give further consideration to the question of extent of double bottoms both longitudinally and laterally. He read the suggestion contained in the British memorandum on watertight sub-division: “All foreign-going passenger steamers should have a complete watertight double bottom extending from the forepeak to the afterpeak bulkheads.”

M. Ferguson (United States of America) and General Meana (Italy) accepted the British proposition, but only for steamers above a certain length. The French delegates pointed out that it would not be possible to prescribe a continuous double bottom for steamers in the Mediterranean trade.

Rules proposed by DR. Bruhn (Norway), slightly amended after discussion, were then agreed to in the following terms:

1. In vessels 200 and under 250 feet in length a double bottom is to be fitted from the machinery space to the forepeak bulkhead or as near as practicable thereto.

2. In vessels 250 and under 300 feet in length a double bottom is to be fitted at least outside of the machinery space extending to the fore and after peak bulkheads, or as near as practicable thereto.

3. In vessels 300 feet and over in length a double bottom is to be fitted amidships, extending to the fore and after-peak bulkheads, or as near as practicable thereto.

The French Delegation, considering the case of Mediterranean navigation, agreed to the proposition on the understanding that its application would be restricted to trans-oceanic navigation.

After discussion, it was decided that, whatever might be the definitions adopted by the Conference, the above rules are only intended to apply to “ocean-going” ships.

The question of the extent of double bottom laterally was then resumed, the Chairman pointing out that there is actually a tendency to carry double bottoms higher than before, and it would be very desirable to come to some result in that respect.

Motions were presented by M.M. Ferguson, Bruhn, and de Berhle. The Chairman ordered them to be copied for consideration at the next meeting.

Sir John Biles having to leave the Committee for other duties, Sir Archibald Denny took the Chair.

The question of Wells in double bottoms was then considered.

The following suggestions put forward by the British Bulkheads Committee, were adopted by the Sub-Committee:

1. Les navires dont la longueur est comprise entre 200 et 250 pieds (61 et 76 mètres) doivent être pourvus d’un double fond allant de l’avant de la tranche des machines et chaudières jusqu’à la cloison du coqueron avant ou aussi près que possible de cette cloison.

2. Les navires dont la longueur est comprise entre 250 et 300 pieds (76 et 91,5 mètres) seront pourvus de doubles fonds au moins en dehors de la tranche des machines et chaudières. Ces doubles fonds iront à l’avant et à l’arrière jusqu’aux cloisons des coquerons ou aussi près que possible de ces cloisons.

3. Les navires dont la longueur dépasse 300 pieds (91,5 mètres) seront pourvus d’un double fond s’étendant entre les cloisons des coquerons ou s’approchant autant que possible de ces cloisons.
"A well extending to the outer skin may be permitted at the after end of the shaft tunnels of screw vessels.

"If wells or 'hats' are constructed elsewhere in the double bottom in connection with the drainage arrangements, they should not extend downwards from the inner bottom more than half the depth of the double bottom."

"Les puisards établis dans le double fond pour recevoir les aspirations des pompes ne peuvent avoir une profondeur supérieure à la moitié de la hauteur du double fond à l'endroit considéré. Des puisards s'étendant jusqu'à la coque peuvent être admis à l'extrémité arrière des tunnels des navires à hélice."

THE CHAIRMAN then put before the Sub-Committee the question of openings in watertight bulkheads below the bulkhead deck.

The first general rule of the British Memorandum was unanimously agreed to:

"The openings in watertight bulkheads should be reduced to the smallest number compatible with the design and proper working of the vessel, and should be provided with satisfactory means for closing them.

"In the case of watertight bunker doors, satisfactory arrangements should be made by means of screens or otherwise, to prevent the coal from interfering with the closing of the doors."

"Le nombre des ouvertures pratiquées dans les cloisons étanches doit être réduit au minimum compatible avec les dispositions générales et la bonne exploitation du navire; ces ouvertures doivent être pourvues de dispositifs de fermeture satisfaits.

"Les portes étanches ménagées dans les cloisons des soutes à charbon doivent être pourvues d'écrans ou autres dispositifs ayant pour effet d'empêcher que le charbon rende impossible leur fermeture complète."

A discussion then ensued about the limits above which hinged doors might be used. Three different opinions being expressed, the Chairman suggested that further discussion of the question be postponed until the next meeting.

Adjourned to 3 p.m., the 4th December, 1913.
Sixth Meeting.—December 4, 1913, 3 p.m.

Present: Sir John Biles (Chairman), MM. Walter, Ferguson, Palm, Machay, Duguid, de Berlhe, Grolous, Sir Archibald Denny, Meana, Bonfiglietti, Barricelli, Bruhn, Vossnak, and Nilsson.

THE Minutes of the fifth meeting were read, and, after slight corrections, approved.

THE CHAIRMAN read the suggestions submitted to the Sub-Committee by MM. Ferguson, Bruhn, and de Berlhe respecting the lateral extent of double bottoms. He proposed to consider M. Ferguson’s propositions as a motion and the others as amendments to that motion.

The first amendment of Dr. Bruhn was then put before the Sub-Committee:—

“When the breadth of a vessel is 40 and under 60 feet the breadth of the double bottom, measured at the tank top, is not to be more than 10 feet less than the breadth of the vessel for at least half the vessel’s length amidships.”

The vote on that amendment was negative. (In favour: Germany, Austria, France, Norway, Netherlands; Against: United States of America, Belgium, Canada, Great Britain, Italy, and Sweden.)

A second amendment combining the propositions of Dr. Bruhn and M. de Berlhe was then agreed to in the following terms:—

“When the length of a vessel is 550 and under 700 feet the breadth of the double bottom is to be equal to the breadth of the vessel at the height of the inner bottom.”

A third amendment combining the suggestions of MM. Bruhn and de Berlhe was then agreed to unanimously in the following form:—

“When the length of a vessel is 700 feet or over the double bottom is, for at least half the vessel’s length amidships and forward, to be extended up the vessel’s side to a height above the top of the keel not less than 10 per cent. of the vessel’s moulded breadth.”

The original motion proposed by M. Ferguson was then put before the Sub-Committee in the following form:—

“In vessels over 300 feet in length the inner bottom must be continued out to the ship’s sides in such a manner as to protect the bilges.”

The motion was adopted by 7 votes against 4. (For: United States of America, Austria, Belgium, Canada, Great Britain, Italy, Sweden; Against: Germany, France, Norway, Netherlands.)

DR. BRUHN then proposed the text of the second amendment above as a new motion. The vote being negative, that motion dropped.

The final resolutions of the Sub-Committee as regards lateral extension of double bottom were thus as follows:—

“In vessels over 300 feet in length the inner bottom must be continued out to the ship’s sides in such a manner as to protect the bilges.”

“Le double fond des navires dont la longueur dépasse 300 pieds (91.50 mètres) doit se prolonger latéralement vers la muraille de manière à protéger les bouchains.”

“Lorsque la longueur du navire est supérieure à 700 pieds (213.50 mètres) le double fond doit s’élever latéralement au-dessus du dessus de quille à une hauteur égale au moins au dixième de la largeur au fort; cette disposition doit s’étendre au moins sur la moitié de la longueur du navire au milieu ainsi qu’à l’avant.”
THE CHAIRMAN then invited the Sub-Committee further to consider the limit above which hinged doors might be used.

SIR ARCHIBALD DENNY, after having summarised the matter, proposed the following motion:

"Hinged watertight doors are only permitted above a deck when the upper surface of that deck is at least 8 feet above the load-water line at the lowest point of that deck, and such doors are not permitted below such a deck."

The French and Italian Delegations considering the limit of 8 feet too high, a discussion ensued and the Chairman invited the members to prepare amendments on that motion for the next meeting.

Adjourned to 3 p.m., the 5th December, 1913.
Seventh Meeting.—December 5, 1913, 3 p.m.

Present: Sir John Biles (Chairman), M.M. Walter, Ferguson, Palm, Machay, Pierrard, Duguid, de Berlhe, Grolous, Sir Archibald Denny, Meana, Bonfigliotti, Barricelli, Vossnack, and Nilsson.

The minutes of the sixth meeting were approved.

The Chairman asked the Sub-Committee to consider the question of watertight doors of different types.

M. GROLOUS (France) made some remarks about the motion presented at the last meeting by Sir Archibald Denny. He emphasised the usefulness of hinged doors in the service passage-ways of passenger vessels of moderate size, and he proposed to reduce the limit of eight feet suggested by Sir Archibald Denny.

M. WALTER (Germany) proposed to reduce that figure to four feet.

Sir Archibald Denny (Great Britain) explained that his proposition was only intended to apply to living spaces, and he submitted a new draft of his motion.

"Hinged watertight doors in passenger, crew, and working spaces are only permitted above a deck when the upper surface of that deck is at least seven feet above the load water-line at the lowest point of that deck and such doors are not permitted below such a deck."

This motion was agreed to.

A discussion then took place about the level above which hinged doors may be permitted in cargo spaces provided they are closed during the voyage.

M. GROLOUS (France) proposed to allow such doors below the load water-line but above the lowest deck in the ship.

This proposition was not agreed to.

M. FERGUSON (United States of America) proposed the following motion:

"Hinged watertight doors of especially heavy design for handling cargo may be fitted above the load water-line in bulkheads between cargo spaces provided they are closed before a voyage commences and are kept closed during the voyage, and provided entries are made in the ship’s log to this effect.

"Provided also that at the ends of the ship hinged watertight doors shall not be fitted in a cargo deck space below the deck space where such doors may be fitted amidships."

This was unanimously agreed to.

"Des portes étanches à charnières peuvent être admises dans les parties du navire affectées aux passagers et à l’équipage ainsi que dans les locaux de service, à condition qu’elles soient établies au-dessus d’un pont dont le point le plus bas se trouve au moins à 7 pieds (2.135 mètres) au-dessus de la flottaison en charge."

"Des portes étanches à charnières d’un type particulièrement robuste peuvent être admises dans des cloisons séparant deux salles à marchandises à condition que ces portes se trouvent au-dessus de la flottaison en charge. Elles doivent être fermées avant que le navire ne prenne la mer et rester telles pendant la navigation ; mention de leur fermeture doit être faite dans le journal de bord.

"Toutefois, il ne pourra être admis de portes étanches à charnières, même aux extrémités du navire, dans un entrepont à marchandises pour la région centrale duquel ces portes seraient interdites en application de la règle précédente."

This was unanimously agreed to.
THE CHAIRMAN then raised the question of watertight doors to be fitted below the limits referred to in the above resolutions. After a short discussion about the height of the point from which geared doors must be worked, the following resolution was proposed by the Chairman:

"All other watertight doors in the ship shall be sliding doors capable of being closed locally and also from an accessible position above the flooded water-line."

"Toutes les autres portes étanches doivent être des portes à glissières, elles doivent pouvoir se manœuvrer sur place ainsi que d'un point facilement accessible situé au-dessus de la flottaison après avarie."

This motion was unanimously agreed to.

Adjourned to 3 p.m., the 8th December, 1913.
Eighth Meeting.—December 8, 1913, 3 p.m.

Present: Sir John Biles (Chairman), MM. Walter, Ferguson, Palm, Machay, Pierrard, Boris, Meana, Bonfiglietti, Barricelli, Vossuack, and Nilsson. M. Duguid sent an apology for his unavoidable absence.

The minutes of the preceding meeting of the Sub-Committee were read and approved after slight corrections.

M. MEANA suggested that the last resolution passed at the preceding meeting should be completed by adding that doors should be closed in a reasonably short time.

The Chairman said that question would be dealt with later on. He then read suggested resolutions sent by Sir Archibald Denny. Propositions of the same kind having been sent by the French Delegation, the corresponding parts of both sets of propositions were considered by the Sub-Committee.

As to the location of openings, the fifth rule of the French memorandum was agree to, with some alterations so as to read as follows:

"No opening may be made—"

"(a.) In the collision bulkhead below the flooded water-line.

"(b.) In watertight transverse bulkheads separating two cargo holds from one another or a cargo hold from a reserve bunker situated below the load water-line.

"Sliding watertight doors may be fitted below the load water-line—"

"(a.) In a bulkhead separating reserve bunkers from the machinery space.

"(b.) In bulkheads sub-dividing the machinery space.

"(c.) In the transverse bulkheads in the tunnels."

As to the maximum number of openings allowable in the bulkheads referred to in the preceding resolution, the suggestion of Sir Archibald Denny, with some alterations, was agreed to in the following form:

"In the machinery spaces of steamships and apart from bunker doors, not more than one door may be fitted in each main transverse bulkhead within the machinery space for intercommunication, but, where more than one separate shaft tunnel is fitted, a door may be cut for each tunnel.

"If a tunnel is fitted forward either for the purpose of pipes or as a firemen's passage, it must be fitted with a watertight door."

"Il ne doit être pratiqué aucune ouverture:

"(a.) Dans la cloison étanche d’abordage, au-dessous de la flotaison après avarie;

"(b.) Dans les cloisons transversales étanches séparant une cale de chargement de la cale contiguë ou d’une soute de réserve, au-dessous de la flotaison en charge.

"Des ouvertures munies de portes étanches à glissières sont admises au-dessous de la flotaison en charge:

"(a.) Dans la cloison séparant les soutes de réserve des espaces affectés aux machines et chaudières;

"(b.) Dans les cloisons compartimentant les espaces affectés aux machines et chaudières;

"(c.) Dans les cloisons transversales des tunnels étanches."

As to the maximum number of openings allowable in the bulkheads referred to in the preceding resolution, the suggestion of Sir Archibald Denny, with some alterations, was agreed to in the following form:

"Dans les espaces affectés aux machines et chaudières, et exclusion faite des portes de soutes à charbon, il ne peut être pratique qu’une porte dans chaque cloison transversale principale en vue de l’intercommunication; toutefois, s’il y a plusieurs tunnels d’arbres distincts, il peut y avoir une porte d’accès pour chaque tunnel.

"S’il existe un tunnel avant pour la circulation des chauffeurs ou pour le passage des tuyautages, il doit être pourvu d’une porte étanche."

The description of different types of doors was then considered.
After comparisons between Sir A. Denny's resolutions and those of the French Delegation, the Sub-Committee adopted the following general principles:

"The only types of watertight doors permissible on board passenger vessels are sliding doors or hinged doors or doors of any other equivalent pattern, excluding plate doors secured only by bolts.

"1. A hinged door must be fitted with lever-operated catches workable from either side of the bulkhead.

"2. A sliding door may have a vertical or horizontal motion. It must be of suitable material and be fitted with hand-gear for operating at the door itself and from an accessible position above the flooded waterline when there is no power for closing the door.

"3. When the number of watertight doors in the machinery space exceeds five, all the watertight doors situated below the load waterline must be capable of being simultaneously closed by power from a station situated on the bridge, and their opening and closing must be controlled and indicated in that station.

"4. The simultaneous closing of these doors must be slow and must be accompanied by a warning sound signal.

"5. Portable plates on bulkheads are inadmissible except in machinery spaces. If fitted, an entry must be made in the official log whenever they are removed, and also when they are replaced. They must always be in place before the vessel proceeds to sea, and must not be removed at sea except in case of urgent necessity. The greatest care must be taken in replacing them to ensure that the joint shall be perfectly watertight.

"6. If trunkways for forced draught, for access from crew's accommodation to the stokehold or for any other purpose are carried through the main transverse watertight bulkheads, the integrity of the watertight bulkheads should be maintained by watertight doors or other effective means.

"7. Where electric light cables, pipes, &c., are carried through the main transverse watertight bulkheads below the flooded waterline, the bulkhead connections must be watertight and the integrity of the watertight bulkheads maintained.

"Les seuls types de portes étanches admis sont les portes à glissières et les portes à charnières ou toutes autres au moins équivalentes à l'un de ces deux types, à l'exclusion de celles qui sont montées simplement sur boulons.

"1. Les portes à charnières doivent être pourvues de loquets commandés par des leviers manœuvrables des deux côtés de la cloison.

"2. Les portes à glissières peuvent être à déplacement vertical ou horizontal, elles doivent être construites en matériaux convenables, et pouvoir se manœuvrer à la main sur place; en outre, lorsque l'on ne recourt pas à l'énergie mécanique pour la fermeture, la manœuvre doit pouvoir s'effectuer d'un point situé au-dessus de la flottaison après avarie.

"3. Lorsque le nombre des portes étanches des espaces affectés aux machines et chaudières est supérieur à cinq, toutes les portes étanches situées au-dessus de la flottaison en charge doivent pouvoir être fermées simultanément et contrôlées d'un poste unique situé dans la timonerie ou au voisinage immédiat de celle-ci.

"4. La fermeture simultanée de ces portes doit se faire lentement et être accompagnée de l'émission d'un signal avertisseur sonore.

"5. L'emploi de panneaux boulonnés n'est toléré que dans les espaces réservés aux machines et chaudières. Ces panneaux doivent toujours être en place avant que le navire ne prenne la mer; ils ne peuvent être enlevés en cours de navigation qu'en cas d'impericieux nécessité. Chaque fois qu'un panneau est enlevé ou mis en place il doit en être fait mention dans le journal de bord; des précautions doivent être prises pour assurer la parfaite étanchéité du joint.

"6. Si des conduits de tirage forcé ou des courises de communication pour le personnel, notamment entre le poste de l'équipage et les chaufferies, ou tous autres passages similaires traversent des cloisons transversales principales, ces conduits courises ou passages doivent être munis de portes étanches ou d'autres organes équivalents nécessaires pour rétablir l'intégrité de l'étanchéité de la cloison.

"7. Si des tuyautages, des conducteurs électriques, &c., traversent des cloisons étanches transversales principales au-dessous de la flottaison après avarie, des dispositions doivent être prises pour assurer l'intégrité de l'étanchéité de la cloison."
As it had been remarked during the discussion that indicators and other fittings of doors controlled from a central point are only reliable if often in use, M. Ferguson suggested that the question of door drills should be at once considered.

The following resolutions suggested by M. Ferguson were then agreed to:

"1. To ensure their efficiency, all watertight doors in main transverse bulkheads which are in use at sea shall be operated daily at sea as a drill, and the results recorded in the ship's log.

"2. Water-tight doors must be tested by a water pressure corresponding to the head prescribed for the bulkhead where the doors are located."

"1. Lorsque le navire est à la mer, il doit être procédé chaque jour à un essai de fonctionnement de toutes les portes étanches établies dans des cloisons transversales principales qui sont utilisées en cours de navigation; ces exercices font l'objet de mentions explicites au journal de bord.

"2. Les portes étanches doivent être soumises à un essai hydrostatique sous une pression égale à celle qui est prescrite pour la partie de cloison dans laquelle la porte est pratiquée."

Adjourned to 3 p.m., the 10th December, 1913.
Ninth Meeting, December 10, 1913, 3 p.m.

Present: Sir John Biles (Chairman); M.M. Ferguson, Palm, Duguid, Grolous, Bonfiglietti, Vossmanck, and Nilsson.

THE minutes of the preceding meeting of the Sub-Committee were read and approved subject to some corrections suggested by the Chairman and by M. Grolous in the paragraphs concerning sliding doors actuated by power, and watertightness of bulkheads at the places where pipes and electric cables are carried through them.

THE CHAIRMAN asked the members to take a resolution on the question of possibilities of escape in connection with the fitting of doors actuated by power and controlled from the bridge.

Sir Archibald Denny's suggestion on this subject having been considered, M. Grolous insisted on the necessity of providing special escapes for firemen in case of boiler accident.

The following resolution was agreed to:

"In passenger, crew, and working spaces a practical means of escape must be provided from each watertight compartment liable to be isolated by the closing of watertight doors which cannot be opened by the occupants of the compartments.

"There must also be a means of escape from each engine room, shaft tunnel, and stokehold compartments independent of the watertight doors."

"Dans les parties du navire affectées aux passagers et à l'équipage ainsi que dans les locaux de service, tout compartiment étanche exposé à être isolé par suite de la fermeture de portes étanches qui ne peuvent pas être ouvertes par les occupants, doit être pourvu d'une échappée offrant au personnel un moyen de retraite praticable.

"Chaque chambre de machine, chaque chaudière et chaque tunnel d'arbre doit être pourvu en tout cas d'une échappée offrant au personnel un moyen de retraite qui n'exige pas la traversée des portes étanches."

M. GROLOUS having suggested that the preceding resolution should be completed by providing facilities of egress from the vessel in case of emergency, the Chairman said that the question would be examined by the Committee on Life-Saving Appliances.

The question of sluice valves in watertight bulkheads having been put before the Sub-Committee the following resolution was agreed to:

"Sluice valves must be reduced to the smallest number possible and will not be allowed except in positions where they are readily accessible at all times and can be easily kept in order. They must be strongly constructed, efficiently fitted, and regularly inspected. Satisfactory provision must be made for operating them from an accessible position above the flooded waterline. Means must be provided for indicating when they are open or shut."

"Le nombre des vannes établies dans les cloisons étanches doit être réduit au minimum. Les vannes ne sont admises qu'en des endroits suffisamment accessibles en tout temps pour que l'on puisse s'assurer de leur bon état d'entretien ; elles doivent être solidement construites, soigneusement montées et périodiquement visitées. Les vannes doivent pouvoir être convenablement manœuvrées d'un endroit accessible situé au-dessus de la flottaison après avarie et leur mécanisme doit comporter un dispositif indiquant si la vanne est ouverte ou fermée."

THE CHAIRMAN put before the Committee the question of side scuttles and read the British suggestions presented by Sir Archibald Denny. In the course of the discussion which ensued, M. Vossmanck proposed not to go too far into details as to the location of scuttles provided with metal covers. On the suggestion of M. Ferguson it was decided to prohibit side lights in coal or cargo spaces. (Voted in favour of that motion: United States of America, Great Britain, Italy, Netherlands, Sweden; voted against: Austria and France.)
The following general principles were then agreed to:—

"When side scuttles are fitted below a deck the under side of which deck at its lowest point at side is less than 7 feet above the load waterline, they should be permanently fixed and glass lights in such scuttles shall be provided with efficient metal covers.

"No sidelights shall be fitted in any spaces which are exclusively devoted to the carriage of cargo or coal.

"In 'tween-decks above the deck already mentioned, opening side scuttles may be fitted except in spaces exclusively devoted to cargo or coal.

"A system of drill must be organised for closing the scuttles in emergency when required."

M. PALM suggested the preceding resolution should be completed by adding the following one, to which the Committee agreed:—

"All side lights which are not accessible during the voyage should be fitted with efficient metal covers and kept closed during the voyage."

As to scuppers, sanitary discharges, and other similar openings, the following resolution was agreed to:—

"The number of scuppers, sanitary discharges, and other similar openings, must be reduced to the smallest number possible either by making each discharge serve for as many as possible of the lavatory and other pipes, or in any other satisfactory manner.

"If discharges are led through the ship's side from spaces below the flooded waterline, they must be fitted with efficient and accessible means to prevent water from passing inwards.

"It is permissible to have either one valve fitted with a means of working it at a distance, or two valves without such gear, one of them being efficient and accessible. In either case, the accessibility of the valves or of the means of working must be assured by their being situated not lower than the deck above which hinged watertight doors are permitted."

"Au-dessous d'un pont dont la surface inférieure à son point le plus bas en abord se trouve à moins de 7 pieds (2,135 mètres) au-dessus de la flottaison en charge il ne peut être établi que des hublots fixes munis d'une tôle métallique efficace.

"Aucun hublot ne peut être établi dans les soutes à charbon ni dans les compartiments affectés exclusivement à la cargaison.

"Des hublots à ouvrir peuvent être installés au-dessus du pont défini ci-dessus excepté dans les soutes à charbon et les espaces affectés exclusivement à la cargaison.

"Des exercices périodiques doivent être organisés afin d'assurer la fermeture des hublots en cas d'alerte."

"Tous les hublots qui ne sont pas accessibles en cours de navigation doivent être pourvus de tôles métalliques efficaces et celles-ci doivent être fermées pendant la navigation."

"Le nombre des dalots, tuyaux de décharges et autres installations similaires comportant une ouverture pratiquée dans la muraille du navire, doit être réduit au minimum soit en utilisant chaque orifice de décharge pour le plus grand nombre possible d'installations, soit de toute autre manière.

"Les tuyaux de décharge dont l'orifice intérieur se trouve au-dessus de la flottaison après avarie doivent être pourvus d'un organe efficace et accessible empêchant l'eau de s'introduire dans le navire.

"Il suffit pour cela qu'il y ait sur le conduit soit une soupape pourvue d'un mécanisme de commande à distance, soit deux soupapes, et que l'une de ces soupapes soit accessible et efficace. Dans l'un et l'autre cas, la soupape ou l'organe de commande est considéré comme accessible s'il ne se trouve pas plus bas que le pont au-dessus duquel les portes étanches à charnières sont admises."

THE CHAIRMAN having suggested that the means for preventing water from passing inwards should be periodically tested, it was decided on M. Palm's proposition to lay down at a subsequent meeting a general clause for all drills for doors, scuttles, scuppers, ash shoots, rubbish shoots, &c.

Adjourned to 10 A.M., the 11th December, 1913.
Tenth Meeting.—December 11th, 1913, 10 a.m.

Present: Sir John Biles (Chairman); MM. Ferguson, Palm, Machay, Duguid, Rasmussen, Groloous, Bonfiglietti, Barricelli, Vossack, Leman, and Nilsson.

THE CHAIRMAN invited the Sub-Committee to give further consideration to the question of openings of different kinds in the ship's side.

The suggestion of the British Delegation concerning coaling and other similar ports was agreed to as follows:

"All coaling, cargo, and gangway ports in the vessel's side below the flooded waterline must be efficiently closed and made secure before the vessel puts to sea, and kept closed during the navigation of the ship.

"Coaling, cargo, and gangway ports must not be fitted below the load waterline. Provided also that at the ends of the ship none of these ports shall be fitted in a cargo space below the 'tween-deck space where such ports may be fitted amidships."

Coming to ash shoots and rubbish shoots, the Chairman asked whether the British suggestions should not be enforced by making it compulsory to carry the inboard opening of the shoots above the flooded waterline.

M. Groloous was of opinion that such severity would be a serious hindrance to the ship's exploitation, it being quite impossible practically to avoid rubbish shoots ending in the galleys. He thought, and M. Bonfiglietti supported that opinion, that at the level where a hinged watertight door is permitted, a simple hinged cover on the top of a shoot must be considered as sufficient.

After some further discussion, the following resolution was agreed to:

"The inboard openings of ash shoots, rubbish shoots, &c., must be not lower than the deck above which hinged watertight doors are allowed in paragraph . They may be permitted above this level if fitted, to the satisfaction of the administration, with efficient covers, which should be watertight if below the flooded waterline. Such covers must be incapable of being clogged in any way, and should be at least as easily and effectively closed as a watertight door or side scuttle."

On the suggestion of M. Groloous, it was decided to complete the resolutions concerning discharges by the following one, to be inserted before the other requirements on discharges and scuppers:

"All inlets and discharges in the side of the ship must be arranged so as to prevent the accidental admission of water into the ship.

