CONSEIL INTERNATIONAL DES UNIONS SCIENTIFIQUES - INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS
SPECIAL COMMITTEE ON OCEANIC RESEARCH
(SCOR)

INTERNATIONAL INDIAN OCEAN EXPEDITION
30 EAST 40TH STREET - NEW YORK 16, N. Y. - LEXINGTON 2-6533

COORDINATOR
ROBERT G. SNIDER

CABLES
SCORINDOC - NEWYORK

FROM: Coordinator

TO: Distribution List (attached)

Under separate cover, by air mail, I am forwarding a set or sets of sixteen IIOE work charts derived from H.O. 17,138 B and C. The work charts separate by seasons and by disciplines, the information presented on the H.O. charts. They have been designed as analytical tools, to be used in conjunction with textual or tabular material describing the sub-disciplinary research in which each vessel is engaged, to facilitate examination of the extent to which existing cruise plans provide adequate coverage of significant problems in terms of time, area and discipline. Reference should also be made to the "Summary of Cruise Plans" with appendices issued by this office as of 1 April 1962. Ultimate reference may have to be made to individual ships' cruise plans and reports issued by the various laboratories and National Committees.

With these various tools it may be possible to identify gaps in coverage of important research problems, and to adjust existing cruise plans or design the programs of new cruises to fill gaps.

It should be noted that the detailed information provided to this office by the several laboratories and nations varies widely in its detail, particularly with regard to sub-disciplines, frequency and depth of observations, and precise detail on techniques. There is also an almost total absence of identification of the specific scientists who will be carrying out the work.

Several experts in the various disciplines have suggested the following sub-disciplines or techniques which might be emphasized.

BIOLOGICAL OCEANOGRAPHY

Zooplankton - Deep water samples of any kind
Isaacs-Kidd Midwater Trawls
Indian Ocean Standard Net
Other (specify)

BIOLOGICAL OCEANOGRAPHY (Cont'd.)

Pigments
Primary production
Phytoplankton net samples
Benthic sampling
Ichthiology
Experimental Fishing
Microbiology
Other (specify)

GEOLOGY, GEOPHYSICS, BATHYMETRY

Gravity
Magnetics
Deep reflection
Seismic refraction
Cores
Heat Flow
Bottom photography
Dredging
Precision Depth Recording
Other (specify)

PHYSICAL OCEANOGRAPHY

Temperature
Salinity
Bathythermograph
GEK
Transparency
Currents (instrument measurements - specify)
Sound Velocity
Radio-activity sampling
Other (specify)

CHEMISTRY

Oxygen
Nutrient salt analysis
Trace elements
CO_2
C_{14} and other isotopes
pH
H_2S
Other (specify)

METEOROLOGY

Surface Observations
Radiosonde
Radar-wind
Radiation Balance
Wave observation
Other (specify)

Such information must be made available and exchanged at an early date. If it has not already been forwarded for each cruise in this detail to this office or that of the Secretary of the Intergovernmental Oceanographic Commission it should be forwarded at an early date to Dr. Warren S. Wooster, Secretary of IOC, UNESCO, place de Fontenoy, Paris-7, France.

A preliminary sub-disciplinary breakdown of cruise programs may be distributed in the future by this office. However, since this letter is probably the final general and formal communication from me prior to the end of the year, I wish to express my warm appreciation to each National Committee for the high degree of cooperation I have been afforded during the past three years. To my very many good friends genial hosts and associates whom I have been privileged to know around the world during this period, may I extend sincerest good wishes for personal happiness and for success in this important effort - the Expedition.

Most cordially yours,

Robert G. Snider

P.S. After 1 January 1963 my address will be:

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RGS/jas
11162

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30 EAST 40TH STREET · NEW YORK 16, N. Y. · LEXINGTON 2-6533

COORDINATOR
ROBERT G. SNIDER

CABLES
SCORINDOC · NEWYORK

10 November 1962

FROM: Coordinator
TO: Recipients of sets of 16 I.I.O.E. Work Charts and my letter subscripted RGS/jas 11162.