"Les coupées, portes de chargement et sabords à charbon situés au-dessous de la flottaison après avarie doivent être efficacement fermés et assujettis avant que le navire ne prenne la mer ; ils doivent rester fermés pendant la navigation. Les coupées, portes de chargement et sabords à charbon ne peuvent en aucun cas être établis au-dessous de la flottaison en charge ; toutefois ils ne peuvent être établis vers les extrémités du navire dans un entrepont à marchandise pour lequel ils ne seraient pas admis au milieu du navire en application de la règle précédente.

"Les orifices intérieurs des conduits d'éjecteurs à escarbilles, des manches de dèversement, &c., doivent se trouver plus haut que le pont au-dessus duquel les portes étanches à charnières sont admises en application de la règle . Ils peuvent être admis au-dessus de ce pont s'ils sont pourvus de couvercles installés à la satisfaction de l'administration. Ces couvercles doivent être étanches s'ils sont établis au-dessous de la flottaison après avarie ; ils doivent être disposés de manière à ce que leur fermeture ne puisse jamais être empêchée par l'interposition de corps étrangers, et cette fermeture doit être équivalente à celle des portes étanches et des hublots."

Les prises d'eau et décharges établies sur la muraille du navire doivent être disposées de façon à empêcher toute introduction accidentelle de l'eau dans l'intérieur du navire."
Concerning the materials and scantlings of watertight doors, &c., the Sub-Committee agreed to the following resolution:

"The design of and the materials used in the construction of watertight doors, side scuttles, coal, cargo, gangway ports, valves, pipes, ash and rubbish shoots, must be to the satisfaction of the administration."

"Les dispositifs adoptés ainsi que les matériaux utilisés pour la construction des portes étanches, hublots, coupées, sabords à charbon, portes de chargement, valves, conduits et manches de déversement, doivent répondre aux exigences de l'administration."

Adjourned to 3 p.m., the 12th December, 1913.
Eleventh Meeting.—December 12, 1913, 3 p.m.

Present: Sir J. Biles (Chairman), M.M. Walter, Palm, Pierrard, Duguid, de Berlhe, Grohous, Sir A. Denny, Meana, Boniglletti, Barrieelli, Vossnack, and Nilsson.

THE minutes of the ninth and tenth meetings were read and approved, subject to slight corrections.

The Sub-Committee considered the resolution as regards construction of watertight bulkheads passed at the third meeting (27th November), and agreed to substitute for the words “prescribed head of water” the words “actual head of water which will come on the bulkhead in the flooded condition.”

The Sub-Committee then took into consideration the question of prescribing the head of water to be applied in testing certain bulkheads, in connection with the resolution on the subject passed at the third meeting (27th November), and it was agreed as follows:—

“For the foremost and aftermost compartments, and for deep tanks and compartments intended to hold liquids, the head of water should be 8 feet above the top of the tank, or at least to the flooded water-line, whichever is the greater. For double bottoms, at least to the lead water-line.”

On the suggestion of Sir A. Denny, the question of frequency of inspections and tests was reconsidered, in connection with the resolution on the subject passed at the eighth meeting (10th December), and it was proposed to substitute the following for the original resolution:—

“To ensure their efficiency, all watertight power doors and hinged doors in main transverse bulkheads, if in use at sea, must be operated daily at sea, and all other doors which are in use at sea at least once a week. The results of those tests must be recorded in the log.”

As the original resolution had been passed on the proposal of M. Ferguson, who was not present at this meeting, it was unanimously decided to inform him of the suggested alteration.

The following resolutions as regards inspection of doors and door drill were then passed:—

1. “The watertight door system and all mechanisms and indicators connected therewith and all valves, the closing of which is necessary to maintain the watertightness of a compartment, must be periodically inspected at sea and the results of such inspection entered in the log.”

2. “Drills for the operating of watertight doors, scuttles, valves, scuppers, ash-shoots, and rubbish-shoots, shall take place periodically during the voyage.”

1. “Les portes étanches, y compris les mécanismes et les indicateurs qui s’y rapportent, ainsi que les soupapes dont la fermeture contribue à assurer l’étanchéité d’un compartiment, doivent être périodiquement inspectées en cours de navigation et le résultat de ces inspections doit être consigné dans le journal de bord.”

2. “Il doit être procédé périodiquement, en cours de navigation, à des exercices de manœuvre des organes de fermeture étanches des portes, hublots...
"A complete drill shall take place before leaving port and as soon as practicable after leaving port and thereafter at least once a week during the voyage."

3. "A record of all inspections and drills must be entered in the log and any defects noted."

4. "All watertight doors must be kept closed at sea, except when necessarily opened for the working of the vessel, and must always be ready to be immediately closed."

The question of closing watertight doors during foggy weather and at night was considered.

M. GROLLOUS said he did not think this was a question of construction, but one of navigation.

It was agreed that the preceding resolution covered the point as far as was necessary.

The following resolutions were next agreed to:

1. "Watertight decks, trunks, and ventilators must be of the same strength as the bulkhead at the place where they occur. The means adopted for making them watertight, and for dealing with the various openings in them, must be satisfactory. If watertight covers are used for the latter purpose, these must be fitted before the vessel goes to sea, and kept closed during the voyage."

2. "A hose or flooding test must be applied to watertight decks and trunks after completion. Ventilators and trunks, where fitted, must be carried watertight to at least the flooded waterline."

3. "With a view to maintaining strength and watertightness no change shall be made in the condition of watertight decks, trunks, and ventilators after the completion of the survey unless with the permission of the Administration."

As to the admissibility and location of air-ports, the following resolution was agreed to by a majority (for: Austria, Belgium, Canada, Great Britain, Italy, Sweden; against: France, Germany, Netherlands):—
"No air-ports are permissible in the ship's side below the flooded waterline."

As all the preceding resolutions had referred to main transverse bulkheads the following general principle was agreed to concerning longitudinal bulkheads:—

"All regulations made for main transverse watertight bulkheads shall apply to longitudinal bulkheads so far as is practicable."

The final items referred to the Sub-Committee under the heading "Machinery space" were then reviewed, these being as follows:—

Division by bulkheads.
Grouping of boiler rooms with respect to watertight compartments.
Maximum length of watertight compartments in machinery space.
Practicability and desirability of wing bulkheads in vessels of broad beam.

It was decided that these were questions of sub-division which should be dealt with by Sub-Committee No. 1.*

Adjourned sine die.

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* The text of the resolutions passed by Sub-Committee No. 2 was presented to the Main Committee at their fourth meeting (see page 132).
Twelfth Meeting.—December 15, 1913, 10 a.m.

Present: Sir John Biles (Chairman), MM. Walter, Ferguson, McBride, Palm, Duguid, Sir A. Denny, Bonfiglietti, Barricelli, Bruhn, Vossnack and Leman.

THE Minutes of the eleventh meeting were read and approved.

THE CHAIRMAN put before the Sub-Committee the different points of the draft report of the Sub-Committee that had been referred back to them by the full Committee at the Meeting on December 13th.*

The first point discussed was that of the definite wording to adopt for different tests that had been determined in the draft report by the height of the flooded waterline.

Dr. BRUHN (Norway), GENERAL MEANA (Italy) and M. FERGUSON (United States of America) were of opinion that the highest possible position of that waterline had to be considered and that in this connection the words "margin line" were the best to use with the limit under consideration.

MM. FERGUSON and McBRIIDE (United States of America) read a new arrangement of the first part of the report in which several improvements had been introduced with a view to clarifying the phraseology: these proposals were adopted.

The question of the pressure limit to be used in deep tank tests was discussed. Instead of testing these to a height up to the margin line, it was agreed, on the proposal of M. Ferguson and Sir A. Denny, to take as limit the height of the load waterline.

SIR A. DENNY in order to make clearer the intention of the Sub-Committee as regards closed hinged doors in cargo spaces, proposed introducing in the text a requirement that special closing arrangements have to be provided for. This was agreed to.

The question of the power doors having been referred to the Sub-Committee in order that the wording of the report might be made to agree with the intention of the Sub-Committee, Sir A. Denny, speaking for the British Delegation, proposed to make hand gear controlled from an accessible position above the margin line compulsory in addition to power gear. This was agreed to.

As to the time when watertight doors have to be tested, it was decided to complete the text by adding the words "either before or after installation."

The clause relating to sliding doors, especially in tunnels, was then reconsidered, and, on the suggestion of M. Ferguson, it was decided after some discussion to strike out the whole clause, in view of the practical impossibility of defining in a few lines all the possible locations of watertight doors of this type; the ground being sufficiently covered by the clause stating that all doors other than doors which are allowed to be of the hinged pattern must be sliding doors.

The general clause stating that "no openings may be made..." was changed so as to read as follows: "No doors, slide valves, manholes, or access openings shall be permitted..." in order to make the intention of the Sub-Committee more clear as to the openings possible in collision bulkheads.

The words "air ports" being considered as possibly misleading were replaced by the words "ventilating scuttles."

SIR A. DENNY (Great Britain) wished to reopen the discussion on the minimum number of watertight doors in machinery spaces which makes it compulsory to fit power doors. A vote amongst the members of the Sub-Committee was favourable to the reconsideration, but as the Sub-Committee had only been invited by the full Committee to reconsider certain definite points it was decided as a matter of procedure that the question should be raised by the British Delegation at a subsequent meeting of the full Committee.

Adjourned sine die.†

* See page 155.
† A formal meeting of the Sub-Committee was held on the 17th December to approve the foregoing Minutes and to authorize the Chairman to present the report, with the alterations referred to in the Minutes, to the full Committee (see page 152).
THE Sub-Committee, having carefully considered the questions referred to them
by the Committee, have the honour to submit the following recommendations:—

I.—CONSTRUCTION AND INITIAL TESTING

OF BULKHEADS.

1. Watertight bulkheads must be constructed in such a manner that they shall
be capable of supporting, with a proper margin of resistance, the pressure due to the
actual head of water up to the margin line.

2. With reference to the proper margin of resistance, experiments are being carried
out to determine this, and it is not desirable to come to a final conclusion until the
results of these experiments are available.

3. Steps and recesses in bulkheads must be made watertight throughout, and each
must be of the same strength as the bulkhead at the place where it occurs. Where
frames or beams pass through plating which has to be watertight, the watertight-
ness must be obtained by caulked angle chocks, or cast-iron or steel chocks
efficiently secured and rust jointed, and not by wood or cement.

4. Testing main compartments by filling them with water is not compulsory. A
complete examination of all bulkheads must be made by a surveyor. Testing by
hose must be carried out in all cases to assist the visual tests.

5. The foremost and aftermost compartments must be tested with water to a head
up to the margin line. Double bottoms, deep tanks, and all compartments intended
to hold liquids must be tested with water to a head at least eight feet above the
top of the tank or to the load water line, whichever is the greater.

6. With a view to maintaining strength and watertightness, no change shall be
made in the condition of the bulkheads after the completion of the survey unless
with the permission of the administration.
II.—Double Bottoms.

7. In vessels 200 and under 250 feet in length a double bottom must be fitted at least from the machinery space to the forepeak bulkhead, or as near as practicable thereto.

8. In vessels 250 and under 300 feet in length a double bottom must be fitted at least outside of the machinery space and extend to the fore and after peak bulkheads, or as near as practicable thereto.

*Note.—Clauses 7, 8, and 9 apply only to ocean-going vessels.*

9. In vessels 300 feet and over in length a double bottom must be fitted amidships and extend to the fore and after peak bulkheads, or as near as practicable thereto.

10. In vessels 300 feet and over in length the inner bottom must be continued out to the ship’s side in such manner as to protect the bilges.

11. In vessels 700 feet and over in length the double bottom, for at least half the vessel’s length amidships and forward, must extend up the vessel’s sides to a height above the top of the keel not less than 10 per cent. of the vessel’s moulded breadth.

12. A well extending to the outer skin is permitted at the after end of the shaft tunnels of screw vessels. If wells or “hats” are constructed elsewhere in the double bottom in connection with the drainage arrangements, they must not extend downwards from the inner bottom more than half the depth of the double bottom at that point.

III.—Openings in Watertight Bulkheads.

13. The openings in watertight bulkheads must be reduced to the smallest number compatible with the design and proper working of the vessel and satisfactory means must be provided for closing them.
14. No doors, sluice valves, manholes, or access openings are permitted—

(a.) In the collision bulkhead below the margin line.

(b.) In watertight transverse bulkheads separating two cargo holds from one another, or a cargo hold from a reserve bunker, except as referred to in paragraph 17.

15. In the machinery spaces of steamships, and apart from bunker doors, not more than one door may be fitted in each main transverse bulkhead within the machinery space for intercommunication, but where more than one separate shaft tunnel is fitted a door may be cut for each tunnel.

16. The only types of watertight doors permissible on board passenger vessels are sliding doors or hinged doors, or doors of any other equivalent pattern, excluding plate doors secured only by bolts.

A hinged door must be fitted with lever-operated catches workable from either side of the bulkhead.

A sliding door may have a horizontal or vertical motion. If hand-operated only, it must be fitted for operation at the door itself, and also from an accessible position above the margin line. If operated by power, it must be fitted for operation by power from the bridge, and by hand at the door itself and from an accessible position above the margin line.

In the case of watertight bunker doors, satisfactory arrangements must be made by means of screens or otherwise, to prevent the coal from interfering with the closing of the doors.

17. Hinged watertight doors in passenger, crew, and working spaces are only permitted above a deck, the under surface of which, at its lowest point, is at least 7 feet above the load water line, and such doors are not permitted below such a deck. Hinged watertight doors of especially heavy design may be fitted above the load water line in bulkheads between cargo spaces, provided they are closed before the voyage commences, and are kept closed during the voyage by efficient closing gear. None of these doors shall be fitted in a cargo deck space below the lowest deck space in which amidships it is permissible to fit such doors.

14. Il ne peut exister ni porte, ni vanne, ni trou d'homme, ni aucun orifice d'accès :

(a.) Dans la cloison étanche d'abordage, au-dessous de la ligne de surimmersion ;

(b.) Dans les cloisons transversales étanches séparant une cale de chargement de la cale contiguë ou d'une soute à charbon de réserve, sauf exceptions spécifiées au paragraphe 17.

15. Dans la tranche des machines et chaudières, et exclusion faite des portes de soutes à charbon, il ne peut exister qu'une porte de communication dans chaque cloison transversale principale ; toutefois, s'il y a plusieurs tunnels d'arbres distincts, chacun d'eux peut être muni d'une porte d'accès.

16. Ne sont admises que les portes à charnières et les portes à glissières ou toutes autres d'un type au moins équivalent, à l'exclusion des portes montées simplement sur boulons.

Les portes à charnières doivent être pourvues de loquets commandés par des leviers manœuvrables des deux côtés de la cloison.

Les portes à glissières peuvent être à déplacement vertical ou horizontal. Celles qui sont actionnées uniquement à bras doivent pouvoir être manœuvrées sur place et en outre d'un point accessible situé au-dessus de la ligne de surimmersion ; celles qui comportent l'emploi d'une énergie mécanique doivent pouvoir être manœuvrées :

(a.) Mécaniquement de la timonerie ;

(b.) À bras, sur place et d'un point accessible au-dessus de la ligne de surimmersion.

Les portes étanches des soutes à charbon doivent être pourvues d'écrans ou autres dispositifs ayant pour effet d'empêcher le charbon de faire obstacle à leur fermeture.

17. Des portes étanches à charnières peuvent être admises dans les parties du navire affectées aux passagers et à l'équipage ainsi que dans les locaux de service, à condition qu'elles soient établies au-dessus d'un pont dont la surface inférieure à son point le plus bas se trouve au moins à 2,14 mètres (7 pieds) au-dessus de la flottaison en charge ; de semblables portes ne sont pas autorisées au-dessous d'un tel pont.

Des portes étanches à charnières d'un type particulièrement robuste peuvent être admises dans les cloisons séparant deux locaux à marchandises à condition que ces portes se trouvent au-dessus de la flottaison
18. All other watertight doors in the ship located where hinged doors are not permitted, shall be sliding doors capable of being closed locally, and also from an accessible position above the margin line.

19. When the number of watertight doors in the main transverse watertight bulkheads in the machinery spaces exceeds five, all watertight doors situated below the load water line must be capable of being simultaneously closed by power from a station situated on the bridge, and their opening and closing must be controlled and indicated in that station. The simultaneous closing of these doors must be slow, and must be preceded by a warning sound signal.

20. Portable plates on bulkheads are inadmissible except in machinery spaces. If fitted, they must always be in place before the vessel proceeds to sea, and must not be removed at sea except in case of urgent necessity. The greatest care must be taken in replacing them to ensure that the joint shall be perfectly watertight.

21. All watertight doors must be kept closed at sea except when necessarily opened for the working of the vessel, and must always be ready to be immediately closed.

22. If a tunnel is fitted forward either for the purpose of pipes or as a firemen's passage it must be fitted with a watertight door.

If trunkways for forced draught, for access from crew's accommodation to the stokehold or for any other purpose, are carried through the main transverse watertight bulkheads, the integrity of the watertight bulkheads must be maintained by watertight doors or other effective means.

23. Where electric-light cables, pipes, &c., are carried through the main transverse watertight bulkheads below the margin line the bulkhead connections must be watertight and the integrity of the watertight bulkheads maintained.

en charge. Elles doivent être fermées à l'aide d'un mécanisme efficace avant que le navire ne prenne la mer et rester telles pendant la navigation.

Toutefois, il ne pourra être admis de porte étanche à charnières, même aux extrémités du navire, dans un entrepont à marchandises pour la région centrale duquel ces portes seraient interdites en application de la clause précédente.

18. Toutes les autres portes étanches doivent être des portes à glissières.

19. Lorsque le nombre des portes étanches dans les cloisons transversales principales des espaces affectés aux machines et chaudières est supérieur à cinq, toutes les portes étanches situées au-dessous de la flottaison en charge doivent pouvoir être fermées simultanément et contrôlées d'un poste unique situé dans la timonerie ou au voisinage immédiat de celle-ci.

La fermeture simultanée de ces portes doit se faire lentement et être précédée de l'émission d'un signal avertisseur sonore.

20. L'emploi de panneaux démontables n'est toléré que dans les espaces réservés aux machines et chaudières. Ces panneaux doivent toujours être en place avant que le navire ne prenne la mer ; ils ne peuvent être enlevés en cours de navigation si ce n'est en cas d'impérieuse nécessité ; les précautions nécessaires doivent être prises pour rétablir la parfaite étanchéité du joint.

21. Toutes les portes étanches doivent être fermées en cours de navigation ; il ne peut être dérogé à cette règle que lorsque les besoins du service l'exigent ; toute porte ouverte doit pouvoir être fermée immédiatement.

22. S'il existe un tunnel avant pour la circulation des chaudières ou pour le passage des tuyautages, ce tunnel doit être pourvu d'une porte étanche.

Si des conduits de tirage forcé ou des couses de communication pour le personnel, notamment entre le poste de l'équipage et les chaudières ou tous autres passages similaires traversent des cloisons transversales principales, ces conduits, couses, ou passages doivent être munis de portes étanches ou d'autres dispositifs équivalents nécessaires pour rétablir l'intégrité de l'étanchéité de la cloison.

23. Si des tuyautages, des conducteurs électriques, &c., traversent des cloisons étanches transversales principales au-dessous de la ligne de submersion, des dispositions doivent être prises pour assurer l'intégrité de l'étanchéité de la cloison.
IV.—Exits from Watertight Compartments.

24. In passenger and crew spaces a practicable means of escape must be provided from each watertight compartment liable to be isolated by the closing of watertight doors which cannot be opened by the occupants of the compartments.

25. There must be a means of escape from each engine room, shaft tunnel, and stokehold compartment independent of the watertight doors.

V.—Sluice Valves.

26. Sluice valves must be reduced to the smallest number possible, and will not be allowed except in positions where they are readily accessible at all times and can be easily kept in order. They must be strongly constructed, efficiently fitted, and regularly inspected. Satisfactory provision must be made for operating them from an accessible position above the margin line. Means must be provided for indicating when they are open or shut.

VI.—Openings in Ship's side.

27. When side scuttles are fitted below a deck the under side of which deck at its lowest point at sides is less than 7 feet above the load water line, they must be permanently fixed and glass lights in such scuttles shall be provided with efficient metal covers.

28. In decks above the deck mentioned in paragraph 27, opening side scuttles may be fitted except in spaces exclusively devoted to cargo or coal.

29. No side-lights shall be fitted in any spaces which are exclusively devoted to the carriage of cargo or coal.

30. All side scuttles which are not accessible during the voyage must be fitted with efficient metal covers, and both the glass and the cover must be kept closed during the voyage.

31. No ventilating scuttles are permissible in the ship's side below the margin line.

32. All inlets and discharges in the side of the ship must be arranged so as to prevent the accidental admission of water into the ship.

IV.—Évacuation des Compartiments étanches.

24. Dans les parties du navire affectées aux passagers et à l'équipage tout compartiment exposé a être isolé par suite de la fermeture de portes étanches qui ne peuvent pas être ouvertes par les occupants doit être pourvu d'une échappée offrant au personnel un moyen de retraite praticable.

25. Chaque chambre de machine, chaque chaufferie et chaque tunnel d'arbre doit être pourvu en tout cas d'une échappée offrant au personnel un moyen de retraite qui n'exige pas la traversée de portes étanches.

V.—Vannes.

26. Le nombre des vannes établies dans les cloisons étanches doit être réduit au minimum. Les vannes ne sont admises qu'en des endroits suffisamment accessibles en tout temps pour que l'on puisse s'assurer de leur bon état d'entretien : elles doivent être solidement construites, soigneusement montées et périodiquement visitées. Les vannes doivent pouvoir être manœuvrées d'un endroit accessible situé au-dessus de la ligne de surimmersion et leur mécanisme doit comporter un dispositif indiquant si la vanne est ouverte ou fermée.

VI.—Ouvertures dans la Muraille.

27. Au-dessous d'un pont dont la surface inférieure à son point le plus bas en abord se trouve à moins de 2,14 mètres (7 pieds) au-dessus de la flottaison en charge, il ne peut être établi que des hublots fixes munis d'une tape métallique efficace.


29. Aucun hublot ne peut être établi dans les locaux affectés exclusivement au transport de marchandises ou de charbon.

30. Tous les hublots qui sont inaccessibles pendant le voyage doivent être munis de tapes métalliques efficaces, et le hublot ainsi que la tape doivent être tenus fermés pendant la navigation.

31. Aucun hublot à ventilation ne peut être établi dans la muraille du navire au-dessous de la ligne de surimmersion.

32. Les prises d'eau et décharges dans la muraille doivent être disposées de façon à empêcher toute introduction accidentelle d'eau dans le navire.
33. The number of scuppers, sanitary discharges, and other similar openings must be reduced to the smallest number possible, either by making each discharge serve for as many as possible of the lavatories and other pipes or in any other satisfactory manner.

34. If discharges are led through the ship's side from spaces below the margin line, they must be fitted with efficient and accessible means to prevent water from passing inwards. It is permissible to have either one valve, fitted with a means of working it at a distance, or two valves without such gear, one of them being accessible. In either case, the accessibility of the valves or of the means of working must be assured by their being situated not lower than the deck above which hinged watertight doors are permitted by paragraph 17.

35. All coaling, cargo, and gangway ports in the vessel's side below the margin line must be efficiently closed and made secure before the vessel puts to sea, and kept closed during the navigation of the ship.

Coaling, cargo, and gangway ports must not be fitted below the load water line. None of these ports shall be fitted in a cargo space below the lowest tween deck space in which amidships it is permissible to fit such ports.

36. The inboard openings of ash-shoots, rubbish-shoots, &c., must not be lower than the deck above which hinged watertight doors are allowed in paragraph 17. They may be permitted above this level if fitted, to the satisfaction of the administration, with efficient covers, which should be watertight if below the margin line. Such covers must be incapable of being clogged in any way, and should be at least as easily and effectively closed as a watertight door or side scuttle.


37. The design of, and the materials used in the construction of, watertight doors, side scuttles, coal, cargo, and gangway ports, valves, pipes, ash and rubbish-shoots must be to the satisfaction of the administration.

VII.—Construction et Essais des Portes Étanches, &c.

37. Les dispositifs adoptés ainsi que les matériaux utilisés pour la construction des portes étanches, hublots, couées, sabords à charbon, portes de chargement, valves, tuyaux, déverseurs à escarbilles et à salétés, doivent répondre aux exigences de l'Administration.
38. Watertight doors must be tested by a water pressure corresponding to the head prescribed for the bulkhead where the doors are located. The test must be made before the vessel is put in service, and either before or after the door is fitted.

VIII.—Periodical Operation and Inspection of Watertight Doors, Scuttles, &c.

39. Drills for the operating of watertight doors, scuttles, valves, scuppers, ash-shoots and rubbish-shoots, shall take place periodically during the voyage.

A complete drill shall take place before leaving port and as soon as practicable after leaving port, and thereafter at least once a week during the voyage.

Provided that all watertight power doors and hinged doors in main transverse bulkheads in use at sea shall be operated daily.

40. The watertight door system and all mechanisms and indicators connected therewith, and all valves, the closing of which is necessary to maintain the watertightness of a compartment, must be periodically inspected at sea.

IX.—Construction of Watertight Decks.

41. Watertight decks, trunks, and ventilators must be of the same strength as the bulkhead at the place where they occur. The means adopted for making them watertight and for dealing with the various openings in them must be satisfactory. If watertight covers are used for the latter purpose, these must be fitted before the vessel goes to sea, and kept closed during the voyage.

42. A hose or flooding test must be applied to watertight decks and trunks after completion. Ventilators and trunks, where fitted, must be carried watertight to at least the margin line.

38. Les portes étanches doivent être soumises à un essai hydrostatique sous une pression égale à la pression réglementaire pour la partie correspondante de la cloison. Cet essai doit être fait soit avant, soit après mise en place de la porte à bord, mais en tout cas avant l'entrée en service du navire.

VIII.—Manœuvres périodiques et inspection des portes étanches, &c.

39. Il doit être procédé périodiquement, en cours de navigation, à des exercices de manœuvre des organes de fermeture étanches des portes, hublots, dalots, soupapes, sabords et manches de déversement. Un exercice complet doit avoir lieu avant l'appareillage, un deuxième le plus tôt possible après avoir quitté le port et ensuite au moins une fois par semaine pendant la navigation : toutefois, les portes dont la manœuvre comporte l'emploi d'une énergie mécanique et les portes à charnières des cloisons transversales principales doivent être manœuvrées quotidiennement lorsqu'elles sont utilisées à la mer.

40. Les portes étanches y compris les mécanismes et les indicateurs qui s'y rapportent, ainsi que les soupapes dont la fermeture est nécessaire pour assurer l'étanchéité d'un compartiment doivent être périodiquement inspectées en cours de navigation.

IX.—Construction des ponts étanches, tambours, &c.—Épreuves initiales.

41. Les ponts étanches, tambours et conduits de ventilation doivent présenter une résistance égale à celle des parties avoisinantes des cloisons étanches. Les procédés employés pour assurer l'étanchéité de ces éléments ainsi que les dispositifs adoptés pour les ouvertures qui y sont pratiquées doivent répondre aux exigences de l'Administration. Lorsqu'il est fait usage d'obturateurs étanches pour ces ouvertures, ils doivent être mis en place avant l'appareillage et rester fermés pendant la navigation.

42. Les ponts étanches et les tambours doivent être soumis à une épreuve d'étanchéité à la lance après leur construction ; l'essai des ponts peut être effectué en les couvrant d'eau. Les conduits de ventilation et les tambours étanches doivent s'élèver au moins jusqu'au niveau de la ligne de surimmersion.
43. With a view to maintaining strength and watertightness, no change shall be made in the condition of watertight decks, trunks and ventilators after the completion of the survey unless with the permission of the administration.

X.—Entries in Log.

44. Hinged doors, portable plates, coaling, cargo, and gangway ports, and inaccessible side suttles, &c., which are required by the preceding rules to be closed during the voyage, must be closed before the ship puts to sea. The closing and the opening (if permissible under the rules) must be recorded in the official log.

45. A record of all drills and inspections required by paragraphs 39 and 40 must be entered in the official log, with a record of any defects.

XI.—Construction of Longitudinal Bulkheads.

46. All regulations made for main transverse watertight bulkheads shall apply to longitudinal bulkheads, so far as is practicable.

Note.—The Sub-Committee submit that the questions referred to them under the heading “Machinery space,” viz., division by bulkheads, grouping of boiler rooms, maximum length of machinery compartments, and practicability and desirability of wing bulkheads, might be considered by Sub-Committee No. 1.

(Signed) J. H. BILES, Chairman.

Ed. W. BOGAERT, Secretary,
December 16, 1913.
Committee on Safety of Construction.

SUB-COMMITTEE No. 3 (SURVEY OF PASSENGER STEAMERS).

First Meeting.—November 25, 1913.

Present: M.M. Rasmussen (Chairman), Smith, de Berlhe, Archer and Barricelli.

THE CHAIRMAN opened the proceedings by referring to the matters the Sub-Committee had to deal with, namely, the questions contained in paragraphs 6, 7, and 8, of the document entitled "Questions before the Conference."

THE CHAIRMAN then put to the Sub-Committee the first question, concerning "arrangements for surveying passenger steamers," viz.:

"In view of the differences in the conditions in different countries, is it possible to secure a uniform system of survey at all ports?"

M. ARCHER (Great Britain) explained that in Great Britain the survey has to be conducted by a surveyor appointed by the Government. In other countries the certificate is issued by the Government on the basis of a survey made by the surveyor of a classification survey, but this could not be done in Great Britain.

M. DE BERLHE (France) said the Conference had not to discuss that point in general, but only to examine the way in which it would be ascertained that the new requirements will be fulfilled.

M. BARRICELLI (Italy) explained that, in his opinion, the certificate to be issued in accordance with the international rules should only be a "certificate of safety" and not a "certificate of seafaring." That certificate would not exempt a ship from the ordinary inspections of the matters that are subject to change (life-boats, equipment, &c.).

M. ARCHER (Great Britain) pointed out that the same question had been examined by the Committee on Certificates.

M. SMITH (United States of America) then read the following memorandum representing the views of his Delegation:

It is not believed that this Conference can or should provide for a uniform system of survey. The actual administration of such systems being necessarily subject to the control of the proper authorities of the signatory States.

It is considered desirable, however, that this Conference should include in the National Certificates proposed in "Section (a), paragraph 4, International Uniformity," items which will cover the specific requirements as to hull, machinery, fittings, &c., which may be adopted by the Conference.

M. DE BERLHE (France) was of opinion that the British system and the system of other countries were equivalent. He supported the opinion of M. Smith, that the certificates should detail the essential requirements adopted by the Conference.

THE CHAIRMAN was of the same opinion, and the following motion was proposed by M. Archer:

"It is not possible to secure a uniform system of survey at all ports."

This motion was agreed to. *See page 46.
The second part of question 6 was then read, viz.:—

"Will it be sufficient to lay down that the survey should be carried out either by Government surveyors or by surveyors specially appointed by the Government for the purpose, so as to secure that in every case the Government concerned accepts full responsibility for the efficiency and completeness of the survey?"

This was considered to be closely connected with the answer given to the first part of the question. The Sub-Committee, after a short discussion, was of opinion that the answer was to a great extent a matter of phraseology, and the members were invited to prepare a text for the next meeting.

Adjourned to 10 A.M., the 27th November, 1913.
Second Meeting.—November 27, 1913, 10 a.m.

Present: MM. Rasmussen (Chairman), Smith, Palm, Pierrard, Boris, de Berlhe, Grothus, Archer, Bonfiglietti, Barriocelli, and Laviagnin.

COPIES of suggested resolutions drafted by the British delegation were distributed to the members.

The first of these was the same as the resolution passed at the previous meeting, viz.:

It is not possible to secure a uniform system of survey at all ports.

Il n'est pas possible d'établir un système uniforme d'inspection applicable dans tous les ports.

This was taken as agreed to.

The second resolution relating to the control of the Government over the survey was then discussed, and M. de Berlhe suggested that it should be made clear that the individual surveyors need not have an appointment from the Government, if they belong to an institution recognised or appointed by the Government for the purpose. M. Pierrard mentioned the possibility of a Government surveyor finding it necessary to review the work of a Classification Society surveyor.

After considerable discussion, a new resolution on the subject was drafted and provisionally accepted, and it was ordered that copies of this should be made in English and French for consideration at the next meeting.

The third suggested resolution was then considered, as regards the possibility of laying down general principles governing the survey of passenger steamers in all countries. Considerable discussion ensued as to whether compliance with the general principles laid down would exempt a vessel from inspection in the ports of all the Signatory States, and a draft resolution referring to the necessity of embodying the general principles in detailed rules was provisionally accepted and ordered to be copied for consideration at the next meeting.

Adjourned to 4.30 p.m., the 28th November, 1913.
Third Meeting.—November 28, 1913, 4.30 p.m.

Present: MM. Rasmussen (Chairman), Smith, Maclay, Pierrard, Boris, Archer, Baricelli, and Loviaguin. M. Archer was accompanied by M. Alexander Boyle, Engineer Surveyor-in-Chief, Board of Trade.

The minutes of the meeting on the 26th November were approved, subject to certain alterations suggested by M. Smith and M. Archer.

The minutes of the meeting on the 27th November were issued to the members.

The resolutions drafted at the meeting on the 27th November were considered, and, subject to a slight alteration in the second, were approved as follows:—

The survey in regard to the points dealt with by the Conference shall be carried out by Government Surveyors. Each Government may, however, under its control, entrust this survey either to Surveyors nominated by it for this purpose or to organizations recognized by it. In every case the Government concerned fully guarantees the completeness and efficiency of the survey.

It is not possible for the Conference to lay down detailed rules governing the survey of passenger steamers in all respects, but it is possible and desirable to formulate general principles which should govern the survey of passenger steamers in the different countries as regards hull, boilers, machinery, and equipment.

Each signatory State undertakes to draw up detailed rules in accordance with these general principles, or to bring its existing rules into agreement with these principles. It also undertakes to secure that these rules shall be enforced.

The surveillance relative aux points traités par la Conférence est exercée par des Agents du Gouvernement. Toutefois, chaque Gouvernement peut, sous son contrôle, confier cette surveillance soit à des experts désignés par lui à cet effet, soit à des organismes reconnus par lui. Dans tous les cas, le Gouvernement intéressé garantit complètement l’intégrité et l’efficacité de la surveillance.

Il n’est pas possible à la Conférence de poser des règles détaillées qui régiraient sous tous les rapports l’inspection des navires à vapeur à passagers, mais il est possible et désiré de poser des principes généraux qui régiraient les navires à vapeur à passagers dans les divers États en ce qui concerne la coque, la chaudières, la machinerie et l’équipement.

Chaque État signataire s’engage à édicter des règles détaillées en conformité de ces principes généraux ou à modifier sa réglementation existante de façon à la mettre d’accord avec ces principes. Il s’engage également à assurer l’application de ces règles.

Paragraph 4 of the resolutions proposed by the British Delegation was then considered, with a view to laying down the general principles referred to in the resolutions already passed. Sub-paragraph (a), providing for an annual inspection of hull, machinery, and equipment, was discussed and amended, and, on the suggestion of M. Smith (United States of America), it was agreed that copies of the clause as amended should be furnished to each member for final consideration at a subsequent meeting.

Sub-paragraph (b), providing that the hull of the vessel shall be to the satisfaction of the surveyors, was then read. M. Loviaguin (Russia) asked whether it was intended that the Government surveyor should satisfy himself as regards all the details, and pointed out the difficulty of doing so if no standard of strength was laid down. This difficulty was especially great in the case of existing vessels coming under survey for the first time. M. Archer (Great Britain) explained the British procedure, and, on the Chairman’s suggestion, further consideration of the clause was postponed.

Sub-paragraph (c), providing that the engines and boilers shall be to the surveyors’ satisfaction, was then considered and amended, final consideration being postponed until the next meeting, in accordance with M. Smith’s suggestion already mentioned.

Sub-paragraph (d), providing for the hydraulic testing of boilers, was then considered. M. Boris (France) read the French Government regulations, which fixed a limit to the hydraulic test pressure, so that in the case of boilers working at high pressure the test pressure would be less than twice the working pressure. M. Pierrard (Belgium) explained the Belgian regulations, which prescribed a smaller test pressure than the French regulations. In both cases, however, a hydraulic test was made
annually. M. Boyle explained the British practice, and the reasons for suggesting an initial test of double the working pressure and tests thereafter at the surveyors' discretion. He mentioned that the Danish regulations and the regulations of Lloyd's Register, the British Corporation, and the Bureau Veritas, all require an initial test of double the working pressure. M. Machay (Hungary) was in favour of this test, and a subsequent test to one and a half times the working pressure every five years.

On the Chairman's suggestion, consideration of the matter was postponed until the next meeting.

Adjourned to 3 p.m., the 1st December, 1913
Fourth Meeting.—December 1, 1913, 3 p.m.

Present: M. Rasmussen (Chairman), MM. Smith, Palm, Pierrard, Machay, Duguid, Archer (accompanied by M. Boyle), Bonfiglietti, Baricelli, and Loviguard.

THE Minutes of the second and third meetings were agreed to.

The resolutions drafted at the third meeting were agreed to as follows:—

“A complete inspection of the whole of the hull, machinery, and equipments, including the outside of the vessel’s bottom, the sea-connections and rudder, as well as the inside and outside of the boilers, shall be made at least once a year by the surveyors mentioned in Resolution No. 2. The screw shafts are to be drawn at the discretion of the surveyor.”

“Les experts visités plus haut procéderont dans le courant de chaque année à une inspection complète de la coque, des appareils mécaniques et des appareils, y compris un examen à sec de la carène, des prises d’eau et du gouvernail ainsi qu’une inspection intérieure et extérieure des chaudières. Les arbres porte-hélices seront retirés lorsque l’expert le jugera utile.”

“The general arrangement, scantlings, materials, and condition of the main and auxiliary engines, boilers, boiler mountings, and other fittings, shall be to the satisfaction of the surveyors and sufficient for the service intended.”

“Les machines principales et auxiliaires, les chaudières, ainsi que tous les accessoires des machines et des chaudières devront être appropriés au service auquel ils sont destinés, et être à la satisfaction de l’expert en ce qui concerne les dispositions, les échantillons, les matériaux employés et l’état d’entretien.”

In connection with the second of these two resolutions, as regards the survey of engines and boilers, the Chairman suggested inserting the word “motors” after “engines” to make it clear that the resolution applied to motor vessels as well as to vessels fitted with steam-engines. After discussion, it was agreed to meet this point by adding the following note at the end of the English text of the general resolution respecting survey, which had been approved at the previous meeting:—

“The word ‘steamer’ includes every ship propelled by mechanical power.”

The French text would be altered accordingly by substituting “navires à propulsion mécanique” for “navires à vapeur.”

THE CHAIRMAN then read his draft resolution respecting the hydraulic testing of boilers. After discussion, it was agreed that the best course would be to state the various equivalent rules at present in force in the different countries, and to prescribe that boilers should be tested in accordance with one of these rules. It was agreed that a resolution should be prepared on this basis for consideration at the next meeting.

THE CHAIRMAN then read his suggested resolution regarding the testing of steam pipes.

M. BOYLE explained the British practice in this respect and the distinction made between brased pipes and pipes of other descriptions.

M. PIERRARD (Belgium) suggested, and it was agreed, to fix a lower limit of size for the testing of auxiliary steam pipes, 1 inches being suggested as the limit. It was agreed to prepare a resolution embodying the views expressed for the consideration of the Committee at the next meeting.

THE CHAIRMAN then moved his draft resolution respecting the testing of oil reservoirs and fuel tanks, and this was generally agreed to, subject to final consideration at the next meeting.

The Sub-Committee then reverted to paragraph 1 (b) of the British suggested resolutions respecting the survey of the hull, and M. Archer read the amended proposals which he had prepared with a view to meeting the views of certain of the Delegations. It was agreed that copies of these amended proposals should be circulated for consideration before the next meeting.
THE CHAIRMAN announced that M. Archer was preparing a draft clause respecting equipments, and that this would, if possible, be circulated before the next meeting.

THE CHAIRMAN then suggested that it would be useful to have a preliminary discussion of the subject mentioned in paragraph 8 of the paper entitled "Questions before the Conference," and M. Smith (United States of America) read a memorandum representing the views of his Delegation on this subject. M. Pierrard (Belgium) thought that, in general, the question of duplication of machinery was not one affecting safety, but a matter which might with confidence be left to the individual shipowners. It was agreed that M. Smith's memorandum should be circulated and considered at a subsequent meeting.

Adjourned to 10 A.M., the 4th December, 1913.
Fifth Meeting—December 4, 1913, 10 a.m.

Present: M. Rasmussen (Chairman), M. Smith (accompanied by M. Uhler), MM. Palm, Machay, Pierrard, Duguid, Boris, de Berlhe, Grolois, Archer (accompanied by M. Boyle), MM. Bonfiglietti, Barricelli, and Loviguin.

The minutes of the fourth meeting were brought up for consideration.

On the suggestion of M. SMITH (United States of America), it was agreed:—

1. That the words "resolution No. 2," appearing in one of the resolutions adopted at the previous meeting, should be adjusted when the resolutions passed by the Sub-Committee were finally arranged for transmission to the Main Committee;

2. That a further opportunity should be given for the consideration of the resolution passed at the previous meeting respecting the arrangements and scantlings, &c., of engines and boilers; and

3. That the following wording of the English text should be substituted for that already agreed to as regards the application of the general principles under consideration to motor vessels:

"Every vessel propelled in whole or in part by steam or other mechanical power shall be deemed a steamer for the purposes of these general principles."

Subject to these points, the minutes were approved.

The CHAIRMAN then asked the Sub-Committee to consider the question of the hydraulic testing of boilers, and the resolution which had been drafted in accordance with the views expressed at the previous meeting was taken as the basis of discussion.

M. BARRICELLI (Italy) explained at some length the views of the Italian Delegation on this subject, and emphasised the view that the Conference should only establish general principles and leave to each country the making of definite rules. If it were decided that the Sub-Committee should suggest a rule as to hydraulic testing the rule should be uniform, and he thought that a test after construction, and subsequent periodical tests at definite intervals, should be made compulsory.

M. PIERRARD (Belgium) thought that the Conference should leave each Government free to maintain the benefit of its own legislation, and expressed the opinion that the four rules embodied in the draft resolution were given as models of equivalent requirements.

A prolonged discussion ensued, in the course of which several members emphasised the view that if the Committee began laying down rules as regards details the inference might be drawn that any details not mentioned could be neglected, and it was strongly suggested that the Committee should confine itself to general principles.

M. BORIS (France) raised the point that it is impossible to establish an equivalence between regulations dealing only with the hydraulic testing of boilers, as so many other considerations, e.g., as to manner of construction, manner of testing, &c., must be taken into account; and he thought it inadvisable to embody in the resolutions of the Committee the particulars of the rules of any individual country.

M. BONFIGLIETTI (Italy) supported the opinion that the duty of the Sub-Committee was limited to laying down general principles, and stated that he proposed again to examine from this point of view the principles which had already been agreed to.

M. UHLER (United States of America) supported the view that if details are dealt with it is very difficult to know which details to select for consideration. In his view, the most important consideration as regards boilers is the material, and the United States regulations prescribe physical and chemical tests to which the material must be subjected. The hydraulic test is no doubt useful for disclosing defects which might not otherwise be discovered, but why select this detail for consideration and leave others undetected? He thought that if the Conference laid down general principles as to the material, workmanship, and possibly the factor of safety of boilers, this would be sufficient; and he suggested that a factor of safety of 3 would be
suitable. He did not, however, wish to press strongly for a factor of safety to be fixed unless the Committee thought it advisable.

M. ARCHER (Great Britain) then read a new resolution which he had drafted to meet the views expressed; the substance of this being that each signatory State should draw up detailed rules regarding hydraulic testing of boilers, and that those rules should be equivalent to any one of the first three rules quoted in the original draft resolution with which the discussion had started. M. Archer pointed out that this resolution did not state that the three rules in question are equivalent to each other, and as regards M. Boris's objection to embodying rules of individual countries in the Convention, M. Archer suggested that the rules in question might be placed in an appendix.

It was agreed that M. Archer's new draft resolution should be copied for consideration at the next meeting, and as M. Archer had included in it not only the testing of boilers, but also the testing of steam pipes, air reservoirs, and fuel tanks (the subjects dealt with in the next two resolutions on the paper), the Sub-Committee passed to a consideration of the resolution suggested by the Russian delegate respecting oxy-acetylene and electric welding.

THE CHAIRMAN thought that this was perhaps hardly a suitable matter for inclusion in the general principles drawn up by the Sub-Committee, as it was almost entirely a matter of detail, and he thought the point could better be met by amending the resolution already passed respecting construction of boilers so as to secure that the workmanship shall be in all cases satisfactory.

After discussion, M. LOVIAGUIN (Russia) withdrew his suggested resolution on the understanding that he might endeavour to have the matter dealt with in some other way.

The meeting then considered the next resolution on the paper respecting the survey of the hulls of passenger steamers.

M. SMITH (United States of America) suggested some alterations, and after an informal discussion, M. ARCHER (Great Britain) stated that M. Boris (France) had suggested the advisability of dealing with hull, boilers, and machinery in one resolution instead of separately, and if the Sub-Committee so desired, M. Archer would draft a new resolution on these lines for consideration at the next meeting.

This was agreed to.

The Sub-Committee then considered the resolution suggested by M. Smith (United States of America) respecting the duplication of machinery.

M. PALM (Austria) said that he considered this matter had a very important bearing on safety, as if the engine or rudder or steering gear of a single-screw steamer broke down the vessel would be entirely helpless, and might incur serious danger before help could arrive. He thought that the Sub-Committee should lay down a condition similar to that contained in the Austrian Regulations, to the effect that all ocean-going passenger steamers should have duplicate main machinery and duplicate steering apparatus, at least one of the two sets of steering apparatus being worked by power.

M. ARCHER (Great Britain) and M. BORIS (France) pointed out the importance of distinguishing between the requirement of duplicate fittings, i.e., fittings identical in every respect, and spare fittings, i.e., a second fitting which can be used in an emergency, but is not necessarily the same as the original one. M. Boris explained the views of the French Delegation as to duplication of machinery, and stated that he would prepare for consideration at the next meeting detailed proposals on the subject.

Further discussion of the subject was therefore postponed.

The Sub-Committee then considered certain additional resolutions proposed by the British Delegation respecting survey of hull and equipments, the object of these being to specify the most important points as regards hull and equipments which should be dealt with in the detailed regulations to be drawn up at a later date by each signatory State. Several of the members pointed out that certain of the subjects mentioned, e.g., side scuttles and other openings in ship's sides, fire extinguishing arrangements, lights and sound signals, and distress signals, were being dealt with by other Sub-Committees or Committees, and should therefore not be considered in this Sub-Committee.
M. ARCHER (Great Britain) explained that the intention was not that this Sub-Committee should discuss what requirements should be prescribed as to the various subjects mentioned, but should merely emphasise the necessity of these subjects being dealt with in the detailed rules of each State.

M. DE BERLHE (France) said that what was being done was practically to prepare a memorandum for the assistance of individual Governments in drawing up or improving their rules, and this being so, he saw no objection to the important points being mentioned, except that he was afraid there would be a difficulty in deciding which points should be dealt with and which could safely be omitted. He suggested that the resolution should make it clear that the items specified were not necessarily the only points to be attended to.

M. LOVIAGUIN (Russia) pointed out that if it was discovered later that any of the other Committees had dealt with any of the points in such a manner as to make it unnecessary for this Sub-Committee to deal with them, those points could then be omitted, but meanwhile it would be better to leave them in as suggested.

It was understood that the French Delegation would prepare before the next meeting a proposal representing their views, and the Chairman asked the members to consider whether any points besides those mentioned in the discussion should be dealt with.

After a short discussion on the subject of compass adjustment, the meeting terminated.

Adjourned to 4:30 p.m., the 5th December, 1913.
Sixth Meeting.—December 5, 1913, 4.30 p.m.

Present: M. Rasmussen (Chairman), M.M. Walter Smith, Palm, Machay, Pierrard, McDonnell, Duguid, de Berlhe, Grosous, Archer (accompanied by M. Boyle), M.M. Meana, Bonifietti, Barricelli, and Loviagun.

The draft minutes of the previous meeting were distributed to the members, together with a copy of the general principles as to survey of passenger steamers, which had been drafted by the French Delegation.

M. SMITH (United States of America) read the draft general principles submitted by the American Delegation.

M. DE BERLHE (France) wished to make it clear that, in his view, the general principles which might ultimately be adopted would merely be a statement of the principal points to be dealt with by each Government in drawing up the detailed rules referred to in one of the earlier resolutions of the Sub-Committee. He emphasised the distinction between those subjects with which the Conference was dealing in detail, such as life-saving appliances, and the subjects on which nothing but general principles would be laid down, such as the survey of passenger steamers, and said that while a certificate attesting compliance with the requirements of the convention would exempt a ship from inspection in a foreign port as regards those matters on which the Conference had laid down detailed rules, it would not exempt it as regards the matters on which the Conference had laid down only general principles. Exemption in respect of these last-mentioned matters could not be given until each nation had examined the detailed rules prepared by the other nations on the basis of the general principles laid down, and could not be given as between two countries unless the Governments of those two countries agreed that their detailed rules were equivalent to each other. In order that a vessel might have full exemption in foreign ports she would thus probably have to carry two certificates—one attesting compliance with the provisions of the Convention, and a supplementary one attesting compliance with the national rules on points of detail not dealt with by the Conference.

M. SMITH (United States of America), referring to M. de Berlhe's remarks regarding exemption from inspection at foreign ports, stated that he wanted to make it clear that the power of his Government to make such inspections to secure that the requirements were complied with by foreign ships in American ports was in no manner impaired. He added that it had been agreed that only general principles could be laid down with respect to hulls, machinery, etc., and confessed that he could not quite understand the point raised by M. de Berlhe.

M. DE BERLHE said the general principles laid down would form a good foundation for the national rules.

M. ARCHER (Great Britain) said he understood and to a certain extent sympathised with M. de Berlhe's point of view, though he did not agree with it. The question seemed to him to be whether the Sub-Committee and subsequently the Conference could lay down general principles in such manner that the detailed rules based on those principles would be of approximately equal effectiveness on important matters, apart from minor details. If so, the general principles would in themselves form sufficient grounds for exemption from survey as regards the matters dealt with. If not, he thought the Sub-Committee should say so. Personally, he was hopeful that principles could be laid down.

M. LOVIAGUN (Russia) pointed out the three courses open: (1) Each country might be left the entire responsibility for the survey of its own vessels, in the sense that no country would survey non-national ships; (2) each country might survey the passenger vessels of the other countries in its own ports, unless these vessels had been surveyed in their own country in accordance with detailed rules which had been examined by the first country and found equivalent to its own; (3) an international agreement might be arrived at as regards the general principles to be followed in surveying passenger vessels, and ships which had been surveyed in accordance with those general principles might be internationally exempted from survey in respect of the points so dealt with without the necessity of first examining and establishing an equivalence between detailed rules. The third course was that suggested by the
British Delegation, but the French Delegation thought that the second course would still be necessary, whether general principles were laid down or not. For his own part, M. Loviaquin thought it would be useful for the Sub-Committee to lay down general principles, whichever course might ultimately be adopted.

After further discussion, the question was postponed till the next meeting. M. Smith undertook to send copies of his suggested resolutions to all the members present, and also to consult Admiral Capps on the question.

Adjourned to 10.30 A.M., the 8th December, 1913.
Seventh Meeting.—December 8, 1913, 10:30 a.m.

Present: M. Rasmussen (Chairman), MM. Riess, Walter, Polis, Smith, Palm, Machay, Pierrard, McDonnell, Boris, Archer (accompanied by M. Boyle), MM. Meana, Bonfiglietti, Barriechi, Brunn, Lovaginya, and Leman.

The minutes of the fifth and sixth meetings were approved, subject to alterations suggested by MM. Smith, Palm and Bonfiglietti.

THE CHAIRMAN stated that, by request of M. Riess, the resolution submitted by the German Delegation as to the manoeuvring power of steamers would be considered at the meeting on Thursday.

THE CHAIRMAN asked the meeting to consider the resolutions as to survey of passenger steamers submitted by M. Smith, and this course was agreed to. These resolutions were then considered in turn and various suggestions were made regarding them.

It was pointed out that the work of the Committee on Certificates had an important bearing on the work of the Sub-Committee, and that this should be kept in mind in drawing up the resolutions. In this connection it was made clear that the Sub-Committee had to deal only with the question of surveys of passenger steamers carried out by the surveyors of the country to which the vessel belongs, though this did not necessarily limit the surveys to those made in ports of the country to which the vessel belonged if that country had or appointed surveyors in foreign ports. As M. Smith’s resolution had been presented in part only and had not been as yet completed to specify the occasions on which surveys should be made, it was agreed, on the suggestion of the Chairman, that passenger steamers should be surveyed—

(a.) Before the vessel is put in service;
(b.) Once in each year thereafter; and
(c.) Between the annual surveys, if necessary.

After a full discussion it was agreed that the Chairman, with MM. Smith, Archer, and Lovaginya, should meet in the afternoon and prepare a draft for consideration on the basis of the resolutions passed at previous meetings, the draft resolutions which had been submitted, and the discussions on those resolutions. M. Boris was invited to attend the meeting, but was unable to do so owing to another engagement.

As regards the question of the duplication of machinery, the Austrian, American, and French resolutions on this subject were considered.

The Austrian resolution was as follows:—

“All ocean-going passenger steamers should have duplicate main machinery and duplicate steering apparatus, at least one of the two sets of steering apparatus being worked by power.”