I enclose an appropriate number of sets of the sub-disciplinary breakdowns for each seasonal chart sent earlier. These have been prepared in this office with the most valuable assistance of Dr. Y. Takenouti of the Office of Oceanography, UNESCO and my assistant Miss Janet A. Smith. There are no doubt errors and omissions however. The Expedition looks good on the surface. I think it will be good. However, the character of the information made available by various individuals, laboratories, and nations varies much in its detail and significance.

These twelve sub-disciplinary breakdowns by seasons for the basic three oceanography disciplines of BIOLOGY, PHYSICS AND CHEMISTRY, and GEOLOGY-GEOPHYSICS-BATHYMETRY are based on documents in this office, and notes brought by Dr. Takenouti from Paris in connection with the transfer of responsibility for coordination from me to the Secretary of IOC. We may have misread the available data - no doubt such instances can be discovered. However, the noteworthy discovery is that when available data provided by the primary sources are examined they are often inadequate for analysis to determine the extent, or even the opportunity, for coordination of effort to achieve the optimum results from the Expedition.

There are now available to Expedition scientists, planners, and disciplinary coordinators for SCOR a set of track charts (Completed Cruises and Projected Cruises - H.O. 17,138-B and H.O. 17,138-C); a Summary of Cruise Plans dated 1 April 1962 issued by this office; a set of 16 I.I.O.E. Work Charts distributed to you in early November 1962; a letter of 1 November 1962 urging submission to IOC of detailed information on sub-disciplinary breakdowns of cruises by all participants; and as of 10 November 1962, the list of sub-disciplinary breakdowns by vessels by seasons in each discipline-past, present and projected. These are the tools, drawn from various national, laboratory and individual contributions which this office has made available to you.

Please forward to the Secretary of the Intergovernmental Oceanographic Commission, UNESCO, Paris, and to each of SCOR's disciplinary coordinators (as reported to me on 24 October 1962 by the President of SCOR) - Chemical Oceanography to Dr. Johannes Krey, Institut für Meerskunde der Universität Kiel, Hohenbergstr. 2, Kiel, Germany; Biological Oceanography to Professor L. A. Zenkevitch, Soviet National Committee on Oceanography, Maronovsku Pereulok 26, Room 21, Moscow V-49, U.S.S.R.; Physical Oceanography to Dr. Paul Tchernia, Sous-Directeur, Laboratoire d'Océanographie Physique, Museum National d'Histoire Naturelle, 43, rue Cuvier, Paris-5, France; and Geological and Geophysical Oceanography to Dr. Robert L. Fisher, Scripps Institution of Oceanography, La Jolla, California, U.S.A., the corrections, amplifications and additions to this sub-disciplinary breakdown necessary to provide all nations and laboratories with data for future planning and coordination. Please forward abuse to me.

Meteorology information for shipboard observations is currently inadequate. It is hoped that such information can be forwarded including programs, personnel, etc. to Dr. Colin S. Ramage, Scientific Director for Meteorology, International Indian Ocean Expedition, International Meteorological Center, Colaba Observatory, Bombay-5, India. I trust that he will be able to disseminate this together with his existing fund of information about the shore and island based meteorological program.

Most cordially yours,

R.G. Snider

Robert G. Snider

P.S

In H.O. 17,138-C VITJAZ '62 is shown going north from 35° S just east of 91° E in black. This also appears on each of the appropriate Work Charts (#4, #8 and #12). Information received from the U.S.S.R. after the H.O Charts went to press indicated that this track should be in green rather than in black.

R.G.S.