After discussion, the first part of this resolution providing for the duplication of the main machinery was not agreed to by the majority of those present. The second part of the resolution was then considered in conjunction with the French resolution which was as follows:—

“Ces règlements doivent prévoir également l’existence d’appareils de secours pour certains auxiliaires importants, savoir:

1. Appareil à gouverner—l’appareil de secours peut être de puissance moindre que l’appareil normal et actionné à bras;

2. Pompos à incendie;

3. Dynamos assurant l’éclairage.”

It was recognised that the questions of fire pumps and spare dynamos were being dealt with by other Committees, and as regards steering gear a resolution combining the French and Austrian resolutions was agreed to as follows:—

“A spare steering apparatus must be fitted, but this may be of less power than the normal apparatus and need not be worked by steam or other mechanical power.”
The American resolution was then agreed to as follows:—

"It is not believed that the question of duplication of main propelling machinery should be dealt with by the Conference, as engineering considerations serve to keep these installations within the limits of safe construction and operation. It is believed desirable, however, for the Conference to formulate general rules requiring the duplication of certain auxiliaries, such as fire pumps, dynamos, and steering engines, in certain classes of ships."

It was agreed that at the meeting in the afternoon the Chairman and other members selected should embody these resolutions in the draft which they were to prepare.

THE CHAIRMAN stated that, according to the schedule, the next meeting would be held on Thursday, the 11th December, at 3 p.m.; but if it appeared desirable to hold the meeting before that date, a notification would be sent to the members, and the Sub-Committee adjourned on this understanding.
Eighth Meeting.—December 10, 1913, 3 p.m.

Present: M.M. Rasnauow (Chairman), Riess, Polis, Smith, Maelay, McDonnell, de Berlhe, Archer (accompanied by M. Boyle), Meana, Barriecelli, Loviagin, Leman. M. Hipwood was also present during the latter part of the meeting.

THE resolutions² drafted by the small Sub-Committee appointed at the previous meeting were presented and considered variation.

M. SMITH (United States of America) stated that Admiral Capps was anxious that each sub-committee should submit its conclusions in such form that if adopted they could be embodied in the Convention with as little alteration as possible, and M. Smith thought this should be kept in mind in going through the resolutions.

The title and paragraph 1 were then considered and agreed to.

On paragraph 2, M. ARCHER (Great Britain) suggested the insertion of words providing that the respective Governments should guarantee the efficiency of the surveyors in each case.

M. DE BERLHE (France) and Dr. RIESS (Germany) expressed the view that no Government would appoint surveyors who were not competent.

M. SMITH (United States of America) pointed out that the paragraph already provided that the Government shall guarantee the efficiency of the survey.

M. ARCHER withdrew his suggestion, and the paragraph was discussed, slightly amended, and agreed to.

Paragraphs 3, 4, and 5 were then considered, amended, and passed.

Paragraph 6 as drafted contained a clause requiring the screw shafts to be drawn at the discretion of the surveyor.

M. DE BERLHE (France), suggested they should be drawn every two years.

M. BOYLE (Great Britain), thought it would not be advisable to specify that they should be drawn more frequently than every three years, though in practice they would probably be drawn about every two years.

After discussion it was agreed to omit the clause, and the paragraph, after slight amendment, was agreed to.

Paragraph 7 was then discussed, amended, and agreed to.

M. ARCHER (Great Britain), moved the insertion of a new paragraph providing that the detailed rules and regulations drawn up by the Signatory States should be such as to secure that vessels shall be sufficient for the service intended. This was in substitution for words which had been struck out of the previous clauses, and which had required that the survey should be such as to secure the sufficiency of the vessel.

On the suggestion of GENERAL MEANA (Italy), it was agreed to limit M. Archer's suggested paragraph to matters affecting safety of life, and the paragraph thus amended was agreed to.

Paragraph 8, respecting hydraulic testing of boilers, was then considered, together with the Appendix containing four rules as to these tests; and a long discussion ensued.

M. DE BERLHE pointed out that the four specimen rules with any one of which national rules were to comply could not be regarded as equivalent, and he suggested the omission of the specimen rules, thus leaving it entirely to the Signatory States to prescribe the test pressures and the intervals between the tests as each Government might think best.

DR. RIESS (Germany) said that either this course should be adopted, or some definite standard should be laid down. It was illogical to select four national rules and embody them in the Convention. The rules of all the participating countries should

² Not printed, the paragraphs being embodied (except for the alterations noted in the Minutes of this and the subsequent meetings, and other minor alterations) in the Report of the Sub-Committee, page 129.
be embodied, or none at all. As he thought it would be difficult to prescribe a standard acceptable to all countries, he supported M. de Berlhe's suggestion as to leaving the matter entirely to the Signatory States.

M. HIPWOOD (Great Britain) agreed with Dr. Riess that it was illogical to include some national rules and omit others. The British Delegation would give further consideration to the matter to see whether they could accept the suggestion made by M. de Berlhe and Dr. Riess, or what alternative they could propose to meet the views expressed.

The further discussion of the paragraph was therefore postponed.

Paragraph 9 was then discussed, amended, and agreed to.

A copy of the paragraphs as agreed to is appended to these minutes.²

DR. RIESS (Germany) then asked permission to call attention to the question of the manoeuvring power of steamers, with special reference to those fitted with turbine engines. Special turbines had to be fitted for going astern, and the power of these had been much too small in the early vessels. The power in later vessels was about 40 per cent. of the full power, as compared with 25 per cent. in early vessels. He thought the Conference should express some opinion on the matter, though he did not press for a definite figure to be fixed if this was objected to.

M. HIPWOOD (Great Britain) said the British Delegation would be prepared to accept a resolution in general terms to the effect that if special engines for going astern are fitted these should be capable of developing sufficient power.

DR. RIESS said he would be prepared to consider this, and as the suggestion met with general agreement, M. Hipwood said the British Delegates would bring forward a draft paragraph on these lines at the next meeting.

Adjourned to 3 p.m., the 11th December, 1913.

* Not printed, the paragraphs being embodied (except for the alterations noted in the Minutes of this and the subsequent meetings, and other minor alterations) in the Report of the Sub-Committee, page 129.
Ninth Meeting.—December 11, 1913, 3 p.m.

Present: M. Rasmussen (Chairman), MM. Walter, Smith, Palm, Machay, Pierrard, Oguid, Boris, de Ierlhe, Sir A. Denny, Archer (accompanied by M. Boyle), Meana, Bonfiglietti, Barricelli, Lovinguin, and Leman.

THE minutes of the seventh meeting were approved, subject to alterations suggested by MM. Smith and Palm.

The paragraphs passed at the eighth meeting were then considered, and after discussion and slight alterations in the wording, these were approved as far as the end of No. 8.

Paragraph 9 was then considered in accordance with the arrangement made at the previous meeting. The paragraph as submitted to the Committee read as follows:—

"The detailed rules shall also prescribe the requirements to be observed as to the initial and subsequent hydraulic tests to which the main and auxiliary boilers, steam pipes, reservoirs which are subjected to high pressure, and fuel tanks for oil motors are to be submitted, as regards the test pressure to be applied and the intervals between the tests."

M. ARCHER moved the insertion, at the end of this paragraph, of the following words:—

"The conditions of the tests for boilers must be at least equivalent to one of the standards (a) (b) (c) or (d) given in Appendix 1, and the conditions of the tests for steam pipes must be at least equivalent to the standard given in Appendix 2."

The Appendix 1 referred to was as follows:—

**Standard (a).**

Main and auxiliary boilers shall be satisfactorily tested by hydraulic pressure, when new, to double the working pressure, and thereafter at intervals of not more than six years to one and a half times the working pressure.

**Standard (b).**

Main and auxiliary boilers shall be satisfactorily tested by hydraulic pressure when new to double the working pressure, but the test pressure need not exceed the working pressure by more than ten atmospheres. Thereafter they must be satisfactorily tested every fourth year to not less than one and a half times the boiler pressure, or six atmospheres above the working pressure, whichever is the least. After 12 years, the tests are made every second year.

**Standard (c).**

Main and auxiliary boilers shall be satisfactorily tested by hydraulic pressure, when new, and thereafter every year, to one and a half times the working pressure, but the test pressure need not exceed the boiler pressure by more than five atmospheres.

**Standard (d).**

The initial and subsequent tests of main and auxiliary boilers shall be made by applying hydrostatic pressure in the proportion of 150 pounds to the square inch to 100 pounds to the square inch of the steam pressure allowed. The aforesaid tests are to be applied when the boilers are new and once in each year thereafter.

M. BOYLE (Great Britain), pointed out that this appendix differed from the one considered on the previous day inasmuch as the standard (c), which represented the British rule, now prescribed that the tests should take place at intervals of not more than six years, instead of leaving it to the Surveyor's discretion. This alteration had been made to meet the views expressed at the previous meeting.
M. LOVIAGUIN (Russia) seconded M. Archer's motion.

GENERAL MEANA (Italy) did not approve of specifying separate rules in an appendix as proposed, and thought the matter could safely be left to the Governments of the various signatory States, who would be responsible for enforcing proper rules.

M. BORIS (France) agreed that the respective Governments might be trusted to deal with the matter properly, and said that, while the idea of inserting rules in an appendix for reference purposes had come from the French Delegation, the suggestion had been made as a means of meeting a difficulty, and, in the view of his Delegation, the appendix was not at all necessary. If it were retained, it must be on the distinct understanding that all idea of equivalence between the rules specified be eliminated, as the French Delegation could not accept this idea.

M. SMITH (United States of America) then read a new clause which he had prepared, covering the question of hydraulic tests in a general way along with other matters relating to boilers.

After further discussion, a vote was taken on the question whether the additions proposed by M. Archer should be made, when the question was decided in the negative.

(For: Great Britain and Russia. Against: Germany, United States of America, Austria-Hungary, Belgium, Canada, Denmark, France, and Italy.)

GENERAL MEANA (Italy) then moved the adoption of the paragraph, subject to certain verbal alterations.

This was seconded by M. PIERRARD (Belgium) and agreed to, without prejudice to subsequent motions for amending the paragraph.

M. ARCHER (Great Britain) expressed the view that if the Conference could lay down any principles which would help, not only the participating States, but any States which might later adhere to the Convention, to secure the safety of boilers, he thought it was a duty to attempt to do so. in view of the serious responsibility resting on the Conference for the safety of life at sea. He fully admitted that the Conference could not lay down detailed rules as to the construction of boilers, but thought if action was taken which would secure an effective hydraulic test in all countries, this would be of great assistance in securing safety. He suggested that the Conference might lay down in general terms the period between successive tests corresponding to different initial and subsequent test pressures, thus specifying a minimum below which no nation might go; and he read a motion which he had drafted on these lines.

M. LOVIAGUIN (Russia) seconded M. Archer’s motion.

After discussion, it was agreed to postpone further consideration of the matter until the next meeting, when the British Delegation would submit a considered clause on the lines suggested.

Paragraph 10 relating to duplication of machinery was then agreed to subject to slight amendment.

A copy of the paragraphs as passed is annexed to these minutes.10

The Sub-Committee then considered a draft motion based on the resolution of the German Delegation as to the power of engines for going astern.

M. BORIS (France) thought it unnecessary to refer specially to engines for going astern.

M. SMITH (United States of America) read an alternative motion in more general terms than the original one. This appeared to meet with general approval and was ordered to be copied for final consideration at the next meeting.

Adjourned to 4.30 p.m., the 12th December, 1913.

* Nor printed, the paragraphs being embodied (except for the alterations noted in the Minutes of the subsequent meeting, and other minor alterations) in the Report of the Sub-Committee, page 129.
Tenth Meeting.—December 12, 1913, 3 p.m.*

Present: M. Rasmussen (Chairman), MM. Polis, Smith, Palm, Machay, Pierrard, McDonnell, Duguid, de Berlhe, Archer, Meana, Barricelli, Loviaguin, and Leman.

The minutes of the eighth meeting (which had been circulated) were approved, subject to alterations suggested by M. Smith (United States of America).

The minutes of the ninth meeting were read and approved.

The Sub-Committee then considered the resolutions passed at the previous meeting, those having been drawn up in the form of a draft report. Subject to verbal corrections, the first eight paragraphs were finally passed.

On the ninth paragraph, M. ARCHER (Great Britain) moved the addition of the following words:—

"Main and auxiliary boilers shall be satisfactorily tested by hydraulic pressure when new, and thereafter at fixed intervals.

The initial and subsequent test pressures shall not be less than one-and-a-half times the working pressure, or five atmospheres above the working pressure—whichever is least.

If the initial pressure is double the working pressure, the interval between the subsequent tests may be six years, but shall in no case exceed that period. If the initial pressure does not exceed five atmospheres above the working pressure, the interval shall not exceed two years. With a higher initial test pressure the period may be increased, subject to the limit of six years stated above."

M. LOVIAGUIN (Russia) seconded Mr. Archer's proposal.

GENERAL MEANA (Italy) objected, and thought the paragraph should be accepted as it stood, without the proposed addition. If it were decided that figures should be inserted in the paragraph, he would specify merely that the test pressure should not be less than 1½ times the working pressure, and that the interval between the tests should not exceed six years. This, however, might have the disadvantageous effect of leading to the adoption in some countries of rules less stringent than those now existing in those countries. He thought 1½ times the working pressure was too high for the periodical tests.

M. PALM (Austria) supported General Meana in advocating that the paragraph should be left as it stood, and that the details of the rules should be entirely left to the signatory States.

M. SMITH (United States of America) reminded the Sub-Committee that they had decided as a general rule not to specify details, and though he sympathised with the wish of the British Delegation to safeguard the point, he thought it would be very difficult to find an acceptable formula. He offered the following resolution:—

"All boilers and appurtenances thereof must be of such construction, shape, arrangement and material, and in such condition, that the same may be safely employed in the service proposed without peril to life, and the periodical survey and test of the same shall be such as to secure that the requirements herein set forth shall be fully complied with, and no boiler or pipe or any connections therewith shall be approved that is made in whole or in part of bad material, or is unsafe in its form or dangerous from defective workmanship, age, use, or other cause."

M. McDonnell (Canada) said that the Canadian rule was to test boilers annually to 1½ times the working pressure. Practically all the Canadian Inspectors were unanimous in thinking that this test was not too high, and they were also practically unanimous in considering it necessary. There had been very little complaint, except from owners who had old boilers.

M. PIERRARD (Belgium) said he had already expressed the view that it would be better to leave the matter to the respective Governments to deal with, as the

* By arrangement with the members the meeting was held at 3 p.m., instead of 4:30 p.m. as originally fixed.

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A hydraulic test was only one of the many details that might be specified, and as it was so difficult to find a satisfactory formula, the matter having now been discussed at length on several occasions without any result. However, in order to enable the question to be settled, he would support the proposal of the British Delegation.

A vote was then taken, when M. Archer's motion was carried by a majority. (For: Belgium, Canada, Denmark, France, Great Britain, Russia. Against: Germany, America, Austria-Hungary, Italy).

THE CHAIRMAN then suggested that the arrangement of the new clause might be somewhat altered, and this was agreed to.

Paragraph 10 was then considered, amended, and passed.

M. POLIS (Germany) then moved the adoption of an additional clause respecting the manoeuvring power of steamers, and this was agreed to, subject to a slight amendment.

THE CHAIRMAN asked for, and received, the authority of the Sub-Committee to make such verbal alterations as might be necessary, in the interests of consistency and suitability, without altering the meaning, and to present the report to the Main Committee. He then announced that the work of the Sub-Committee was complete, and thanked the members for their attendance and their assistance.

M. PIERRARD (Belgium) said he felt he was speaking for all the members of the Sub-Committee in thanking the Chairman for the manner in which he had conducted the business of the Sub-Committee. (Applause.)

M. SMITH (United States of America) said that he wished personally, as well as in behalf of his American colleagues, and he ventured to add, in behalf of the entire Sub-Committee, to express the appreciation felt by all for the careful, efficient and painstaking way in which Mr. Carter, the Secretary of the Sub-Committee, had done the work entrusted to him. (Applause.)

Adjourned sine die.
Report.

The Sub-Committee have carefully considered the questions referred to them by the Committee, and have the honour to report as follows:—

Arrangements as to the Survey of Passenger Steamers by the Authorities of the Countries to which they belong.

For the purposes of the following general principles, a steamer shall be deemed to be a vessel subject to the requirements prescribed by this Conference, and propelled by steam or other mechanical power.

1. It is not possible to secure a uniform system of survey of steamers at the ports of different States.

2. The survey in regard to the points dealt with by the Conference shall be carried out by Government Surveyors. Each Government may, however, entrust the survey of steamers of its own country either to Surveyors nominated by it for this purpose, or to organisations recognised by it. In every case the Government concerned fully guarantees the completeness and efficiency of the survey.

3. It is not possible for the Conference to lay down detailed rules governing the survey of steamers in all respects, but it is possible and desirable to formulate general principles to govern the survey of steamers in the different countries as regards hull, boilers, machinery, and equipments. The following are the general principles which have been formulated, and each signatory State undertakes (1) to draw up detailed rules and regulations in accordance with these general principles, or to bring its existing rules and regulations into agreement with these principles; (2) to communicate these rules and regulations to each of the other signatory States; and (3) to secure that these rules and regulations shall be enforced.

4. The surveys referred to in paragraph 2 shall be made:
   (a) Before the steamer is put in service, as specified in paragraph 5;
   (b) Once each year, as specified in paragraph 6; and
   (c) Between the annual surveys, if required, as specified in paragraph 7.

5. The survey before the steamer is put in service shall include an inspection of the whole of the hull, machinery, and equipments, including the outside of the steamer's bottom, and the inside and outside of the boilers. The survey shall be such as to ensure that the arrangements, material, and scantlings of the hull, boilers, and their appurtenances, propelling and auxiliary machinery, life-saving appliances, and other equipments, fully comply with the requirements of this Conference and of the detailed rules and regulations adopted by the signatory State to which the steamer belongs for steamers of the service in which she will be employed. The survey shall also be such as to ensure that the workmanship of all parts of the steamer and her equipments is in all respects satisfactory.

6. The annual survey shall include an inspection of the whole of the hull, boilers, machinery, and equipments, including the outside of the steamer's bottom. The survey shall be such as to ensure that the steamer, as regards the hull, boilers, and their appurtenances, propelling and auxiliary machinery, life-saving appliances, and other equipments, is in satisfactory condition for the service in which she will be employed, and that she complies in all respects with the requirements of this Conference, and of the detailed rules and regulations referred to in paragraph 3.

7. A survey or inspection either general or partial, according to the circumstances necessitating such survey or inspection, shall be made when any accident occurs or defect arises which affects the safety of the steamer or the efficiency or completeness of her life-saving appliances or other equipment, or when any important repairs or renewals are made; and the survey or inspection shall be such as to secure that the necessary repairs or renewals have been effectively made, that the material and workmanship of such repairs or renewals are in all respects satisfactory, and that the
steamer complies in all respects with the requirements of this Conference and of the
detailed rules and regulations referred to in paragraph 3.

8. The detailed rules and regulations referred to in paragraph 3 shall be such as
to secure, in the interests of safety of life at sea, that the steamer is fit for the service
in which she will be employed.

9. The detailed rules and regulations referred to in paragraph 3 shall prescribe
the requirements to be observed as to the initial and subsequent hydraulic
tests to which the main and auxiliary boilers, steam-pipes, reservoirs which are
subjected to high pressure, and fuel tanks for oil motors are to be submitted, as
regards the test pressure to be applied, and the intervals between the tests.

Main and auxiliary boilers shall be satisfactorily tested by hydraulic pressure
when new and thereafter at fixed intervals.

The initial and subsequent test pressures shall not be less than one-and-a-half
times the working pressure, or five atmospheres above the working pressure, whichever
is the less.

If the initial test pressure does not exceed five atmospheres above the working
pressure, the interval between the subsequent tests shall not exceed two years. With
a higher initial test pressure, the interval may be increased, and if the initial test
pressure is double the working pressure, the interval may be six years, but it shall in
no case exceed that period.

10. Each signatory State shall adopt rules and regulations to provide that
steamers shall have sufficient backing power in order to secure proper control of the
vessel under all conditions of navigability.

Duplication of Machinery.

11. It is not believed that the question of duplication of main propelling
machinery should be dealt with by this Conference. It is believed desirable,
however, to formulate general rules requiring the duplication of certain auxiliaries,
such as steering apparatus, fire pumps, and dynamos, in certain classes of steamers.

Steamers shall be provided with auxiliary steering apparatus, which, however,
may be of less power than the main apparatus, and need not be worked by steam or
other mechanical power.

It is the understanding of this Sub-Committee that the question of duplication
of fire pumps and dynamos has been or is being dealt with by other Committees of
this Conference.

(Signed) A. H. M. RASMUSSEN (Chairman).

(Signed) W. CARTER (Secretary).

December 12, 1913.
Committee on Safety of Construction.

Fourth Meeting.—December 13, 1913, 11 a.m.

ALL the members were present except M.M. Riess, Wierdsma, Wilmink, and Lovinguit.

The Minutes of the third meeting on the 26th November, 1913, were considered and approved.

SIR ARCHIBALD DENNY (Great Britain) referred to the resolution recorded in those Minutes respecting the sub-division of existing vessels, and said that his intention, and he believed the intention of the Committee, had been that the sub-division of existing vessels should not be interfered with, as it would be impossible to apply sub-division rules to all existing ships, and unfair to apply them to some. He was not sure that the resolution to which he had referred made this intention quite clear.

THE CHAIRMAN said that though the clause represented action taken, the language was not necessarily final, and this resolution would have to be considered with the others passed by the Committee before they could be forwarded to the Conference for embodiment in the Convention. He suggested that a Sub-Committee should take up this question of phraseology, and points such as that suggested by Sir Archibald Denny could thus be dealt with.

This suggestion was agreed to.

THE CHAIRMAN then laid before the members the report of No. 3 Sub-Committee, and called on M. Rasmussen, the Chairman of that Sub-Committee, to give such explanations of the report as he might consider necessary, and to second its adoption.

M. RASMUSSEN (Denmark) said that the report was the result of the Sub-Committee’s deliberations at ten meetings, and represented their unanimous findings except as regards the latter part of paragraph 9 respecting the hydraulic testing of boilers, which had been inserted on the motion of the British Delegation by a majority of 6 to 4. The matter had received lengthy consideration, and was not finally decided until after several alternative proposals had been made and rejected. He thought the paragraph as it stood in the report represented a reasonable solution, as it left each country free to adopt such rules as it thought best, subject to certain limits. The Sub-Committee found that in general it was impossible for them to lay down detailed rules as to the survey of passenger steamers, however desirable it might have been to do so. They could only lay down general principles, but it would be seen that they proposed that each signatory State should bind itself to make detailed rules based on the general principles laid down, or to bring its existing rules into conformity with those principles.

THE CHAIRMAN said that while each Delegation had no doubt made concessions during the discussion with a view to reaching agreement, the report represented practically the unanimous decisions of the Sub-Committee, and in these circumstances he did not think any useful purpose would be served by further detailed discussion. He therefore asked that all the conclusions in the report which had been unanimously agreed to by the Sub-Committee should be unanimously accepted by the Committee, and, in the absence of objection, he would take it that this was agreed to.

SIR JOHN BILES (Great Britain), intervening, asked whether this procedure meant that decisions of Sub-Committees which had not been unanimous might come up for revision by the Committee. He asked this question because in his Sub-Committee a large number of the resolutions which would be embodied in the report had been carried by a majority.

THE CHAIRMAN said that he saw no profit whatever in continuing discussion of matters which had been thoroughly discussed in Sub-Committee, but it had appeared to him that a distinction should be made between unanimous findings of Sub-Committees and those which had not been unanimous. He asked whether any Delegation wished to bring before the Committee any suggestions in regard to the report.

None of the Delegations made any suggestions.
THE CHAIRMAN stated that it would be obvious that the phraseology of the report would need to be recast in some instances to make it suitable for embodiment in the Convention, as it was desired by the President of the Conference that all the Committees should put their findings in as definite and concise language as possible. This involved no change in the principles decided upon but only in the form of expression. The task of reducing the resolutions of the Sub-Committees to final form would be undertaken from day to day as might be found possible, so that in their final form they could be passed on to the Committee of Réduction at an early date. With this explanation the Chairman suggested the Committee's acceptance of the report of No. 3 Sub-Committee, and if any Delegation desired to make any objection the opportunity would now be given.

No objection having been made the Chairman announced that the report was unanimously adopted by the full Committee and would be drawn up in a suitable form for embodiment in the Convention. (Applause.)

THE CHAIRMAN said that he felt sure he could interpret the Committee's demonstration as indicating their satisfaction at the work of the Sub-Committee having been done in the best practicable manner.

THE CHAIRMAN then laid before the members a preliminary report containing the text of the resolutions passed by No. 2 Sub-Committee, and called upon Sir John Biles, the Chairman of the Sub-Committee, to make such explanations as he might consider necessary and to second the adoption of the resolutions.

SIR JOHN BILES (Great Britain) said that these resolutions represented the deliberations of his Sub-Committee at eleven meetings, and they dealt with all the points which had been referred to them by the Committee excepting the last section relating to subdivision in the machinery space, which his Sub-Committee thought would necessarily be dealt with by No. 1 Sub-Committee. As the last meeting of the Sub-Committee had ended at 7.15 on the previous evening, he thought great credit was due to the secretaries in extracting from the minutes and arranging the resolutions which had been passed at the various meetings, and presenting them to the Committee within such a short space of time. (Applause.) In the circumstances there had been no opportunity of examining the paper since it was drawn up, and in asking the Committee to adopt it, he did so subject to its being examined in detail, to make certain that it corresponded with the decisions and the intentions of the Sub-Committee.

THE CHAIRMAN thought that in the circumstances it would be advisable to have the paper read, and asked Sir John Biles to read it to the meeting.

SIR JOHN BILES then read the paper paragraph by paragraph, and, at his request, the Chairman asked the members to specify any points in which they thought it did not correspond to what had been intended by the Sub-Committee. In connection with the first paragraph of the paper, which referred to the pressure due to the actual head of water which will come on a bulkhead in the flooded condition, Sir John Biles explained that the expression "flooded condition" had been used throughout the paper to mean the line to which the ship will be submerged under the assumptions adopted by No. 1 Sub-Committee.

DR. BRUHN (Norway) asked whether this meant the line corresponding to the maximum permissible immersion of the vessel under such standards as might be laid down, or the actual immersion taking into account the actual spacing of bulkheads. If the second alternative were intended, the determination of the flooded water-line would involve direct calculations and much extra work. Again, where would the flooded water-line be in the case of vessels for which no subdivision was prescribed?

SIR JOHN BILES said he thought the intention was to use the line corresponding to the actual immersion of the vessel.

PROFESSOR PAGEL (Germany) said one of the main objects of No. 1 Sub-Committee had been to prescribe curves or tables which would obviate the necessity of actual calculations.

SIR JOHN BILES said his Sub-Committee had had to choose between three reference lines, namely, the margin of safety line, the bulkhead deck, and the flooded line. They had been under the disadvantage of not knowing precisely what was being
done in No. 1 Sub-Committee, and he saw no reason why the matter should not be reconsidered, if necessary, to bring it into harmony with what had been already decided in No. 1.

As regards the clause in the paper respecting the periodical operation of watertight doors, Sir John Biles said that this clause had been only provisionally embodied, as it was considered at the meeting on the previous day at which the mover of a previous resolution with which it conflicted had not been present. The mover of the original resolution had now, however, consented to the modified resolution embodied in the paper which he was reading.

As regards the clause providing for watertight doors to be kept closed at sea except when necessarily opened for the working of the vessel, Sir John Biles said the Sub-Committee intended this to cover the question referred to them as to doors being kept closed in foggy weather or in the vicinity of icebergs.

The final resolution respecting longitudinal bulkheads was intended to bring such bulkheads under the requirements of the previous resolutions which had referred mainly to transverse bulkheads.

THE CHAIRMAN then asked the Committee to consider the paper page by page, and to notify any suggestions they might have for improving the language or making the intention more clear.

A number of points were raised regarding arrangement and wording, and the Chairman said that these would be considered by the editing Sub-Committee to which he had already referred, and in this connection he asked, and received, the permission of the Committee to rearrange and simplify the expression before the report was submitted for final consideration.

During the discussion it was decided that the undermentioned portions of the paper should be referred back to the Sub-Committee in order that the intention might be made clear:

1. The paragraph respecting the test to be applied to peaks, tanks, and other compartments intended to hold liquids.
2. The paragraph respecting openings in collision bulkheads.
3. The paragraph respecting the fitting of sliding watertight doors in the transverse bulkheads in the tunnels.
4. The paragraph respecting the provision of hand gear for operating power-worked doors.
5. In this connection Sir Archibald Denny raised the question whether the expression "power door" included a door released from the bridge and dropped by its own weight.
6. The paragraph respecting the testing of watertight doors.
7. The paragraph respecting the provision of escapes from watertight compartments.
8. The paragraph respecting the fitting of valves on discharges through the ship’s sides.

It was agreed to make the following alterations in order to express more clearly the intention of the Sub-Committee:

1. To substitute “preceded” for “accompanied” in the paragraph as to the warning signal to be sounded in connection with the closing of power doors.
2. To insert a general clause embodying all the requirements throughout the paper as to the entry of particulars in the log.

THE CHAIRMAN said that the paragraphs of the paper on which questions had been raised would be considered and brought before the Committee at a further meeting. Subject to this, the action of the Sub-Committee was confirmed by the Committee.

Adjourned to 11 A.M., the 15th December, 1913.
Fifth Meeting.—December 15, 1913, 11 a.m.

All the members of the Committee were present, except MM. Riess, Kersey, Grobous, Wierdsma, Wimink, and Loviagum.

THE CHAIRMAN reported that an informal Sub-Committee had met the previous day and had drawn up certain definitions based on the suggestions which had been made by Professor Pagel, Sir A. Denny, and Dr. Bruhn. He then read the suggested definitions as follows, and asked whether any member took exception to any of them:—

Definitions for purposes of Sub-Division.

1. Load Water Line.—The load water line is that used in determining the subdivision of the vessel.
2. Length.—The length of the vessel shall be the extreme length of the load water line.
3. Breadth.—The breadth of the vessel shall be the extreme width, from outside of frame to outside of frame at or below the load water line.
4. Margin Line.—The margin line is a line drawn parallel to the bulkhead deck at side line, and three inches below the upper surface of that deck at side.
5. Draught.—The draught is the vertical distance from the top of keel amidships to the load water line.
6. Freeboard.—The freeboard is the vertical distance from the load water line to the margin line amidships.
7. Depth.—The depth of the vessel is the sum of the draught and freeboard as above defined.
8. Sheer.—The sheer of the bulkhead deck at any point is the vertical distance between the beam at side line at that point and a line drawn parallel to the load water line at the height of the beam at side line amidships.

9. If block coefficient of fineness of displacement to load water line is used, this coefficient shall be determined as follows:—

\[
\text{Volume of Displacement to Moulded Lines} = \text{Length} \times \text{Breadth} \times \text{Draught}.
\]

10. The permeability of a compartment in free communication with the sea throughout its volume is the ratio of the volume of water-filled space to the total volume of the compartment. Note.—In determining the areas of sections for obtaining the total volume of a compartment which extends above the margin

Définitions.

1. La flottaison en charge est la flottaison considérée dans la détermination du compartimentage.
2. La longueur du navire est la longueur extrême mesurée au niveau de la flottaison en charge.
3. La largeur du navire est la largeur extrême hors membrures mesurée au niveau de la flottaison en charge ou au-dessus de celle-ci.
4. La ligne de surimpression est une ligne supposée tracée sur le bordé à 7,62 centimètres (3 pouces) au-dessous de l’intersection de la surface extérieure du bordé avec la surface supérieure du pont.
5. Le tirant d’eau est la distance verticale mesurée entre le dessus de quille au milieu de la longueur et la flottaison en charge.
6. Le franc-bord de compartimentage est la distance verticale mesurée de la flottaison en charge à la ligne de surimpression au milieu du navire.
7. Le creux est la somme du tirant d’eau et du franc-bord.
8. La touche du pont, dit pont des cloisons, qui sert à déterminer la ligne de surimpression, est mesurée verticalement à partir d’une ligne parallèle à la flottaison en charge, passant par le livet du pont au milieu.
9. Le coefficient de finesse à employer s’il en est besoin est le rapport entre le volume de la carène hors membrures limité à la flottaison en charge, et le produit des trois dimensions : longueur, largeur, tirant d’eau.

10. La perméabilité d’un espace s’exprime par la fraction de cet espace que l’eau est susceptible d’occuper.

Le volume d’un compartiment qui s’étend au-dessus de la ligne de surimpression doit être considéré comme limité à la hauteur de cette ligne.
line, they shall be measured only to a horizontal line through the margin line.

11. The machinery space is to be taken as extending in length between the extreme main transverse watertight bulkheads bounding the spaces devoted to the main and auxiliary propelling machinery, including boilers when used.

PROFESSOR PAGEL (Germany) pointed out that the reference in Definition 10 to the determination of volumes was incomplete and after discussion it was agreed to add the following words to the definition:—

In calculating volumes, moulded lines shall be used.

Les volumes s'étendent hors membranes.

THE CHAIRMAN then asked whether any Delegation dissented to any of the definitions, and, after a pause, announced that, in the absence of objection, they would be accepted as the action of the full Committee.

THE CHAIRMAN then read a paragraph which had been prepared to give effect to the suggestions made at previous meetings as regards the permeability of machinery spaces in vessels propelled by internal combustion engines, and after slight modification the paragraph was agreed to as follows:—

For steam vessels the permeability of the machinery space, including the double bottom in wake thereof, is to be taken as 80 per cent. For vessels fitted with internal combustion engines, the corresponding permeability is to be taken as 85 per cent, unless it is proved by actual calculation that a figure between 80 per cent and 85 per cent is applicable.

La perméabilité à attribuer à la tranche des machines et chaudières, y compris le volume du double fond correspondant, est 0,80 pour les navires à vapeur. Pour les navires munis de moteurs à combustion interne, la perméabilité de la tranche des machines est 0,85 à moins qu'il ne soit prouvé par un calcul direct qu'une valeur comprise entre 0,85 et 0,80 peut lui être attribuée.

THE CHAIRMAN then announced that the four delegates who had drawn up the proposals as to sub-division which had been under consideration at previous meetings had now revised the text of their proposals, so as to make the meaning clear, and copies of the revised text had been distributed in English and French to the members.

He called on M. Pierrard to submit these to the meeting with any explanation he might consider necessary.

M. PIERRARD (Belgium) (speaking in French) explained that the alterations which had been made in the text of the proposals put forward by the German, French, and British delegates in conjunction with himself were alterations of form only, and were intended to remove the possibility of any further misunderstanding occurring, such as had arisen in connection with the original text. The revised text of the proposals was as follows:—

"Article 4.—(1.) The maximum admissible length of one compartment having its centre at any point in the vessel's length is obtained from the floodable length (article 2) by multiplying that length by an appropriate factor.

(2.) This factor depends on the length of the ship, and, for a given length, varies according to the nature of the service for which the ship is intended. This factor decreases in a continuous and gradual manner (i) as the length of vessel increases and (ii) as, for a given length, the vessel departs from the type of vessel engaged in a mixed cargo and passenger service

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and approaches to the type of vessel primarily engaged in the transport of passengers.

"(3.) For each of the two types of vessels referred to in the previous paragraph the variation of the factor may be expressed by a curve of which the coordinates represent the length of the vessel and the value of the factor. The following table gives certain points on the two curves for the limit of each type:

<table>
<thead>
<tr>
<th>Table.</th>
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<tbody>
<tr>
<td>A.</td>
<td>B.</td>
<td>C.</td>
</tr>
<tr>
<td>Feet.</td>
<td>Feet.</td>
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<tr>
<td>1</td>
<td>225</td>
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<tr>
<td>0.84</td>
<td>405</td>
<td>505</td>
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<tr>
<td>0.5</td>
<td>570</td>
<td>490</td>
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<tr>
<td>0.34</td>
<td>700</td>
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<td>0.34</td>
<td>900</td>
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</tr>
</tbody>
</table>

"Figures in thick type in column (A) are exact.

"Figures in ordinary type in column (A) are approximate.

"Column (A) gives the maximum admissible values of the factor for the length of vessels given in columns (B) and (C).

"Column (B) is applicable to vessels engaged in a mixed cargo and passenger service.

"Column (C) is applicable to vessels primarily engaged in the transport of passengers.

"(4.) For a given length the value of the factor appropriate to a vessel between the two extreme limits will be between the values of the factors determined by the two curves before mentioned, and will be automatically fixed by a criterion of service which is to form the subject of further study.

"(5.) When the factor is equal to or less than 0.5 it may be doubled, thus giving at any point of the vessel's length the total length of two compartments; but, in that case, the length of the shorter compartment of any pair must not be less than one quarter of the total length so obtained."

Referring to the table embodied in the proposals, M. Pierrard explained that the approximate factors which had been inserted between the fundamental factors of unity, 0.5 and 0.84 were intended to enable some idea to be formed as to the general trend of the respective curves corresponding to the two extreme types of vessels dealt with. These two limiting curves being traced, the factor applicable to any particular vessel would lie between the extreme values of the factor for that length, and would be fixed according to a criterion yet to be determined. The four delegates would have liked to have agreed on this criterion, but it was not possible to do so, and in the present state of their knowledge, M. Pierrard thought it would be dangerous to attempt to fix the
criterion at this Conference. The authors of the proposal were of the opinion that each country represented at the Conference should study the matter so that when a further opportunity for international discussion occurred, they could make suggestions on the point and agree on a criterion to be used. If this Committee insisted on a criterion being found the Sub-Committee which had prepared the proposals might have to say that the prospect of coming to agreement as to sub-division rules was being endangered. The authors of the proposals were convinced, however, that it was desirable to fix general lines and curves which might and probably could be improved on in the near future when a full and definite solution of the problem would be given. The only further point to which he wished to refer was that paragraph (5) of the proposals had been reproduced at the wish of the German Delegation.

SIR ARCHIBALD DENNY (Great Britain), after giving a summary in English of M. Pierrard’s remarks, added that the factors intermediate between the fundamental factors were those corresponding to the lengths of vessel at which extra sub-division at the forward end would probably be asked for. He agreed that it would not be possible to find a satisfactory criterion without further study, and thought it natural and desirable that the results of this study should be taken up at the International Load-line Conference, if possible. He desired to say that the 5th paragraph of the proposals under consideration met the wishes of the British as well as the German Delegation.

THE CHAIRMAN after having ascertained that no other member of the Sub-Committee which had prepared the proposals desired to speak, thanked them on behalf of the full Committee for their work. All doubt as to the meaning of their proposals was removed, but the factors governing sub-division remained the same. Acting for his American colleagues he had already stated his objections to these factors and would not encroach upon the Committee’s valuable time by repeating them. As no criterion could be laid down at this Conference, it seemed to him obvious that the lower or less severe of the two limits suggested by the four delegates would be the real basis of comparison if embodied in the Convention, and until modified by a “criterion” or “coefficient of traffic” would be the actual law under which action would be taken. If this opinion was incorrect he would be glad to have it corrected. If it was correct it seemed clearly necessary for further consideration to be given to the whole subject, after the adjournment of this Conference, with a view to supplementing action at some future Conference, and it would be open to the Committee to recommend this even though such recommendation could not appear in the Convention itself. In this connection important points were the date of enforcement of the standards laid down and the date when it might be possible more definitely to fix these standards.

He proposed to submit at the next meeting a proposal providing that if the minimum standards laid down by the Convention are exceeded in any particular case, the owners upon making request therfore may have this fact officially noted on the vessel’s certificate, subject to their furnishing the necessary data in substantiation of their claim. As regards the proposals under immediate discussion, if there were no further comment he would formally bring up again the amendment proposed by the American Delegation, let it be disposed of, and then revert to the proposals of the four delegates.

To put the matter in order, M. PIERRARD (Belgium) then formally moved the proposals which he had explained to the Committee, and these were seconded by the German, French, and British Delegations.

GENERAL MEANA (Italy) raised a question as to the wording of the fifth paragraph of the proposals, and it was agreed to alter this paragraph by substituting the words “in order to give” for “thus giving.”

M. FERGUSON (United States of America) then stated the substance of the amendment previously proposed by the American Delegation, and offered it again as an amendment to M. Pierrard’s proposal, the figures being as follows:—
THE CHAIRMAN then announced that, as this had not been seconded, it would be recorded in the Minutes as a motion, since, in view of all the circumstances, it did not seem necessary to repeat the explanations given at the time it was first brought forward.

SIR A. DENNY (Great Britain) asked, in view of the fact that the text of the proposals made by the four delegates had been clarified, whether the amendment proposed by the American Delegation was based on any data more recent than those stated by the Chairman at the previous meeting.

THE CHAIRMAN explained that the data upon which the American proposals were based were those to which M. Ferguson and the Chairman had referred at the previous meeting, and he desired to repeat that the amendment of the American Delegation was put forward after careful consideration and as representing the lowest standards which it appeared to them possible to approve. If the Committee decided otherwise, their decision would of course prevail but he hoped that future investigation would enable the standard of subdivision to be improved.

SIR ARCHIBALD DENNY (Great Britain) said that though M. Ferguson’s amendment had not been seconded, he thought it would be discourteous if an important proposal by one of the countries represented at the Conference were disposed of without comment, and he asked the permission of the Chairman to say a few words. Proceeding Sir Archibald Denny said he thought the assumption that, if the two standards proposed were embodied in the Convention, the lower of the two would be acted on to the exclusion of the other, was assuming action which the responsible Governments would have hesitation in taking. He appreciated the desire to apply the two-compartment standard to vessels of as small a length as possible, and accepted the American proposals as being based on the best material available, but while the British Bulkheads Committee had not completed their investigations they had examined a large number of vessels, and had found difficulty as he had already explained in applying the two-compartment standard outside certain limits, viz.: below 500 feet for pure passenger vessels, and 600 feet for cargo-passenger vessels.

As regards other countries which had made the most extensive investigations into the subject, the International Committee had also before them the valuable work of the French Committee, and the experience of the German authorities: and in this connection he desired to pay a warm tribute to the attitude of Professor Pagel throughout the discussions, and to thank him for his frankness and for the fullness of the information which he had laid before the Committee. (Applause.)

The proposals of the four delegates had abolished steps such as existed in the present German regulations: they went beyond the German requirements as to fast passenger vessels, and they struck a low mean as to the cargo-passenger vessels, which, owing to the abolition of the steps, meant, as Professor Pagel had already explained, an increase of severity in actual practice.

He admitted that better results could be obtained in special vessels, but in a Committee of this kind, where all the representatives had a grave responsibility to their respective Governments, it seemed desirable at present not to make a too violent change from good practice giving subdivision approaching that now laid down. Even if the rules laid down were not the most stringent which might with further study be
found practicable, it would still be a work of stupendous importance if they succeeded in establishing for the first time an international basis for rules as to sub-division.

It would of course be practicable to say that more severe conditions than those proposed should be laid down, and vessels might be produced under such conditions, but it seemed to him that a just mean, or rather something better than a just mean, should be the aim of the Committee, and this was in his opinion represented by the proposals of the four delegates.

THE CHAIRMAN, speaking on behalf of his American colleagues, stated that comments on the American proposals by various delegates at meetings of the full Committee and Sub-Committee indicated that the proposals were regarded by many as too severe for present incorporation in the convention. The American representatives had stated their position explicitly, and in view of the many important matters still to be disposed of by the Committee, were unwilling to prolong the discussion needlessly. His colleagues were therefore agreed with him in submitting the main question to a formal vote without further delay.

A vote was then taken on the proposals of the four delegates, when there voted:—
For: Germany, Austria-Hungary, Belgium, Canada, Denmark, France, Great Britain, Italy, Norway, the Netherlands, Russia, and Sweden. Against: United States of America.

Adjourned to 10 A.M., the 16th December, 1913.
Sixth Meeting.—December 16, 1913, 10 a.m.

MORNING SESSION.

ALL the members of the Committee were present except MM. Riess, Kersey, Groloos, Wierdsma, Wilmink, and Lovignan.

THE minutes of the ninth meeting of No. 1 Sub-Committee were considered and approved, subject to the inclusion of the full text of the original proposals made by the Belgian, German, French, and British Delegations.

The minutes of the tenth meeting of No. 3 Sub-Committee were approved, subject to alterations suggested by M. Smith (United States of America).

THE CHAIRMAN asked whether the Sub-Committee which had been studying the questions of extra sub-division at the forward end of vessels and the maximum lengths of compartments had any suggestions to put before the meeting.

M. BORIS (France) stated that he had prepared a draft dealing with the first of the two subjects mentioned by the Chairman. This was based on the existing German regulations, but with an increase of severity corresponding to that embodied in the decision already taken as to sub-division generally. His suggestion was that one-compartment ships for lengths above those corresponding to the factor 34 should be so sub-divided as to be capable of floating with the two foremost compartments flooded; two-compartment ships for lengths above those corresponding to the factor 39, but less than those corresponding to the factor 33, should fulfill the same condition as regards the three foremost compartments; and those for lengths above that corresponding to the factor 35 should fulfill the same condition as regards the four foremost compartments. The factor 34 corresponded to a pure passenger vessel 305 feet long and a cargo vessel 405 feet long; the factor 39 corresponded to a vessel of any type 700 feet long; the factor 35 corresponded to a vessel of any type 850 feet long.

In order to secure the above-mentioned conditions being fulfilled in the manner intended, it would be also necessary to specify that the number of compartments stated should occupy a certain percentage of the length of the vessel. The German rule was 18 per cent. for the three foremost compartments and 25 per cent. for the four foremost compartments. He suggested that the figure 18 might be increased to 20, and the figure 25 might be retained.

He read a proposal on these lines which he had drafted, explaining that the wording was only provisional. He added that he had been advised by one of his eminent colleagues that if too great a proportion of the ship's length at the forward end were flooded the stability of the vessel might be prejudiced. Personally, therefore, he thought that the percentages mentioned should be maxima as well as minima, and should not be increased unless it was proved that the stability would not be unduly affected in the case of flooding.

PROFESSOR PAGEL (Germany) stated that he had had the pleasure of assisting M. Boris in drawing up the proposals which had just been explained. He entirely agreed with them, and seconded them on the understanding that, as M. Boris had mentioned, the wording was only provisional.

SIR ARCHIBALD DENNY (Great Britain) also supported the proposals on the same condition, and read a draft which he had hastily prepared for consideration with a view to shortening the proposed paragraph if possible.

After some discussion Sir Archibald Denny's draft was slightly modified, and ordered to be copied for consideration at the afternoon session.

THE CHAIRMAN then submitted on behalf of his American colleagues a resolution providing that, if increased safety is secured in any vessel by means of watertight sub-division over and above the minimum requirements of the Convention,
the degree of increased safety shall be noted on the certificate of the vessel. This resolution had been drafted to carry out a suggestion made by the Chairman at a previous meeting, and he thought it had special importance, because the standards which would be laid down by the Conference were admittedly minima. As the investigations made by various countries had not gone far enough at this time to enable them to reach the final limits intended, there would be some indeterminate ground, and the object of the resolution was to take the lower limit of this indeterminate ground and to provide that any owner who goes beyond that lower limit shall have this fact officially recognised.

The resolution proposed by the Chairman read as follows:—

"The requirements imposed by article 4 are minimum requirements. When the watertight sub-division of a vessel now or hereafter built is such as to provide a degree of increased safety over and above that provided by the sub-division rules prescribed by this Convention, the character and extent of this increased safety, so far as it may be practicable to express it, shall be recorded by the proper Government officials on the certificate of the vessel in question when such record is requested by the owner. An owner claiming such record shall submit all the data necessary to establish his claim, including the values of the factor defined in article 4, which would apply to the vessel as actually constructed. In determining the degree of increased safety above referred to, the factors which apply to the actual vessel shall be expressed as a percentage of that factor in column (A) which applies to a vessel of the length under consideration, this being indicated in column (B) of the table in article 4. Values of the factor for lengths not specifically stated in column (B) shall be obtained by interpolation in accordance with section (3) of article 4."

A prolonged discussion ensued, in the course of which it was suggested by General Meana (Italy) that the increased security might be expressed by stating the length of the vessel of the same type as the one under consideration to which the factor used in sub-dividing the latter was appropriate under the tables. Sir Archibald Denny (Great Britain) suggested that the difference between the two lengths should preferably be stated as a percentage of the length of the vessel under consideration, and expressed the view that official recognition should be given only to a substantial increase of security. Dr. Bruhn (Norway) pointed out the difficulty of a practical application of the idea embodied in the resolution, as in the absence of a coefficient of traffic it would be impossible to determine the factor which should be used in sub-dividing any particular vessel under the rules, and therefore impossible to say whether, or to what extent, the actual sub-division of the vessel was better than the minimum prescribed. He asked whether it would be possible to provide that if a vessel other than a pure passenger ship complied with or exceeded the requirements for a pure passenger ship of its length this should be stated in the certificate.

THE CHAIRMAN, replying to a question, said that he anticipated the procedure suggested in his resolution would continue after the coefficient of traffic had been fixed. With reference to Dr. Bruhn's suggestion, he said this would exclude all vessels which complied with a standard less than that prescribed in column (C) of the table already adopted. Alternative courses might be:

1. To specify the respective lengths in both columns (B) and (C) to which the sub-division of the vessel under consideration corresponded: or,

2. To specify to what extent the sub-division was below or above the standard of column (C).

PROFESSOR FAGEL (Germany) said that he would be inclined to interpolate between the two columns according to the average permeability, and he was disposed to favour the suggestion of expressing the increased safety in terms of percentage of length, but what should be the least percentage of official notice should be taken?

M. PIERRARD (Belgium) said that he doubted whether the Committee was competent to consider the matter from the administrative point of view. Still, from the practical point of view he thought the proposal was entirely analogous to present practice, and he was prepared to second it if it was amended in the manner suggested.
by Dr. Brunn, so as to provide that any excess over the requirements of column (C) should be officially noted.

M. Pierrard then read the text of the resolution amended as he proposed:

"The requirements imposed by article 4 are minimum requirements. When the watertight sub-division of a vessel hereafter built is such as to provide a degree of safety over and above that provided by the sub-division rules prescribed by this Convention, it shall be recorded by the proper Government officials on the certificate of the vessel in question when such record is requested by the owner.

"The degree of increased severity is determined by mentioning that the sub-division is more severe than provided for in column (C) of the table of article 4 for pure passenger vessels.

"Values of the factor for lengths not specifically stated in column (C) shall be obtained by interpolation in accordance with section (3) of article 4."

He added that he concurred in the suggestion that only a substantial increase of security should be recognised.

THE CHAIRMAN summarised the discussion, and said that M. Pierrani's suggested amendment would be copied for consideration at a future meeting.

THE CHAIRMAN then submitted on behalf of the American Delegation a resolution as to the fitting of bulkheads to retard the spread of fire, and explained that this was found necessary as it had been ascertained that the other Committees which it had been expected would deal with the subject had not done so.

The resolution was as follows:

"In portions of a vessel above the margin line there shall be fitted steel bulkheads, which, in themselves or in conjunction with steel decks, will serve to retard the spread of a fire from one section of the vessel to another. These bulkheads shall be fitted at intervals not greater than the spacing required for watertight bulkheads for purposes of sub-division. Openings in these fire bulkheads shall be closed by fireproof doors."

M. BORIS (France) said that the subject of the resolution had already been considered by the French Delegation, who had submitted a suggestion respecting it in their supplementary memorandum.

Their idea had been to divide the ship for fire-prevention purposes into three large compartments, and for this purpose to extend the machinery bulkheads one 'tween deck space higher than the other bulkheads. He was prepared to support the principle of the resolution submitted by the Chairman, but thought the question of the spacing of the extra bulkheads must be cautiously dealt with in order to avoid undue interference.

PROFESSOR PAGEL (Germany) stated that he could also support the principle of the resolution, as the German regulations dealt with the matter. Those regulations, however, did not require the fire-prevention bulkheads to be closer than 40 metres, and he thought the resolution was too severe as regards spacing. It seemed to him to mean extending all the watertight bulkheads to the highest deck.

THE CHAIRMAN explained that the intention was merely to fit bulkheads of light construction, not watertight bulkheads. Replying to a question by Dr. Brunn, he said that he thought the resolution should apply to the case of long erections on deck.

M. PALM (Austria) stated that the Austrian regulations were similar to those in force in Germany as described by Professor Pagel. He suggested that the bulkheads should be spaced at a maximum distance of 40 metres, should coincide with the watertight bulkheads as much as possible, and should be insulated.

The Committee then adjourned until the afternoon.
AFTERNOON SESSION.

At the afternoon session all the members were present except M.M. Riess, Kersey, Rasmussen, Archer, Wierisma, Wilmink, Lobjaquin, and Nilsson.

The paragraph drafted at the morning session respecting extra sub-division at the forward end of vessels was formally submitted, but on discussion was found to require amendment, and Sir Archibald Denny undertook to prepare a new text.

M. BORIS (France) then, on behalf of the French Delegation, submitted two alternative resolutions as to stability, longitudinal sub-division, and maximum length of compartments, as follows:—

First Proposal.

"In view of the effect on stability of the flooding of certain compartments, a limitation determined by taking into account the transverse proportions of the vessel should, if necessary, be imposed on the maximum permissible length of such compartments.

"When longitudinal bulkheads or double-skin are fitted an increase determined by taking into account the relative extent of the wing compartment as compared with the whole compartment under consideration may be applied to the maximum permissible length of such a compartment. Provided that in case of such longitudinal sub-division being fitted efficient arrangements be made, if necessary, for counteracting the list.

"In no case whatever the length of any watertight compartment shall exceed 28 metres (92 feet)."

Second Proposal.

"In regard to stability, a limitation on the length of certain compartments may or may not be imposed if necessary.

"When longitudinal bulkheads or double-skin are fitted an increase of the length of the compartment in wake of such arrangements may be permitted. Provided that in the case of such longitudinal sub-division being fitted efficient arrangements be made, if necessary, for counteracting a heavy list.

"In no case whatever the length of any watertight compartment shall exceed 28 metres."

As a rule, the length of any watertight compartment shall not exceed 24 metres; this limit, however, may be raised up to 28 metres for the compartments in wake of which longitudinal bulkheads or double-skin are fitted."

The first of these was intended to deal with the matter in a somewhat specific way, and the second was an alternative for consideration should the Committee decide that such specific treatment was undesirable.

He thought that a fixed limit to the length of compartments, like the limit of 28 metres in the German regulations, might not be suitable for all cases, and that the question of a further check on the length of compartments in special cases should be considered as regards not only the amidship compartments, but also possibly forward compartments. Such special cases would include those where a vessel was very broad in proportion to her draft, and such vessels, in view of their breadth, might naturally be fitted with longitudinal bulkheads or a double-skin. This addition to their safety should be taken into account, and if the length of compartments had been reduced on account of the transverse proportions it might be again increased on account of the longitudinal sub-division. It would not be possible for the Committee to prescribe what method should be followed in these adjustments, and the intention of the resolutions which he had submitted was merely to secure the establishment of the general principle.

He felt that the consideration of stability, whether in connection with the length of main compartments or with longitudinal sub-division, was of as much importance as the question of the coefficient of traffic, and should be definitely made the object of further study in the same manner. He would be quite agreeable to an additional clause being inserted in his suggested resolutions to make it clear that they were only intended as a basis for further investigation, and in any case the French Bulkheads Committee intended to continue its study with a view to formulating some method by
which the length of main compartments could be increased in proportion to the advantages secured by the provision of longitudinal bulkheads. As regards the two alternative forms of longitudinal sub-division, he was aware that the British and German authorities were not favourable in principle to wing bulkheads, and that they preferred double-skins; but the French Delegation thought that in many cases wing bulkheads if properly fitted would be much better than double-skins, as the latter would often be pierced. If the Committee did not desire to go into the matter as fully as was suggested in the first of the two resolutions which he had submitted, he asked consideration for the second, which was much more general in its terms, and could, if desired, also be subject to an additional clause stating that the points mentioned were to be further investigated. It would be seen that this second resolution embodied two alternatives: the second of the alternatives being inserted to cover the case of smaller vessels in which compartments 28 metres in length might be too long. He hoped that the resolutions would receive careful consideration by the Committee, so that the Convention might contain some reference to the important questions with which they dealt.

If they were not mentioned at all, he thought a great responsibility would be incurred, and a responsibility which the French Delegation were not prepared to accept.

SIR ARCHIBALD DENNY (Great Britain) repeated a previous remark to the effect that M. Boris' real object in introducing the question of stability was to limit the length of compartments; but Sir Archibald Denny, in view of the arguments which had been advanced at previous meetings, hardly thought it necessary to introduce the conception of stability in this connection.

As regards longitudinal subdivision, however, the conception of stability must be introduced. The British Bulkheads Committee were strongly of opinion that, if wing bulkheads were fitted, it should be under stringent conditions as to listing, and the evidence taken by the Committee had shown that no efficient means had yet been produced for connecting coal bunkers on opposite sides of a vessel. Double-skins were, in the opinion of his Committee, useful only as a protection against a ripping blow, not against a direct collision; but, one side could easily be connected with the other, thus avoiding the danger of listing, and from the analogy of the double bottom, a double-skin would probably form a valuable protection against a grazing blow. He thought that if longitudinal sub-division was provided some compensation might be given in respect of it, and this could be done by sub-dividing the vessel in accordance with the factor appropriate, say, to a vessel of the same type but 100 feet shorter in length, always provided that the compartments did not become longer than 28 metres.

He thought also that middle-line bulkheads should be dealt with, also watertight decks. The latter formed a valuable protection, and if they were fitted throughout the length of the vessel or about the water-line, a factor appropriate to a vessel 150 feet shorter might possibly be used. These figures were only arbitrary.

His Committee did not think that longitudinal subdivision or watertight decks would be fitted except in large vessels, and their idea was that the fact of being fitted should not result in the transverse sub-division being altered in such manner as to make what would otherwise have been a two-compartment vessel into a one-compartment vessel.

PROFESSOR PAGEL (Germany) stated that the question of stability had been dealt with by the German Bulkheads Committee on the suggestion of a German professor of naval architecture, and four members of the Committee had made exact calculations as to the stability of vessels after damage. These members had all independently found that the stability was sufficient. The Germanischer Lloyd had also made numerous calculations with the same result. There was also no record of a passenger vessel capsizing.

For these reasons the German Committee had unanimously decided not to insert requirements as to stability in their rules beyond the rule which already existed as to the length of compartments being limited to 28 metres. He thought that the business of the International Committee was to draw up rules for practical purposes, and these should therefore be as simple as possible. All that was necessary seemed to him to be a simple limitation on the length of compartments, and he suggested that a clause to this effect might be adopted, adding, if necessary, that the limitation was due to the consideration of stability.

The question of longitudinal bulkheads had also been carefully considered by the
German Committee, who had agreed that middle-line bulkheads are a direct source of danger. Side bunkers were considered a good protection for the boilers, but owing to the necessity of fitting doors and to the possibility of a list being caused if one side is flooded, the German Committee considered their value as watertight compartments to be doubtful, and as the machinery space always has in practice a reserve of safety the fitting of side bunkers was not considered necessary. The German Committee, on the other hand, thought that a double-skinned should be recommended as stated in the German memorandum, but without this being allowed to influence the length of the main compartments.

M. GROLOUS (France) emphasised the importance, from a safety point of view, of watertight bulkheads (which are the most practical form of double-skinned), and thought it necessary that owners and builders should be encouraged to fit them by enabling the length of the main compartments so protected to be increased.

PROFESSOR VOSSNACK (Netherlands) stated that he had made several calculations as to the initial stability of large vessels fully flooded, and had always found this sufficient when the compartments were fully flooded, while if there was a margin the range of stability would also probably be sufficient. He thought, however, that something should be said in the Convention on the subject of stability to show that it had not been overlooked, and he therefore seconded the French resolution to a certain extent. He was of the same opinion about longitudinal bulkheads as Sir Archibald Denny and Professor Pagel, and agreed with them as to the desirability of recommending a double-skinned and a watertight deck.

DR. BRUHN (Norway) said he did not favour any rules being made as regards the stability of vessels when intact, as this depended on the loading of the vessel, and therefore could not be controlled by a surveyor. In these circumstances it did not seem to him a suitable matter for the Conference to deal with. As regards stability in flooded conditions he did not see why this should be dealt with. The proposed rule dealt with the relative stability, but if anything were done it should theoretically be as regards actual stability. Actual stability, however, could not be determined, and therefore could not be used in regulating the floodable length. Dr. Bruhn then mentioned a case where a vessel had been flooded, and had sunk without capsizing.

SIR ARCHIBALD DENNY, M. FERGUSON, and the CHAIRMAN gave further examples relating to the stability of vessels under flooded conditions.

SIR J. BILES (Great Britain) stated that he was strongly opposed to longitudinal bulkheads. He knew of no recorded case of any vessel not fitted with such bulkheads which had turned over before sinking, and any recorded cases of capsizing were, he thought, all due to the fitting of longitudinal bulkheads. He failed to see why any advantage in the length of main compartments should be given if side bulkheads were fitted. There was no necessity for having boiler rooms approaching 28 metres in length, and he did not see what advantage it would be to allow the length to be increased. As to stability generally, all experience seemed to show that no appreciable danger in this direction was caused from free flooding. If there was any doubt in any particular case it would not be difficult to make direct calculations, and as the doubtful cases would probably be the very large vessels, which were invariably built on expert advice, he did not think danger was likely to arise in practice.

As regards middle-line bulkheads, he knew of cases where it had been found advantageous to fit these with appropriate arrangements for counteracting the danger of listing should water be admitted to one side of the bulkhead only.

On the general question, he thought that the responsibility for stability must in any case rest with the owner. It would be difficult to deal with it by international regulation, and, if an attempt to do so were made, owners might consider themselves relieved of their responsibilities, and unfortunate results might follow. Therefore it seemed desirable to leave the question alone.

As regards longitudinal bulkheads, a further disadvantage which had not been mentioned was that these usually formed bunkers, and were fitted with doors worked from the bridge, so that men working inside were liable to get shut in, and it might be difficult to devise means of escape.

M. BORIS (France) announced that, in order not to occupy more time, he would withdraw the first of his two resolutions, and asked that consideration be given to the second.

PROFESSOR VOSSNACK (Netherlands) stated that he was prepared to second
the first and third paragraphs of the resolution now submitted by M. Boris, i.e., omitting the paragraph as to longitudinal sub-division.

M. BORIS (France) stated that he would accept this on condition that he might bring forward as a separate motion the clause relating to longitudinal sub-division.

SIR ARCHIBALD DENNY (Great Britain) proposed a further amendment to substitute for the resolution under consideration a simple limitation of the length of compartments to 28 metres, viz.:

"In no case whatever shall the length of any watertight compartment exceed 28 metres."

"En aucun cas la longueur d’un compartiment ne peut dépasser 28 mètres."

PROFESSOR PAGEL (Germany) seconded Sir Archibald Denny’s amendment.

M. PIERRARD (Belgium) said that from a theoretical point of view he sympathised with the French proposal, but from a practical point of view it was difficult to see how the matter could be dealt with for the purpose of the Convention, or even whether it was necessary to deal with it.

Sir Archibald Denny’s amendment was then put to the vote and carried by a majority. For: Germany, United States, Austria-Hungary, Canada, Great Britain, Norway. Against: France, Italy, Netherlands. Abstained from voting: Belgium, for the reasons stated by M. Pierrard.

THE CHAIRMAN announced that, as the amendment which had been carried was offered as a substitute for the resolution proposed by M. Boris and seconded by Professor Vossenack, the latter resolution was now disposed of. It would be open to M. Boris to submit as a separate proposal his suggestion as to longitudinal sub-division, and Sir Archibald Denny’s amendment to that proposal would be copied and considered at the same time.

THE CHAIRMAN then asked the members to bear in mind the unfinished business, so that it might be considered and expeditiously disposed of at the next meeting.

Adjourned to 3 p.m., the 17th December, 1913.
Seventh Meeting—December 17, 1913, 3 p.m.

All the members of the Committee were present except MM. Riess, Wierdsma, Wilmink, and Lotiagnin.

The minutes of the fourth meeting on the 13th December were approved.

The American Delegation submitted an amended resolution respecting the notation of certificates to indicate the increased degree of safety which a ship might possess above the requirements of the Convention.

THE CHAIRMAN explained that the resolution as originally submitted had been amended to embody the amendment proposed by M. Pierrard at the previous meeting of the Committee, and also included language to cover the suggestions made by General Meurice. The amended resolution was as follows:

"The requirements imposed by article 4 are minimum requirements. When the watertight sub-division of a vessel hereafter built is such as to provide a degree of safety over and above that provided by the sub-division rules prescribed by this Convention, it shall be recorded by the proper Government officials on the certificate of the vessel in question, when such record is requested by the owner.

"The degree of increased safety shall be expressed by stating that the sub-division is equal to or more severe than that provided for a vessel of equal length in Column (C) of the table of article 4, with an additional statement giving the length of the vessel in Column (C) whose degree of sub-division would correspond to that of the vessel in question.

"Values of length and factors for lengths not specifically stated in Column (C) shall be obtained by interpolation in accordance with section (3) of article 4."

SIR JOHN BILES moved the insertion of the words "now and" after the word "vessel" in the third line of the resolution.

After some discussion as to whether it was necessary to alter the terms of the resolution to make it apply specifically to vessels now built as well as to those hereafter built, the question was decided in the negative, on the ground that the Committee was then dealing with "new vessels," and the main object of the resolution was to encourage the provision of the best possible sub-division in new ships. As to "existing ships" it was considered that each State, under a resolution already passed, would be at liberty to apply the same procedure to ships now built if desired, even though this was not specifically provided for in this resolution.

SIR ARCHIBALD DENNY (Great Britain) pointed out that if the criterion of service were fixed, then the increased safety possessed by any vessel could be expressed with reference to the exact sub-division required for that vessel by the rules, and that would be preferable to expressing it with reference to the highest standard imposed by the rules. Would it not be possible to embody this idea in the resolution and thus provide an additional incentive to fixing the criteria as quickly as possible?

SIR JOHN BILES (Great Britain) thought that the resolution as proposed did not do justice to the cargo-passenger vessel between the limits B and C, as, in order to
attain the official endorsement of its certificate, sub-division equal to or in excess of that required for the highest type of vessel would have to be provided. It would thus be much more difficult for a cargo-passenger vessel to obtain the special mark than for the pure passenger vessel.

SIR A. DENNY (Great Britain) pointed out that this unfairness would be removed if the criterion were fixed, and the excess safety stated as he had suggested. It was the desire of the British delegation to fix the criterion as quickly as possible, and he did not see why it should take very long. It might be possible to obtain agreement for it through the usual diplomatic channels, and then the procedure which he had suggested would apply.

THE CHAIRMAN said that Sir A. Denny’s suggestion was really dealing with some unknown future action, and that the American resolution seemed to be the only way of dealing with the probable conditions existing at the termination of the Conference. He was not so sanguine as Sir A. Denny as to the rapidity of arriving at conclusions as to the “criterion,” or as to the possibility of promptly having such conclusions internationally agreed to by diplomatic correspondence. He thought that if the resolution presented by the American Delegation was passed, it would greatly strengthen the work of the Conference. Replying again to questions by Sir A. Denny the Chairman said that if the American resolution was passed, this would not debar the British Delegation from bringing forward their resolution as a separate motion, if they so desired; and that the object of the resolution was two-fold, as inferred, since its provisions were intended to be continuous and to be given full effect even after the determination of the “criterion of service.”

SIR JOHN BILES (Great Britain) stated that he would prefer to submit his suggestion in the form of an amendment to the American resolution, and he therefore moved that the following words should be added to that resolution:

“When the criterion of service named in article 4 (4) is fixed, the degree of increased safety shall be expressed by stating that the sub-division is equal to or more severe than that provided for a vessel of equal length in its own curve similar to the (B) or (C) column in article 4, with an additional statement giving the length of the vessel whose degree of sub-division would correspond to that of the vessel in question.”

M. PIERRARD (Belgium) and M. BORIS (France) objected to the amendment on the ground that it was unnecessary to pass resolutions contingent upon the determination of a coefficient as regards which nothing could be done at the Conference, though M. Boris thought that the suggestion contained in Sir J. Biles’s amendment would be quite suitable for use once the coefficient had been fixed. The coefficient could, he thought, only be fixed by an international conference, perhaps the Load-Line Conference, and that Conference would have to review the labours of this one, and would then have an opportunity of introducing the necessary modifications such as that suggested by Sir J. Biles.

M. PALM (Austria) seconded Sir J. Biles’s amendment.

A vote was then taken on the question whether the clause moved by Sir J. Biles should be added to the resolution submitted by the American Delegation, the understanding being that, if this vote was negative, the British Delegation would be free to bring forward the clause as a separate motion if they so desired.

The question was decided in the negative. For: Austria-Hungary, Canada, Great Britain: Against: Germany, United States, Belgium, Denmark, France, Italy, Norway, Russia, Sweden.

The question whether the resolution submitted by the American Delegation should be accepted was then put to the meeting, and decided in the affirmative by an unanimous vote.

Copies of an amended resolution drafted by the American Delegation respecting fireproof bulkheads were then distributed. This amended draft gave effect to suggestions made at the meeting on the previous day, and was as follows:

“In portions of a vessel above the margin line there shall be fitted fireproof bulkheads which, in themselves or in conjunction with steel decks, will
serve to retard the spread of a fire from one section of the vessel to another. These bulkheads shall be fitted at intervals not greater than 40 metres. Openings in these fire bulkheads shall be closed by fireproof doors.”

SIR A. DENNY (Great Britain) asked whether reference to decks meant that, if the fireproof transverse bulkheads in different ‘tween decks were staggered with steps between them, these should be fitted with steel decks. The reply was in the affirmative.

SIR J. BILES (Great Britain) pointed out that this might mean the fitting of very extensive steel decks where none were required for strength. It was further questioned as to whether steel decks so fitted were good for fire-resisting, and pointed out that the accommodation arrangements of the vessel and communication between the decks might be seriously interfered with.

M. FERGUSON (United States of America) said that the object in view was to prevent fire from spreading in a longitudinal direction, and, therefore, only steps in the deck would be affected.

After further discussion THE CHAIRMAN stated that he thought the wording of the resolution should be altered before action was taken, and the resolution was accordingly withdrawn for re-consideration and re-introduction by the American Delegation, if desired.

SIR A. DENNY (Great Britain) then submitted for purposes of discussion the following resolution respecting longitudinal and horizontal sub-division:

1. If watertight longitudinal side bulkheads or double skins are fitted amidships, it should be proved to the satisfaction of the administration either (1) that when any space bounded by transverse partitions between the outer skin and the inner skin or longitudinal bulkhead on one side is flooded for a length not less than the length required to be floodable with transverse sub-division only, the list shall not exceed ten degrees; or (2) in cases where the flooding of this space on one side would cause this degree of list, that efficient arrangements have been made for counteracting the list.

2. In the case of such arrangements being fitted, satisfying the above conditions, the factor for ascertaining the floodable length for the transverse sub-division up to that appropriate to a vessel 15 per cent. shorter may be used.

3. An inner skin, if fitted less than three wide, will not be taken into account.

4. Watertight longitudinal middle line bulkheads should not be permitted in any part of the vessel, unless the requirements of paragraph 1, as to listing, are complied with.

5. If a watertight deck is fitted throughout the whole length of the vessel at or about the load water-line, the factor for ascertaining the floodable length for transverse sub-division up to that appropriate to a vessel 25 per cent. shorter may be used.

6. In regard to the conditions laid down in Article 4, paragraph (1), these may be met by carrying up the bulkheads if necessary through ‘tween decks above the normal bulkhead deck, or alternatively they may be met by fitting a watertight deck at or about the load water-line. They may also be considered to be fulfilled if a double skin, complying with the requirements of paragraphs 1 and 3, is fitted from the peak bulkhead to a transverse watertight bulkhead situated not less than the prescribed percentage of length abaft the stem. The double skin should extend to a deck above the load water-line, and the peak bulkhead should not be more than 6 per cent. of the vessel’s length abaft the stem.

Sir A. Denny explained that he brought forward this suggested resolution so as to develop discussion as to whether an allowance should, or should not, be made in the lengthening of transverse compartments when longitudinal sub-division is fitted. The Committee were aware that their French colleagues were very strongly in favour of such allowance being made. So far as the British Bulkheads Committee was concerned, no suggestion had been made for lengthening transverse compartments when side bulkheads were fitted amidships, although provision had been made in paragraph (13) of the British memorandum for making such allowance forward with a double skin. While no suggestion was made in the memorandum for any increase with
a watertight deck, such proposal had been discussed by the British Committee, and a proposal similar to that now made was suggested. He thought the Committee might be asked to decide the general principle whether the fitting of longitudinal sub-division should warrant an increase in the length of the main transverse compartments.

M. BORIS (France) while greatly appreciating the intention of Sir A. Denny's suggestions, and prepared to second them in principle, as he thought that some compensation for longitudinal sub-division was not only equitable but necessary, feared it would be very difficult to fix definitely at this Conference the method of dealing with the matter, and suggested that it might be sufficient to pass a general resolution calling attention to the various points, leaving them to be dealt with by the administrations for the present, and suggesting that they should be internationally settled when an opportunity occurred.

PROFESSOR PAGEL (Germany) agreed that precautions must be taken against listing due to longitudinal sub-division, but did not agree with the idea of increasing the length of the main transverse compartments in which longitudinal sub-division was fitted.

THE CHAIRMAN thought that the sympathy of many was with the principle that some allowance in respect to transverse sub-division might be made when some form of longitudinal sub-division was fitted, but personally he could not see how the details could be fixed at this Conference. A paragraph indicating that the subject had not been ignored, and leaving room for subsequent investigation and agreement, seemed all that could be attained. He suggested that something of this sort might be drafted for consideration at the next meeting, and, while he did not wish to limit discussion unduly, he deprecated spending too much valuable time on the details of questions which it was practically certain could not be settled at this Conference, especially as there were very important questions to be discussed upon which final conclusions could be reached.

PROFESSOR VOSSNACK (Netherlands) thought it would be dangerous to allow the length of the transverse compartments to be increased on account of longitudinal sub-division.

After further discussion SIR A. DENNY, with the permission of M. Boris, withdrew his resolution, and the Chairman suggested that M. Boris might draft a general paragraph on the subject for consideration at the next meeting.

PROFESSOR PAGEL (Germany) stated that he did not think the subjects were sufficiently important for the Committee to deal with at present, and be suggested that the whole question of longitudinal bulkheads, double skins, and water-tight decks should be dropped.

DR. BRUHN (Norway) seconded. No final decision was arrived at.

DR. BRUHN (Norway) then read the following three paragraphs, which he had drafted respecting the stability of vessels in the intact condition:

"1. The responsibility for the stability of a vessel at sea must rest with the owner and captain, as it is practically impossible for others to control the loading of a vessel.

2. It is desirable that stability calculations be made by the ship-builders for passenger vessels, in order that the attention of owners and captains may be drawn to any unusual features affecting the stability; the importance of which may not be directly apparent to those responsible for the proper loading and ballasting of the vessels.

3. It is not possible to lay down any satisfactory general rule as to the minimum amount of stability necessary for the purpose of safety."

He explained that he had prepared these only on the assumption that it would be necessary for the Committee to make some reference to the subject, but his first suggestion would be that the Committee should not deal with the matter at all. He thought that the question of stability calculations was one for owners, and not one for the Conference to deal with, and he did not think that ships would be made materially safer if stability calculations were made compulsory in all cases.

Replying to the Chairman, Dr. Bruhn said that he did not intend his suggested paragraphs, even if passed, to be embodied in the Convention.
THE CHAIRMAN then stated that in these circumstances it seemed unnecessary to consider the paragraphs, and the only item concerning stability left for consideration was the American resolution on the subject, which had already been put before the members, and was as follows:—

"Stability calculations and curves shall be made for all vessels hereafter constructed, and there shall be supplied to the owners sufficient stability data, with explanatory notes or other means of clearly indicating the condition of the vessel as regards stability (1) in the light condition, (2) in ballast, and (3) when loaded under certain limiting assumptions as to density and location of cargo."

At Sir Archibald Denny's request, the Chairman read the letter from the Australian Delegate at the Conference to Lord Mersey, in compliance with which the question of stability had been placed on the agenda of the Committee.® The letter was as follows:—

"Commonwealth Offices, 72, Victoria Street,
London, November 21, 1913.

Dear Lord Mersey,

WITH reference to my interview with you at the Board of Trade regarding the question raised by the Commonwealth Government in a cablegram to me concerning the stability of vessels, I have, following your suggestion, consulted Sir John Biles and given him extracts from a speech in the House of Representatives, to which the Commonwealth Government called my special attention.

"Sir John Biles states that the subject of stability referred to in this speech is one to which a great deal of consideration has been given by naval architects, and the desirability of having a standard of stability has been expressed by many both publicly and privately. There are no doubt great difficulties in the way of determining what is a sufficient amount of stability, and I also understand that, even if a metacentric height could be laid down, there would be a great difficulty, if not practical impossibility, of at any time testing it.

"As the Commonwealth Government apparently is very interested in this question, I feel under some obligation to raise it, and therefore, subject to consultation with you, I would like to have it raised either in the Committee on Bulkheads or at a meeting of the Conference.

"I cannot help thinking that this question is of considerable importance, and it might be highly desirable to be able, after the Conference has dispersed, to say that the matter had been considered, even if it is not found practicable to adopt any standard.

"Yours sincerely,
(Signed) R. MUIRHEAD COLLINS."

In the course of the subsequent discussion, Dr. Bruhn amended the second paragraph of his proposal so as to make it mandatory in form, and suggested that the first paragraph and the second paragraph as amended should be substituted for the American resolution.

M. FERGUSON (United States of America) thought it dangerous for the Conference to lay down the principle that the responsibility should be put on the master, and that information as to stability should be given to him. This seemed to be going outside the province of the Conference.

SIR J. BILES (Great Britain) suggested that the necessities of the situation might be met by the Chairman writing a letter to Lord Mersey with reference to the Australian Delegate's letter, in which it might be pointed out that the Committee were of opinion that it was impracticable to recommend the adoption of a compulsory standard as to the degree of stability to be possessed by vessels, and that it would be impracticable to enforce a regulation that suitable information as to stability should be provided to masters of all ships.

DR. BRUHN (Norway) said he favoured this suggestion, and if it were adopted he would withdraw his proposal.

* See minutes of third meeting, page 44.
After some further discussion, the American Delegation temporarily withdrew their resolution, and it was left to Sir John Biles, with the Chairman, to draw up a letter which might be sent to Lord Mersey as suggested.

THE CHAIRMAN then called upon Sir John Biles to present the report of No. 2 Sub-Committee.

SIR JOHN BILES (Great Britain) reminded the Committee that at the meeting on the 13th December the preliminary draft report had been read and adopted except as regards certain points which had been referred back to the Sub-Committee so that their intention might be made clear. The Sub-Committee had therefore held a meeting to consider these points, and the report which was now in the hands of the members contained the alterations which had been decided on at that meeting. Sir John Biles then explained how the Sub-Committee had dealt with each of the points referred back to them, and he read the following paragraph which had been unanimously agreed to by the Sub-Committee at their meeting:

"The Sub-Committee wish to express their appreciation of the valuable services rendered by their Secretary, M. Bogaert. His complete command of both French and English, and his intelligent appreciation of the subjects discussed by the Sub-Committee, have made the work of the members easy and pleasant. The Sub-Committee recommend that a minute to this effect be placed upon the Committee's minutes." (Applause.)

As regards paragraph 2 of the report, respecting the standard of strength for watertight bulkheads, he called the attention of the Committee to the fact that this left the question in an indeterminate condition, as it deferred the determination of the margin of resistance until the time when the results of the British Bulkheads Committee's experiments were available.

Some further action would therefore be necessary, and he presumed the Committee would consider whether they should make a recommendation to the Conference as to the action that should be taken. Subject to this point, he moved the adoption of the report.

SIR ARCHIBALD DENNY (Great Britain) stated that the British Bulkheads Committee proposed to make a series of tests on the experimental coffer dam, and as soon as these were completed the results would be handed over to the calculating staff for analysis, and for comparison with the results of other tests which had been made, and with the extensive data which had been collected by the Committee. As a result of all this the Committee would be able to recommend standards for the construction of bulkheads. These would doubtless be communicated to the Powers, who would thus have the opportunity of examining them and considering whether they should be adopted internationally. He was in a position to state that Lloyd's Register of Shipping and the British Corporation, each of which was represented on his Committee, would adopt the standards recommended by the Committee, and he believed there was some ground for thinking that the standards would probably be adopted by the foreign classification societies also.

M. DE BERLHE (France) and PROFESSOR PAGEL (Germany) confirmed what Sir Archibald Denny had said.

Some discussion arose as to whether paragraph 2, which referred to the results of the tests, could go into the Convention.

THE CHAIRMAN said that he would consider the point with Sir John Biles.

THE CHAIRMAN announced that two Delegations desired to re-open points dealt with in the report, and stated that the first of these was the question of power doors (paragraph 19) regarding which Sir Archibald Denny desired to offer a resolution.

SIR JOHN BILES (Great Britain) stated that this paragraph was fully discussed by the Sub-Committee and unanimously agreed to; but at the final meeting of the Sub-Committee Sir Archibald Denny had explained the point which he desired to raise, and the Sub-Committee had unanimously recommended that he should be at liberty to do so. As, however, the point was not one of those which had been referred back to the Sub-Committee it could only be raised at a meeting of the Full Committee.

THE CHAIRMAN then stated that unanimous consent of the Committee would be necessary to re-open this question and permit Sir Archibald Denny to explain his proposed resolution. This consent having been unanimously given,
SIR ARCHIBALD DENNY stated that he thought paragraph 19 of the report would compel the fitting of power doors in cases where the fitting of such doors was not necessary; and he gave examples showing that even in small ships the number of doors in the machinery space might amount to five, and therefore power doors would have to be fitted. The evidence taken by his Committee did not prove that power doors had ever been instrumental in saving a vessel, and it had shown the existence of a very strong feeling among experienced engineers to the effect that the ordinary door is quickly closed, and is not a source of danger if properly attended to. The type of door which could be released either at the door itself or from the bridge, and allowed to drop by its own weight had been strongly recommended to his Committee, and he thought provision should be made for the use of such doors. He therefore suggested that the figure 5 should be modified, and that the report should make it clear that drop doors released from the bridge might be considered as power doors.

THE CHAIRMAN asked Sir Archibald Denny to prepare a definite clause expressing his views, and to bring it before the Committee at the next meeting. He then stated that the second point which it was desired to reopen was that of fixed side scuttles, and after receiving the unanimous consent of the Committee to a discussion of this question, he called upon M. Walter.

M. WALTER (Germany) stated that he thought paragraph 27 of the report required further consideration, as the fixed side scuttles which it made compulsory would be very liable to be broken, especially on leaving port, and if replaced by members of the crew this might not be properly done; also it seemed desirable in the interests of health that the side scuttles should be capable of being opened when the vessel was in port, though he quite agreed they should not be opened at sea.

THE CHAIRMAN asked M. Walter to prepare a draft for consideration at the next meeting.

Adjourned to 11 a.m., the 18th December, 1913.
Eighth Meeting.—December 18, 1913, 11 a.m.

MORNING SESSION.

All the members of the Committee were present except MM. Riess, Duguid, Kersey, Sir John Biles, Barricelli, Wierisma, Wilmink, and Lvingstone.

THE minutes of the tenth and eleventh meetings of No. 1 Sub-Committee were brought up for consideration and, subject to corrections suggested by Professor Pagel, M. Boris, Sir A. Denny, and Professor Vossnäck in the minutes of the tenth meeting, these were approved.

THE CHAIRMAN explained that the proceedings of No. 1 Sub-Committee had been now merged with those of the Full Committee, inasmuch as No. 1 Sub-Committee had been sitting with the Full Committee since the 13th December.

SIR ARCHIBALD DENNY (Great Britain) stated that, after consultation with Dr. Brunh, he feared that it would not be possible for them to make complete suggestions as to the subdivision of vessels below the limits of length dealt with in the articles already agreed upon.

The Committee then considered a paper containing the text of all the articles approved by No. 1 Sub-Committee, this being regarded as the report of the Sub-Committee up to the date of its merging with the Full Committee.

After a few verbal corrections had been made, SIR ARCHIBALD DENNY (Great Britain) moved that the Committee give further consideration to the clauses respecting existing vessels which had been agreed to at the third meeting of the Committee. He thought that when this clause was under discussion in the small Sub-Committee by whom it was drafted, the intention had been that it should secure existing ships from serious structural alterations, and should limit interference with them to questions such as watertight doors, openings in ship’s sides, and other matters not involving complete re-construction.

THE CHAIRMAN, intervening, pointed out that, before any action could be taken, the paper under consideration should be brought before the Full Committee as the report of the No. 1 Sub-Committee, and he asked whether the Full Committee gave their unanimous consent to re-opening discussion as to existing ships.

M. BORIS (France) thought that the paragraph on this subject was satisfactory, as it left freedom of action and responsibility for action to the administrations to which vessels respectively belonged.

Further consideration of the question was therefore postponed.

Upon the motion of the Chairman, and subject to possible further consideration of the clause relating to "existing ships," the Committee then formally accepted the report of Sub-Committee No. 1, and unanimously adopted it as a part of the Full Committee’s report.

THE CHAIRMAN then laid before the meeting a revised text of the resolution respecting fireproof bulkheads which had been considered at previous meetings. The wording of this resolution was as follows:

"In all portions of a vessel above the margin line there shall be fitted fireproof bulkheads at a mean spacing not greater than 40 metres. Openings in these bulkheads shall be fitted with fire-proof doors. Steps and recesses in such bulkheads shall be made fireproof."
M. DE BERLHE (France) asked what was intended by providing that steps in the bulkheads referred to should be made fireproof. He thought this might mean fitting fireproof decks throughout a large proportion of the vessel's length in certain cases.

SIR ARCHIBALD DENNY (Great Britain) said that he would like to see the reference to steps omitted.

THE CHAIRMAN said that the spacing of the bulkheads was certainly not severe, and if they were arranged regularly, the steps ought not to present difficulties.

M. DE BERLHE (France) moved that the words "steps and" should be omitted from the resolution.

DR. BRUHN (Norway) seconded.

On a vote being taken, M. de Berlhe's motion was carried by a majority. (For: Germany, Austria-Hungary, Belgium, Denmark, France, Great Britain, Italy, Norway, Russia, Sweden, United States of America, Netherlands.)

THE CHAIRMAN announced that, thus altered, the clause would be emasculated, and his colleagues desired to withdraw it. He was doubtful whether the question had been clearly understood by the Committee, and the American Delegation would consider whether they would introduce a new resolution so drafted as to express more precisely the object in view.

SIR ARCHIBALD DENNY (Great Britain) then moved a resolution as to the fitting of forepeaks and afterpeaks as follows:—

"A forepeak bulkhead should be fitted in all vessels to extend to the bulkhead deck, or to the weather deck in ships having continuous superstructures. This bulkhead should be placed at a distance of not less than 5 per cent. of the vessel's length from the stem at the load water-line. An afterpeak should also be fitted carried up to the bulkhead deck."

PROFESSOR PAGEL (Germany) supported the resolution, but pointed out that in large liners it was inconvenient to have the forepeak bulkhead carried above the bulkhead deck, and it seemed doubtful whether it was necessary to carry it up as provided in the resolution.

SIR ARCHIBALD DENNY (Great Britain) pointed out that, in view of the conditions which might arise if the bow of a ship were entirely destroyed and the ship had to steam ahead in rough weather, it seemed necessary to provide that the forepeak bulkhead should be carried up. He pointed out that there was nothing to prevent doors being fitted in the bulkhead above the level of the bulkhead deck, and in these circumstances he did not see how any inconvenience would be caused.

PROFESSOR PAGEL (Germany) stated that, in view of Sir Archibald Denney's remarks, he would withdraw his objection and would second the resolution.

M. FERGUSON (United States) pointed out that if the afterpeak bulkhead were carried to the bulkhead deck, it would make it impossible to fit the steering gear in the usual position adopted at present in small ships, and this gear would have to be fitted on deck. He suggested that the option of terminating the afterpeak bulkhead at a lower level and fitting a watertight flat should be given.

SIR ARCHIBALD DENNY (Great Britain) said that he would agree to this if the condition were added that the measure of safety of the vessel should not be impaired by this modification.

DR. BRUHN (Norway) said that if permission was given to step the afterpeak bulkhead below the bulkhead deck this would be reducing safety in small vessels, as in such vessels the afterpeak bulkhead is always carried up at present. In his opinion the provision as to maintaining the measure of safety would not apply, as these vessels would be too small to come under the rules as to subdivision.

PROFESSOR PAGEL (Germany) read an extract from the rules of the Germanischer Lloyd, showing that M. Ferguson's suggestion was in accordance with the present requirements of those rules.

THE CHAIRMAN then read the amended clause, and asked the Committee whether, in its present form, it was objected to.
No objection being offered the clause was accepted as follows:

"A forepeak bulkhead shall be fitted in all vessels to extend to the bulkhead deck, and to the weather deck in ships having continuous superstructures. This bulkhead shall be placed at a distance of not less than 5 per cent. of the vessel's length from the stem at the load water-line. An afterpeak bulkhead shall also be fitted. This bulkhead shall at least be carried to the first deck above the load water-line, and, if not carried to the bulkhead deck, a watertight flat shall be fitted from the afterpeak bulkhead to the stem on the level of the deck at which it stops, provided, in this case, that the degree of safety of the vessel as regards sub-division is maintained."

Il doit exister à l'extrémité avant de tous les navires une cloison d'abordage s'élevant jusqu'au pont de compartimentage; sur les navires à superstructure continue cette cloison doit s'élever jusqu'au pont le plus élevé. La distance mesurée à la flottaison en charge de cette cloison à l'étrave ne doit pas être inférieure à 5 pour cent de la longueur du navire.

Il doit exister également une cloison à l'extrémité arrière. Cette cloison doit s'élever jusqu'au pont de compartimentage. Elle peut toutefois être arrêtée au-dessus de ce pont, sous la double réserve qu'elle s'élève au moins jusqu'au premier pont au-dessus de la flottaison en charge et que ce pont forme plafond horizontal étanche depuis la cloison en question jusqu'à l'elambot; en aucun cas, néanmoins, la sécurité du navire, au regard du compartimentage, ne doit se trouver diminuée de ce fait.

SIR ARCHIBALD DENNY (Great Britain) then moved a resolution respecting steps and recesses in bulkheads as follows:

"A bulkhead may be recessed transversely, provided the sides of the recess are at a sufficient distance from the sides of the vessel. Vertical steps are inadmissible in vessels where the factor is greater than 3. In vessels where the factor is 3 or less, the total length of the steps in any bulkhead should not exceed 2 1/2 per cent. of the vessel's length.

In the case of all recesses and steps the total volume of the compartment on either side of the position of the bulkhead as determined by article 3 should be unaffected."

PROFESSOR PAGEL (Germany) suggested that the sentence prohibiting vertical steps in vessels whose factor was greater than 3 should be omitted.

SIR ARCHIBALD DENNY (Great Britain) stated that he could not accept this suggestion, as if the bulkheads in the vessels referred to were stepped the danger that a collision would cause the flooding of two compartments was greatly increased, and as the factor was greater than 3, this would probably result in the sinking of the vessel.

M. FERGUSON (United States of America) pointed out that steps were sometimes necessary in the machinery spaces of the vessels under consideration, and suggested that they might be allowed if the degree of safety of the vessel was maintained.

THE CHAIRMAN requested that the members who had suggested amendments to Sir A. Denny's resolution should confer together and bring forward a revised resolution for consideration at the afternoon session.

Adjourned to 3:20 p.m.

AFTERNOON SESSION.

All the members were present except MM. Riess, Kersey, Archer, Barricelli, Wierdama, Wilming, and Laviagun.

The minutes of the fifth meeting of the Committee were considered and, subject to a correction suggested by Sir Archibald Denny, were approved.
SIR ARCHIBALD DENNY (Great Britain) moved the following resolution as to extra sub-division at the forward end of vessel:

"Art. 4 ( ). When the factor applicable to any vessel is less than 0.84 but more than 0.5, the combined length of the two foremost compartments must not exceed the floodable length at the extreme fore end, provided also that the length of the second compartment is not greater than that admissible by sections (1), (2), and (3) of this article.

"When the length of the vessel is more than 700 but less than 825 feet, the floodable length at the forward end of the vessel must be at least 20 per cent. of the vessel's length; and the ship, forward of a bulkhead placed either at the distance of the actual floodable length abaft the stem or not nearer to the stem than 20 per cent. of the vessel's length, must be divided into at least three compartments.

"When the length of vessel is 825 feet or over, the same method must be adopted, but the floodable length must be at least 28 per cent. and the number of compartments at least four."

This was agreed to by a unanimous vote.

The American Delegation submitted a revised resolution respecting fireproof bulkheads as follows:

"In portions of a vessel above the margin line there shall be fitted fireproof bulkheads, which will serve to retard the spread of fire from one section of the vessel to another. These bulkheads shall be fitted at a mean spacing not greater than 40 metres. Openings in these bulkheads shall be closed by fireproof doors and recesses in them shall be made fireproof."

This was agreed to by a unanimous vote.

SIR ARCHIBALD DENNY (Great Britain) moved a revised resolution respecting steps and recesses in bulkheads, which was the same as the resolution on the subject which he had moved at the morning session with the addition of a proviso on the lines suggested by M. Ferguson.

M. DE BERLHE (France) thought that the limit of 2½ per cent. was too short in small vessels, and suggested that the French rule of 2 per cent. of the length of the vessel, plus 3 metres, should be adopted.

DR. BRUHN (Norway) thought the prohibition of vertical steps in vessels where the factor was greater than 0.5 was too severe, and based on a consideration of large vessels rather than on the necessities of the smaller vessels. He suggested that the prohibition should be limited to vessels over 300 feet in length.

SIR ARCHIBALD DENNY (Great Britain) and PROFESSOR PAGEL (Germany) stated that they were prepared to accept M. de Berlhe's suggestion as to the limit.

THE CHAIRMAN suggested that Dr. Bruhn's point might be met by limiting the prohibition to vessels to which the sub-division rules already agreed upon might apply.
The resolution as thus amended was then put to the meeting, and, no objection being made, was accepted as the unanimous action of the Committee.

The resolution was as follows:

"Art. 4 ( ). A bulkhead may be recessed transversely, provided the sides of the recess are at a sufficient distance from the sides of the vessel. Vertical steps are inadmissible in the main transverse watertight bulkheads of vessels to which the subdivision rules apply where the factor is greater than 3, unless such arrangements are made by additional subdivision as shall maintain the same measure of safety as the standard vessel.

"The total length of the steps in any bulkhead should not exceed 2 per cent. of the vessel's length, plus 10 feet.

"In the case of all recesses and steps the total volume of the compartment on either side of the position of the bulkhead as determined by this article should be unaffected."

THE CHAIRMAN then raised the question of minimum requirements as to subdivision of vessels below the limits of length dealt with in the rules already adopted, and asked whether the Committee considered it practicable to prescribe rules for these or preferred to mention the subject in a general clause as being one which required further study.

SIR ARCHIBALD DENNY (Great Britain) supported the second suggestion, as he thought the Committee had not sufficient information to enable it to prescribe definite requirements.

DR. BRUHN (Norway) was doubtful whether the point could not be dealt with to a certain extent, and pointed out that the Committee had not yet specifically adopted any requirements as to the fitting of bulkheads bounding the machinery space, although such bulkheads were necessary and had been assumed throughout the Committee's work. He thought that if a clause as to peak bulkheads was inserted something should also be said about machinery space bulkheads.

THE CHAIRMAN and SIR ARCHIBALD DENNY pointed out that if a requirement as to the fitting of peak and machinery space bulkheads was inserted and nothing further was said on the matter, it might be assumed that these were the only bulkheads required in the vessels not dealt with under the subdivision rules; whereas, in fact, such vessels might be capable of further subdivision. This point might, however, be covered by a general clause, and Dr. Bruhn was asked to draft a resolution for consideration at the next meeting.

The amendments suggested in the report of No. 2 Sub-Committee were then considered, and SIR A. DENNY (Great Britain) moved that the following clause should be inserted in paragraph 16 of the report, after the word "margin line" at the end of the third clause:

"A door dropping by its own weight, and fitted with a cataract cylinder or equivalent arrangement, shall be considered as being operated by power, if capable of being released from the bridge."

SIR J. BILES (Great Britain) said that the intention of the Sub-Committee had been to allow drop doors released from the bridge as a type of power doors, and that Sir Archibald Denny's suggested resolution was thus in accordance with the Sub-Committee's intention.
THE CHAIRMAN then put the resolution to the meeting and no objection being offered it was accepted.

SIR ARCHIBALD DENNY then moved that the following be substituted for paragraph 19 of the report:

"When the number of watertight doors in the main transverse watertight bulkheads at or about the stokehold level in the machinery space exceeds five, excluding the watertight doors at the entrance of tunnels, all watertight doors situated below the load water-line must be capable of being simultaneously closed from a station situated on the bridge, and their opening and closing must be indicated at that station.

"The simultaneous closing of these doors must be preceded by a warning sound signal."

The resolution was put from the Chair and accepted in the absence of objection.

SIR ARCHIBALD DENNY then moved that the following clauses be added to paragraph 19 of the report:

"If watertight doors which have sometimes to be open at sea for the purpose of trimming coal, are fitted between bunks in the tween-decks below the bulkhead deck, these must be operated by power."

"When trunkways in connection with refrigerated cargo are carried through main transverse watertight bulkheads, and the sills of the openings are less than 7 ft. above the load water-line, such openings must be fitted with doors operated by power."

He explained that in the opinion of his Committee the doors referred to in the suggested new clauses were of such a dangerous nature when open that they should either be dispensed with altogether, or be capable of being closed from the bridge.

The resolution was put to the meeting from the Chair and accepted in the absence of objection.

M. WALTER (Germany) then moved the following resolution, which he desired should be substituted for paragraph 27 of the report of No. 2 Sub-Committee:

"When side scuttles are fitted below a deck the under side of which deck at the lowest point at sides is less than 7 ft. above the load water-line, they must be permanently fixed, or, if capable of being opened, they must be closed watertight and locked in that position when the vessel is at sea, and glass lights in such scuttles shall be provided with efficient metal covers."

SIR ARCHIBALD DENNY (Great Britain) said that if he was sure it was possible to fit an arrangement which could not be opened without the sanction of the Captain he would raise no objection to the resolution, but he thought it certain that firemen and others who might be provided with tools and might not understand the danger, would open any description of light that might be fitted except one that was absolutely fixed.

M. FERGUSON (United States of America) thought that reasonable discipline must be assumed, and that if the key of the side scuttles was in the captain's custody [1244—87]
it was not likely that the scuttles would be opened at sea. The necessity for opening them at sea was not so great, as the ventilation was better, but in port, especially in hot climates, he thought it would be a great disadvantage if the side scuttles could not be opened. As regards the question of their being opened by unauthorised persons, he pointed out that if a man desired to get fresh air, he might not hesitate to break a fixed side scuttle, and this would be worse than taking off a scuttle of the kind mentioned in the resolution.

SIR ALCHIBALD DENNY (Great Britain) said that if the resolution was amended to secure that the scuttles were not opened at sea under any condition, that the keys were kept by the captain, and that the arrangement was such that it could not be tampered with he would raise no further objection. He also suggested that as he did not think any scuttle fulfilling these conditions was at present constructed it would be advisable for any State which approved such a side scuttle to communicate particulars to the other States.

Further discussion of the matter was suspended to allow a new clause to be drafted.

At the request of the Chairman, M. Bogner then read the French text of a resolution which had been provisionally agreed to in Lord Mersey’s Committee of Chairmen respecting the ships to which the Convention should apply.

THE CHAIRMAN then read the English text of this resolution as follows:—

“1. This Convention, except as otherwise provided, shall apply only to merchant steamships registered in one or other of the Contracting States and carrying more than twelve passengers on voyages between a port in a Contracting State and a port outside that State.

“2. Steamships of a Contracting State engaged upon voyages specified in the Schedule which will be annexed to this Convention at the time of ratification as voyages which that State does not regard as ocean voyages are excluded from the operation of this Convention. Provided that no voyage shall be included in the Schedule in the course of which a vessel is navigated to a point more than 200 miles from the nearest land.

“Provided also that any Contracting State shall be entitled to claim from any other Contracting State the concession of the privileges of the Convention to any class of its ships engaged on a voyage specified by it in the Schedule, on condition that the State making such a claim applies to such ships the regulations prescribed by the Convention for ocean voyages except as far as the application of such regulations is, having regard to the nature of the voyage, unnecessary or unreasonable.”

THE CHAIRMAN stated that it was the hope of the Committee which had drawn up this definition that it would be accepted by all the Committees and apply to the work of each as far as possible. He also pointed out that he had already mentioned the substance of the resolution at a previous meeting. He suggested that it should be accepted for the purposes of this Committee and asked whether any member objected to this course.

DR. BRUHN (Norway) pointed out that if this resolution was adopted the small vessels to which he had referred more than once would come within the scope of the Convention as their voyage would take them more than 200 miles from shore.
He did not, however, press the objection and on the resolution being put to the meeting it was accepted in principle and so far as concerned its application to the work of this Committee.

SIR ARCHIBALD DENNY (Great Britain) then read a revised resolution respecting side scuttles which had been prepared on the lines suggested, this being intended to take the place of paragraph 27 of the report of No. 2 Sub-Committee.

After some discussion, in the course of which it was pointed out that Sir Archibald Denny’s suggestion as to communicating designs of side scuttles could be covered by a general clause, the resolution was put to the meeting and accepted in the absence of objection.

The resolution was as follows:—

“27. (a.) Subject to clause (b) below, when side scuttles are fitted below a deck, the under side of which deck at its lowest point at side is less than 7 feet above the load waterline, they must be permanently fixed.

(b.) Side scuttles which are capable of being opened may be fitted in the positions defined in clause (a) provided that:—

1. They must be closed watertight and locked before the vessel proceeds to sea.

2. They must not be opened while the vessel is at sea.

3. The time of opening such scuttles in port and of closing them before the vessel proceeds to sea shall be entered in the log book.

4. The construction of such scuttles must be such as to effectually prevent any person opening them without the consent of the master.

(c.) Glass lights in scuttles when fitted in the positions defined in clause (a) must be provided with efficient metal shutters.”

“27. (a.) Au-dessous d’un pont dont la surface inférieure à son point le plus bas en abord se trouve à moins de 2,14 mètres (7 pieds) au-dessus de la flotaison en charge, il ne peut être établi que des hublots fixes:

(b.) Toutefois des hublots à ouvrir peuvent être établis dans les entreponts visés au paragraphe (a) ci-dessus, s’il est satisfait aux conditions suivantes:

1. Ces hublots doivent être fermés d’une façon étanche et verrouillés avant que le navire ne prenne la mer.

2. Ces hublots ne doivent pas être ouverts en cours de navigation.

3. Mention au journal de bord doit être faite des heures auxquelles ces hublots auront été ouverts dans le port et fermés et verrouillés avant le départ du navire.

4. Ces hublots doivent être tels qu’il soit matériellement impossible à toute personne de les ouvrir sans autorisation du capitaine.

(c.) Les hublots établis dans les entreponts visés au paragraphe (a) ci-dessus doivent être munis de tapes métalliques efficaces.”

THE CHAIRMAN then announced that the report of No. 2 Sub-Committee had been fully dealt with and was now complete and accepted as its own by the Full Committee. He desired to thank Sir John Biles and the Sub-Committee for their work, and thought the Committee would especially appreciate the action of Sir John Biles in being willing to serve as Chairman of this Sub-Committee at a time when he was also Chairman of one of the main committees of the Conference. (Applause.)

THE CHAIRMAN then submitted to the meeting a resolution respecting the date of enforcement of the rules laid down by the Committee, viz.:—

“The above rules have been drawn up upon the assumption that they will be applied in full to all new ships covered by the Convention. For the purpose of these rules a ‘new ship’ is assumed to be a ship the construction of which is commenced after the 1st July, 1914, or after the date of ratification of the Convention, if later than the 1st July, 1914. The term ‘existing ship’ includes all other ships covered by the Convention.”

After discussion it was agreed that the laying of the keel of a vessel was a more definite point of departure than the commencement of construction.

Just as the vote was about to be taken the Chairman announced that word had reached him that the Committee of Chairmen had been considering the matter of enforcement of the Convention and were about to suggest that the Convention should be ratified on the 31st December, 1914, and should come in force on the 1st April, 1915.
He desired to know whether the Committee concurred in this suggestion or whether it desired to make any different recommendation, e.g., that the enforcement should be coincident with ratification.

After discussion it was decided that a reasonable date for enforcement would be three months after the date fixed for the ratification, and the resolution was therefore amended and accepted as follows:—

“The foregoing rules have been drawn up on the assumption that they will be applied in full to all new ships covered by the Convention. For the purpose of these rules a ‘new ship’ is assumed to be a ship the keel of which is laid three months or more after the date of ratification of the Convention. The term ‘existing ship’ includes all other ships covered by the Convention.”

SIR ARCHIBALD PENNY (Great Britain) then referred to the proceedings at the morning session respecting the reopening of the question of treatment of existing ships, and stated that he understood that the Committee was now prepared to give unanimous consent to this question being discussed.

This having been ascertained by the Chairman:

SIR ARCHIBALD PENNY (Great Britain) asked the Committee, for the reasons he had already given, to alter the wording of the clause respecting existing ships so as to make it clear that these ships should not be considered by their administrations in respect of subdivision.

The original clause was as follows:—

“It is not practicable for the Committee to lay down definite principles with regard to bulkhead subdivision for all existing foreign-going ocean passenger vessels, and the Committee is of opinion that arrangements on existing ships should be considered on their merits by the administration of the country to which each vessel belongs with a view to improvements which provide increased safety where practicable.”

SIR ARCHIBALD PENNY suggested that the word “but” should be substituted for the word “and,” and that the words “in other respects” should be substituted for “arrangements on.”

THE CHAIRMAN stated that, speaking for the American Delegation, he did not favour this suggestion, as he did not think the administrations should be prevented from considering the bulkhead subdivision of existing ships, and obtaining such improvements as might be feasible. He would have no objection to substituting “but” for “and,” and he would also not object to adding the words “and reasonable” at the end of the paragraph if the Committee so desired.

These two amendments substituting “but” for “and,” and adding “and reasonable,” were then put to the meeting and accepted unanimously in the absence of objection.

SIR ARCHIBALD PENNY (Great Britain) then moved that the words “in other respects” be substituted for “arrangements on.”

DR. BRUHN (Norway) seconded.

On a vote being taken the question was decided in the negative. (For: France, Great Britain, Norway, Netherlands. Against: Germany, United States of America, Austria-Hungary, Belgium, Canada, Denmark, Italy, Russia, Sweden.)

SIR J. BILES (Great Britain) then read the following statement respecting stability which he had prepared in accordance with the arrangements made at the previous meeting:—

“The Committee is of opinion that it is not practicable to determine the amount of stability which a vessel might have in order to be safe. It is further not considered practicable always to determine the amount of stability which
steamers will have immediately after completing loading. The Committee is, therefore, not prepared to recommend that any regulations should be framed in relation to the stability of steamships. The Committee recommends the President to reply in the above sense to the Australian Delegate, Captain R. Muirhead Collins, but to refrain from embodying any reference to the question in the Report of the Conference."

DR. BRUHN (Norway) seconded.

THE CHAIRMAN stated that, if adopted, this would be regarded as the opinion of the Committee with respect to the general subject of stability as raised by the communication forwarded by Lord Mersey, and that the substance of this resolution would be communicated to Lord Mersey.

No objection being made the statement in the resolution was accepted in principle, subject to the wording being revised if necessary.

M. FERGUSON (United States of America) announced that the American Delegation had decided, in view of the discussions which had taken place, and the probability of not accomplishing the good results intended, to withdraw the proposal as to compulsorily furnishing shipmasters with information as to the stability of their vessels.

THE CHAIRMAN requested that any member who desired to make any suggestion as regards the general clause in regard to matters requiring further study, to which he had already referred, should communicate with him at the end of the meeting.

He understood that the Committee wished to conclude their work not later than 1:30 P.M. on the following day (19th December), and he had therefore done all in his power to expedite business. Considering all the circumstances, he was of opinion that much more had been done than had been anticipated by some at the opening of the Conference.

If the members of the Committee decided to separate to-morrow, upon the completion of the programme already laid out, as he understood many of them had arranged to do, it would clearly be necessary that they should entrust to the Chairman (who would avoid himself of the assistance of those members who remained in London) the task of arranging the results of the Committee’s work in their final form, and of having the French translation completed and printed. The resolutions of the Committee and other material extracted from the minutes for embodying in the Report would not be altered in substance in the process of framing the Report, and the only alterations made would be those of arrangement and such changes in wording as might be necessary with a view to consistency and suitability. He proposed that, after the meeting on the following day, the next meeting of the Committee should be on the 5th January, 1914, at 10 A.M. when he would lay before the members the complete Report in English and French. They might then go through the Report in its completed form, and assure themselves of the character of such verbal changes as had been found necessary prior to final action by the Commission de Rédaction. At that late date, however, it would be practically impossible to materially alter what had been done, and he desired the Committee fully to understand the situation.

In the absence of objection, the procedure outlined by the Chairman was sanctioned by the Committee.

Adjourned to 10 A.M., the 19th December, 1913.

* The following is a copy of the Chairman’s communication on the subject to Lord Mersey:—

Dec 23, 1913.

Dear Lord Mersey,

With reference to the letter from the Australian delegate respecting stability which you referred to the Committee on Safety of Construction, the Committee has considered the general subject of the stability of ships under various conditions, and is of opinion that it is not practicable to determine the amount of stability which a vessel ought to have under all conditions in order to be safe. It is further not considered practicable always to determine the amount of stability which vessels will have immediately after completing loading. The Committee is therefore not prepared to recommend that any regulations should be framed in relation to the stability of steamships.

I return Captain Muirhead Collins’ letter herewith.

Yours faithfully,

W. L. CAPPs
Ninth Meeting.—December 19, 1913, 10 a.m.

All the members of the Committee were present except MM. Riess, Duguid, Kersey, Sir John Biles, Wierdsma, Wilminck, and Løvaguen.

Copies of the resolutions passed at the previous meeting were distributed to the members.

Sir Archibald Denny (Great Britain) pointed out that the wording of the resolution respecting power doors in refrigerating trunkways did not altogether express the intention, and in order to make the matter clear it was unanimously agreed to insert the words "two or more" between "through" and "main transverse watertight bulkheads," in order to show that the requirements were not intended to apply to refrigerating machinery situated in a recess of a bulkhead but only to trunkways carried through several bulkheads.

M. DE BERLHE (France) raised a question as to the wording of the resolution respecting forepeak bulkheads, and suggested that it should be altered so as to state merely that the forepeak bulkhead should be carried to the weather deck in all cases.

After discussion, Sir Archibald Denny (Great Britain) moved that the resolution be unaltered, and on a vote being taken this was carried by a majority. (For: Germany, United States, Austria-Hungary, Belgium, Denmark, Great Britain, Italy, Norway, Netherlands, Russia, Sweden. Against: France.)

M. ARCHER (Great Britain) suggested that the words "and locking" should be inserted after the words "closing" in paragraph (b) 3 of the resolution respecting side scuttles.

This was agreed to.

No further objection being made to the wording of any of the resolutions, they were finally accepted as expressing the intention of the Committee.

Dr. Bruhn (Norway) then moved that provision for the fitting of machinery space bulkheads should be made, and suggested that this could most conveniently be done by an amplification of the resolution passed on the previous day respecting peak bulkheads.

This suggestion was supported by M. Ferguson (United States of America) and, no objection being made, was agreed to.

The final wording of the resolution was as follows:—

"A forepeak bulkhead shall be fitted in all vessels to extend to the bulkhead deck, and to the weather deck in ships having continuous super-structures. This bulkhead shall be placed at a distance not less than 3 per cent. of the vessel's length from the stem at the load water-line. An after-peak bulkhead and bulkheads dividing the machinery space from the cargo and passenger spaces shall also be fitted and carried up to the bulkhead deck. If the after-peak bulkhead is not carried to the bulkhead deck, it shall at least be carried to the first deck above the load water-line, and a watertight flat shall be fitted from the after-peak bulkhead to the stem on the level of the deck at which it stops, provided in this case that the degree of safety of the vessel as regards sub-division is maintained."

"Il doit exister à l'extrémité avant de tous les navires une cloison d'abordage s'élevant jusqu'au pont de compartimentage; sur les navires à superstructure continue cette cloison doit s'élever jusqu'au pont le plus élevé. La distance mesurée à la flottaison en charge de cette cloison à l'étrave ne doit pas être inférieure à cinq pour cent de la longueur du navire.

"Il doit exister également une cloison à l'extrémité arrière et des cloisons aux extrémités de la tranche des machines pour en séparer les portions du navire affectées aux passagers et aux marchandises; toutes ces cloisons doivent s'élever jusqu'au pont de compartimentage. La cloison de l'extrémité arrière peut toutefois être arrêtée au-dessous de ce pont, sous la double réserve que cette cloison s'élève au moins jusqu'au premier pont au-dessus de la flottaison en charge et que ce pont forme plafond horizontal étanche depuis la cloison en question jusqu'à l'étambot; en aucun cas, cependant, la sécurité du navire, au regard du compartimentage, ne doit se trouver diminuée de ce fait."
SIR ARCHIBALD DENNY (Great Britain) then moved that the following clause be added to the article already passed respecting the method to be adopted for determining the combined length of a pair of adjacent compartments:—

If one of the two compartments is situated inside the machinery space and the second is situated outside the machinery space, and the average permeability of the portion of the ship in which the second is situated differs from 3, a correction must be made for the purpose of adjusting the length of the pair of compartments, so as to ensure that the proper length of the pair of compartments is not exceeded.

PROFESSOR PAGEL (Germany) seconded, and explained that the German method of dealing with the case of a pair of compartments having different permeabilities was to draw two curves, one for each permeability, and interpolate between these according to the ratio of the respective volumes of the two compartments.

In reply to the Chairman, SIR ARCHIBALD DENNY (Great Britain) explained that the object of the resolution was to prevent the standard of security being diminished due to differences of average permeability.

The resolution was then put to the meeting by the Chairman, and accepted in the absence of objection.

SIR A. DENNY (Great Britain) then moved the following resolution:—

"Recognising the desirability that the criterion referred to in Article 4 (4) should be determined and accepted internationally at the earliest possible date, the Signatory States agree to press forward the study of the subject forthwith, and to communicate to each other the results of that study with the least possible delay. The Committee recommend that His Britannic Majesty's Government be invited to undertake the duty of circulating this information, and, as soon as a definite result is attainable, of endeavouring to secure through the diplomatic channel the acceptance by the Signatory States of the criterion; and thereon, as from a date and subject to the conditions to be agreed upon, such criterion shall have effect as if it were prescribed in the Convention."

He explained that this was brought forward on account of the great importance of securing international agreement on the criterion at as early a date as possible, and it was thought that this could best be obtained if some definite procedure was laid down in the Convention. He was authorised to state that the British Government would, if the Conference so desired, be happy to act as the channel of communication between the different Signatory States, and to take such steps as might be necessary and possible with a view to the matter being settled.

PROFESSOR PAGEL (Germany) seconded the resolution.

THE CHAIRMAN explained that he had also prepared a resolution dealing with those questions which might require further study.

SIR ARCHIBALD DENNY stated that he had a further resolution on the subject dealing with certain specific points.

After discussion, the CHAIRMAN announced that he had consulted the mover and seconder of the resolution quoted above, and it was thought that the most expedient way of dealing with the matter would be to combine the three drafts and deal with the whole subject in one resolution.

This was agreed to, and the Chairman authorised to draft a resolution accordingly.

GENERAL MEANA (Italy), referring to the table of sub-division factors already adopted by the Committee, asked whether it would not be possible for the Conference to agree on the complete curves of which these factors gave certain points. If this could be done it would secure uniformity of action in all countries, at least as regards the limiting types of vessels.
THE CHAIRMAN thought the idea a good one, for the important point was to secure uniformity, and the question of the exact form of the curve did not seem to him so essential as the determination of a uniform curve for the use of all countries. If curves could be drawn and agreed to before the Conference ended this would save a lengthy interchange of views later.

SIR ARCHIBALD DENNY (Great Britain) supported the suggestion.

PROFESSOR PAGEL (Germany) stated that he had discussed the matter very carefully with some of his colleagues, and the conclusion they came to was that it would be impracticable to lay down the curves, or at least curve B, until some further points on that curve had been derived from a transformation of the German rules and practice. It might be possible, however, to draw the C curve.

After further discussion it was agreed that the question should be remitted to the Chairman, with Professor Pagel, M. Pierrard, M. Boris, and Sir A. Denny, and that if they succeeded in reaching a result they should report it at the meeting of the Committee on the 5th January.

THE CHAIRMAN reminded the members of his remarks at the previous meeting, and the unanimous agreement of the Committee as to the final preparation of the report being entrusted to him, and asked and received authority to sign the report when prepared. He then described the plan on which he proposed to draw up the report, this being to print the resolutions adopted by Sub-Committee No. 1, with such additional resolutions as were subsequently decided upon at the meetings of the full Committee; then the resolutions contained in the report of No. 2 Sub-Committee, and following these the resolutions of No. 3 Sub-Committee; these to be exactly as they had been passed, subject to such verbal changes as might be found to be absolutely necessary for clear meaning, and to insert before each of these the necessary explanatory matter, this being reduced to the smallest compass possible. To this would be appended the exact text of the articles to be embodied in the Convention, or some equally suitable method would be followed. The articles would be based on and follow as closely as possible the language of the resolutions as passed by the Committee. If any verbal alterations were found necessary these would be noted and attention called to them at the meeting of the Committee in January. The minutes of the Committee need perhaps not be mentioned in the report, or annexed thereto. They formed a part of the records of the Conference, and the Conference could call for them if they so desired. If the Committee desired a different procedure to be followed he would endeavour to meet their wishes, but if no objection was made to the course he had outlined it would be followed.

No objection was made.

THE CHAIRMAN proceeding, said that, in looking through the report of No. 3 Sub-Committee with a view to considering what rearrangement would be necessary to make it suitable for embodiment in the Convention, he had come to the conclusion that some general clause summing up the intention of the Sub-Committee should be inserted, and he read a clause which he had drafted, and which provided that no boilers, steam pipes, fuel tanks, &c., should be used if of bad material or otherwise unsatisfactory.

M. ARCHER (Great Britain) pointed out that this clause was not comprehensive, as it made no reference, for example, to the hull of the vessel.

THE CHAIRMAN explained that paragraph 8 of the Report of No. 3 Sub-Committee was quite sufficient to cover all general questions, but as it was followed by paragraph 9, which went into some detail as to the hydraulic testing of boilers, an impression might be given that other important details not mentioned in the report were not meant to be attended to.

SIR ARCHIBALD DENNY (Great Britain) suggested that the positions of paragraphs 8 and 9 might be reversed.

M. FERGUSON (United States of America) pointed out that paragraph 9, while it began by stating that boilers, steam pipes, fuel tanks, and reservoirs should be tested by hydraulic pressure, proceeded to specify the tests for boilers without saying anything about the other items. The inference might be drawn that the other items were not intended to be tested.
THE CHAIRMAN then suggested that the second and third parts of the paragraph might be amended to read as follows:—

"Main and auxiliary boilers, connections, tanks, reservoirs and steam piping more than 4 inches in diameter shall be satisfactorily tested by hydraulic pressure when new and thereafter at fixed intervals. The initial and subsequent test pressures of the boilers shall not . . . ."

No objection being made, this amendment was agreed to.

THE CHAIRMAN then submitted to the Committee two resolutions which had been drawn up respecting the establishment of the criterion, and of rules respecting other points not dealt with in the Convention, and respecting interchange of information between the signatory States.

After discussion and slight amendment these resolutions were agreed to as follows:—

Les États signataires reconnaissant qu'il est désirable de voir fixer par une entente internationale, dans le plus court délai possible, le critérium de service visé par l'article 4, paragraphe 4, s'engagent à poursuivre activement leurs études à ce sujet et à s'en communiquer les résultats.

La Conférence émet le vœu que le Gouvernement britannique soit invité à assumer la charge de ces communications et à provoquer par l'intermédiaire diplomatique l'accord des États signataires au sujet de ce critérium aux fins que des résultats définitifs pourront être acquis. Ce critérium, une fois admis par chacun des États signataires, sera applicable, à partir d'une date et dans les conditions à fixer par l'accord, au même titre que les prescriptions de la Convention elle-même.

La même procédure est valable pour les points suivants:—

1. Installation de cloisons longitudinales étanches, double coque, ponts et plafonds étanches : majoration éventuelle de la longueur des compartiments protégés par ces dispositifs.

2. Navires dont la longueur est inférieure à celle des navires visés à l'article 4, paragraphe 3 : compartimentage propre à réaliser la plus grande sécurité possible.

Les États signataires échangeront dans la plus large mesure possible tous renseignements au sujet de l'application des règles de la présente Convention en matière de sécurité de la construction. Ils se communiqueront mutuellement : les méthodes ou règlements qu'ils adopteront : les renseignements sur les nouveaux dispositifs ou organes qu'ils adopteraient pour donner une suite pratique aux règles de la Convention : les décisions qu'ils prendraient sur les points de principe non couverts par celle-ci : enfin, les résultats de leurs études ultérieures sur les questions qu'elle n'a pas traitées.
THE CHAIRMAN then referred to the draft minutes of the sixth meeting of the Committee, copies of which were in the members' hands, and suggested that if the Committee so desired the formal approval of these minutes and of the minutes of the subsequent meetings might be deferred until the meeting of the Committee on the 5th January.

This was agreed to.

THE CHAIRMAN then referred in most appreciative terms to the work done by the Secretaries of the Committee, and stated that he would see that the sense of the Committee in this respect was expressed in a suitable manner by a resolution recorded in the minutes. Such a recognition of the painstaking and effective work of MM. Carter and Bogaert would undoubtedly meet with the cordial approval of every member of the Committee. (Applause.)

SIR ARCHIBALD DENNY (Great Britain) said he had claimed as a privilege the pleasant duty of proposing a hearty vote of thanks to the Chairman. The Chairman and Committee were to be congratulated upon the results obtained, results, however, which would not have been possible but for the large amount of preliminary work relating to sub-division which had been going on for many years previous to the meeting of this Conference. He might compare the work to the building of a house. The foundations were laid and the walls begun by the report of the 1891 Bulkheads Committee, and an almost important addition to the building was made on the introduction of the German rules for sub-division in 1896. Although somewhat slow progress was made thereafter, the work was never stopped, and advances were made in every country. It seemed, however, as if a serious accident was necessary to spur the countries to combine in the completion of the work. That work had now been undertaken and was satisfactorily accomplished, leaving unfinished only the decoration and furnishing of the building. While he had referred to the loss of the "Titanic," he wished to add that practice and experience had shown travelling by sea to be the safest form of travel, and he thought it was an advantage that they were meeting almost two years after that disaster, as the intervening period had been occupied with useful and necessary work, and it was now possible to view events in their proper perspective without pressure of panic and in the light of common sense.

The Committee had departed from the usual form of expressing their results by reference to one-, two-, or more compartment ships, and had instead adopted a factorial system, which, however, might be interpreted in the old way. But it must not be forgotten that safety by sub-division was only conditional, and that the measure of safety attained depended upon the assumptions made. It might quite well be that vessels whose factor was 5, if differently loaded, would not be two-compartment ships, but, on the other hand, ships with a considerably larger factor might still be two-compartment ships under certain conditions of loading. Finally, the method affected vessels of all sizes above at least 200 feet, and produced a gradual increase of safety as vessels increased in size, which was evidently the only possible way of dealing with the question.

To the completion of the building each nation had brought its stone, some more or less polished and ready, some rough-hewn, but all essential, and the result was orderly international sub-division. But perhaps one of the most beneficial effects of the Conference would be the establishment of personal friendships between the technical men of all countries, and arising therefrom the advantage of free communication between them.

At the opening of the Committee's work the situation appeared somewhat difficult, as three systems between which it was very difficult to choose were offered for the consideration of the Committee. The honour of finding the bridge which had enabled the Committee to proceed belonged to their Belgian colleague, M. Pierrard, and he ventured to thank M. Pierrard on behalf of the Committee for what he had done. (Applause.)

While, as he had said, each member had rendered the best service in his power, the services rendered by the Chairman were of outstanding importance, and he felt that the Committee could not too cordially thank him for the way in which he had presided over their deliberations and assisted them in arriving at results. He had occupied the chair with an independence which was recognised by all, and he was glad to think that the Committee had been as loyal to the Chairman as the Chairman had been to the Committee. (Loud applause.)
THE CHAIRMAN thanked Sir Archibald Denny for his remarks and the Committee for the manner in which they had endorsed them. He was bound to admit that the responsibility of his position had at times seemed almost too severe, but he knew that, throughout, each member had been endeavouring to reach what seemed to him the best result, and he felt under a personal obligation to every member of the Committee for their effective work, and for the way in which they had supported and assisted him. Where each member had assisted so greatly in the difficult work assigned to the Committee it seemed inappropriate to make discriminating reference; but, if he were to make any distinction, it would only be to endorse Sir Archibald Denny's remarks as to the services rendered by M. Pierrard.

It had been a real pleasure to him to be associated with the work of the Committee, and he felt sure that it would have far-reaching and beneficial results.

Ideals in work of this character were not easily attained, but the Committee had done their best, and future practice in shipbuilding would no doubt reflect the results of their labours. By working together earnestly and sympathetically they had undoubtedly advanced the interests of humanity. (Applause.)

Adjourned to 10 A.M., the 5th January, 1914.
Tenth Meeting.—January 5, 1914, 10 a.m.

MORNING SESSION.

Present: Admiral Capps (Chairman), MM. Riess, Pagel, Ferguson, Smith, McBride, Boris, Sir A. Denny (accompanied by Professor Welch), Sir J. Biles, Archer, Meana, Vossnack, and Nilsson.

THE CHAIRMAN welcomed the members back, and wished them a Happy New Year, at the same time regretting that, owing to pressure of other duties, some members of the Committee were unable to be present.

The minutes of the 6th, 7th, 8th, and 9th meetings were considered and approved, subject to corrections suggested by Sir A. Denny and Professor Vossnack in the first-mentioned, and by Sir A. Denny in the last-mentioned, minutes.

THE CHAIRMAN referred to his remarks at the previous meeting in relation to the excellent work of the Secretaries, and submitted the following resolution, which was approved by acclamation:

Resolved: That the Committee on Safety of Construction desires to record its high appreciation of the intelligent co-operation and unyielding zeal of the Secretaries, MM. Carter and Bogner, which have greatly facilitated the work of the Committee, and enabled it to complete its important duties within the comparatively short time at its disposal.

THE CHAIRMAN laid before the members a list of the points in which the wording of the articles embodied in the report of the Committee differed from the resolutions passed by the Committee. He had prepared the report in virtue of the authority given to him by the Committee at their last meeting, and had had the assistance of Sir Archibald Denny and MM. Boris, Ferguson, Smith, and McBride, and the Secretaries in clearing up doubtful points. He called special attention to the most important of the differences between the report and the resolutions, and gave the reasons why the alterations had been made.

As regards the omission from the end of Article 15 (1) of the words "which cannot be opened by the occupants of the compartments," thus making the paragraph read as follows:

(1) In passenger and crew spaces practicable means of escape shall be provided from each watertight compartment liable to be isolated by the closing of watertight doors—

SIR JOHN BILES (Great Britain) explained that the intention of No. 2 Sub-Committee had been to allow watertight doors to be used for escape from passenger and crew spaces, and suggested that, to prevent any misunderstanding as to this, the words "liable to be isolated by the closing of watertight doors" should be omitted.

THE CHAIRMAN said that the omission of these words would make the paragraph absolutely comprehensive, and he saw no objection to the suggestion.

After a short discussion it was agreed to omit the words in question.

With reference to the addition of the words "during each voyage" to Article 19 (2) respecting periodical inspection of the watertight door system, &c. —

DR. RIESS (Germany) asked whether it was really intended to require inspection during each voyage in the case of vessels engaged on short voyages.

THE CHAIRMAN pointed out that the inspection was not for strength, design, &c., but to make sure that the doors, &c., were in good working order.
SIR JOHN BILES (Great Britain) said he was not sure that the intention of No. 2 Sub-Committee was to require an inspection each voyage.

PROFESSOR PAGEL (Germany) suggested that the inspection should take place at least once a week; and after a short discussion this was agreed to, and it was decided to alter the article accordingly.

With reference to the omission of the words "With a view to maintaining strength and watertightness" from Article 20 (3), thus making the paragraph read as follows:

(3.) No change shall be made in the condition of watertight decks, trunks, and ventilators after the completion of the survey, unless with the permission of the Administration—

SIR JOHN BILES (Great Britain) asked whether the words omitted were not necessary in order to indicate the kind of changes prohibited; otherwise the repainting of a bulkhead, or some other trifling change in condition, might come under the prohibition.

SIR ARCHIBALD DENNY (Great Britain) pointed out that the word "structure" was used in the French text to translate "condition," and it was agreed to substitute "structure" for "condition" in the English text, and also in the similar context in Article 13 (5).

THE CHAIRMAN suggested, and it was agreed, to insert the words "to the Administration" after "satisfactory" in Article 20 (1).

Some discussion arose as to the insertion of the words "to the forepeak bulkhead" in Article 21 (5) respecting the extension of the double bottom up the sides; but M. Ferguson (United States of America), Professor Vossnack (Netherlands), and Professor Pagel (Germany) pointed out that this was in accordance with the intention of No. 2 Sub-Committee, and Sir John Biles agreed with this view.

The Committee having then dealt with all the points in which the wording of the report as printed differed from the exact wording of the resolutions, proceeded to consider suggestions for further minor alterations in the wording.

GENERAL MEANA (Italy) called attention to the wording of that part of Article 7 relating to the permeability of machinery spaces in motor vessels, and it was agreed to alter this in order to make it clear that in no case could a permeability of less than 50 per cent. be used.

PROFESSOR PAGEL (Germany) suggested, and it was agreed, to insert "chain-boxes" in section (a) in Article 7 as a space whose permeability should be taken at 60 per cent.

PROFESSOR PAGEL (Germany) pointed out, with reference to Article 9 (3) respecting the combined length of the two forward compartments in certain cases, that in order to ensure compliance with the Committee's intention, a minimum length for the second compartment from forward should be imposed. On his suggestion it was agreed to require that the length of this compartment should not be less than 3 metres (10 feet), and to amplify Article 9 (3) accordingly.

SIR ARCHIBALD DENNY (Great Britain) called attention to the definition of length in Article 5 (2), and suggested that in order to make this definition fair as between ships with different forms of sterns, the following words should be added to it:

"less 3 per cent. or is the distance between the fore end of the stem and the centre of the rudder stock, whichever is the greater."

Adjourned to 3:30 p.m.
AFTERNOON SESSION.

Present: the same members as in the morning except MM. Boris and Nilsson.

SIR ARCHIBALD DENNY (Great Britain) reminded the Committee of his suggestion for altering the definition of length in Article 5 (2), but after a short discussion stated that he would withdraw it.

SIR ARCHIBALD DENNY (Great Britain) called attention to Article 14 (2) (b) respecting the fitting of doors in bulkheads separating a cargo hold from an adjoining cargo hold or reserve bunker, and after discussion it was agreed to substitute “space” for “hold,” in order more clearly to express the original intention and to show that the prohibition applied not only to the lowest part of each hold, but also to cargo ’tween-deck spaces, except as provided in Article 14 (6).

M. McBRIDE (United States of America) suggested that the article might be still further clarified by inserting ’tween-deck” between “cargo” and “spaces” in line 6 of Article 14 (6), and ’tween” between “cargo” and “deck” in line 8 of the same article. This was agreed to.

SIR ARCHIBALD DENNY (Great Britain) called attention to Article 14 (3), reading as follows:—

(3.) In the machinery spaces of steamships, and apart from bunker doors, not more than one door may be fitted in each main transverse bulkhead within the machinery space for intercommunication, but where more than one separate shaft tunnel is fitted a door may be cut for each tunnel. If a tunnel is fitted forward, either for the purpose of pipes or as a communication passage, it must be fitted with a watertight door.

He pointed out that this would prevent doors being fitted in the upper part of bulkheads for access to auxiliary machinery, &c. Such doors were actually contemplated in other parts of the report, and were not of such a dangerous character as those actually at the stokehold level. He did not think it could have been the intention of the Committee to prohibit such doors, and he suggested that the words “at or about the stokehold level” should be inserted after “bulkhead.”

THE CHAIRMAN pointed out that, if this were agreed to, watertight bulkheads could have as many openings in them as might be desired, provided the openings were some little distance above the stokehold level.

M. FERGUSON (United States of America) said he thought that when No. 2 Sub-Committee passed the resolution on which the paragraph was based, they had in mind chiefly the doors in bulkheads between main machinery compartments, and did not specially consider those in after engine-room bulkheads above shaft tunnels.

THE CHAIRMAN suggested that Sir Archibald Denny’s object would probably be met if the words “apart from bunker and tunnel doors” were substituted for “apart from bunker doors” in the paragraph.

SIR JOHN BILES (Great Britain) suggested the substitution of “shaft tunnel” for “tunnel.”

These two suggestions were agreed to, and it was accordingly decided to insert “and shaft tunnel” after “bunker.”

PROFESSOR PAGEL (Germany) called attention to Article 14 (4), requiring watertight doors to be operated by hand from above the margin-line. He stated that, in the “Imperator,” it had been found impracticable to work the doors in this manner owing to friction in the gear, and the doors were therefore arranged for operation from a deck below the margin-line, but above the head-line.

SIR ARCHIBALD DENNY and THE CHAIRMAN suggested that, if it was necessary to do so, arrangements could be made for leading the gear sufficiently direct to avoid excessive friction, and Professor Pagel did not press his point.

It was agreed that the French text of the report should be altered to correspond with the alterations in the English text, and several improvements in the French text were also agreed to during the meeting.
THE CHAIRMAN stated that the members whom the Committee had authorised to prepare curves showing factors of sub-division had been working at this during the recess, and if it was found possible to fix further points on the curves these would be inserted in the Report, in accordance with the statement in paragraph 7 thereof. If no member had any further suggestions to make the work of the Committee might be regarded as completed. He again thanked the members for their hearty co-operation in all the work assigned to the Committee, and expressed his appreciation of the manner in which they had received the Report which he had prepared under their authority.

GENERAL MEANA (Italy) said that before the proceedings terminated he desired, on his own behalf and that of the members, again to thank the Chairman for the manner in which he had presided over their deliberations. (Loud applause.)

THE CHAIRMAN thanked General Meana and his other colleagues for their appreciative expressions. It had been a great honour and a very real pleasure to him to be associated with them in so important a work. He hoped that the personal friendships which had grown up through this association might have many opportunities for further development in the years to come.

Adjourned sine die.