RGS/jas
enc:

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I.I.O.E. WORK CHART No. 1
BIOLOGICAL OCEANOGRAPHY CRUISES
PAST and PROJECTED
December - February (Red)

L E G E N D

0 - Biology (unspecified)
1 - Phytoplankton net samples
2 - Zooplankton
  a - Deep water samples of any kind
  b - Isaacs-Kidd Midwater Trawls
  c - Indian Ocean Standard Net
  d - Other (specify)
3 - Benthic sampling
4 - Primary production
5 - Ichthyology
6 - Experimental Fishing
7 - Microbiology
8 - Pigments
9 - Other (specify)

AUSTRALIA
DIAMANTINA '60 - Feb. - B-1,2,4,8
DIAMANTINA '61 - Feb. - B-1,2,4,8
DIAMANTINA '62 - Feb. - B-1,2,4,8
GASCOYNE '61 - Feb. - B-1,2,4,8

FED. REP. OF GERMANY
UNK. SHIP '63-64 - B-0

INDIA
KISTNA '62 - Dec. - B-1,2,3,4,5,6
VARUNA '62 - B-1,2,6

JAPAN
KAGOSHIMA-MARU '63-64 - B-0
KOYO-MARU '62-63 - B-1,2a,2c,4,6,9 (eggs, oblique trawling)
KOYO-MARU '63-64 - B-0
UMITAKA-MARU '60-61 - B-1,2,6
UMITAKA-MARU '62-63 - B-0
UMITAKA-MARU '63-64 - B-0

PAKISTAN
ZULFIQUAR '62 - B-1,2,4
ZULFIQUAR '63 - B-1,2,4

PORTUGAL
ALMIRANTE LACERDA '63-64 - B-1,2a,6,8,9 (visual)

REP. OF SOUTH AFRICA
NATAL '62 - B-1,2,9 (visual)
NATAL '63 - B-1,2,4,6

THAILAND
OC. VES. #2 '62-63 - B-1,2,5

U.S.S.R.
VITJAZ '59-60 - B-1,2,3,4,5
VITJAZ '60-61 - B-0
VITJAZ '62 - B-0

UNITED KINGDOM
DISCOVERY '63 - Dec. '63 - Jan. '64 - B-9 (visual)
DISCOVERY '64 - Feb. - B-1,2,4,8,9 (fish eggs, larva, mid-water trawl)

U.S.A.
ANTON BRUUN '63 - B-1,2a,2b,2c,3,4,5,6,8
ANTON BRUUN '64 - B-1,2a,2b,2c,3,4,5,6,8
SERRANO '61 - B-0
SERRANO '63 - B-0
TE VEGA '63 - B-0
VEMA '60 - B-1,2,3,7
ARGO '60 (Track shown only on Charts #9 &#12 - B-1,2a,2b,3,9 (insects)

NOTE:

ARGO '62-63 - in east Bay of Bengal is in error.

RGS/jas
10 Nov. 1962

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I.I.O.E. WORK CHART No. 2
BIOLOGICAL OCEANOGRAPHY CRUISES
PAST and PROJECTED
March - May (Blue)

L E G E N D

0 - Biology (unspecified)
1 - Phytoplankton net samples
2 - Zooplankton
  a - Deep water samples of any kind
  b - Isaacs-Kidd Midwater Trawls
  c - Indian Ocean Standard Net
  d - Other (specify)
3 - Benthic sampling
4 - Primary production
5 - Ichthyology
6 - Experimental Fishing
7 - Microbiology
8 - Pigments
9 - Other (specify)

AUSTRALIA
DIAMANTINA '60 - Mar. - B-1,2,4,8
DIAMANTINA '61 - Mar. - B-1,2,4,8
DIAMANTINA '62 - Mar. - B-1,2,4,8
GASCOYNE '61 - B-1,2,4,8

FRANCE
CALYPSO '63- B-1,2,3,9 (photography)
CDT. ROBERT GIRAUD '61 - B-1,2a

FED. REP. OF GERMANY
UNK. SHIP '63 - B-0

INDIA
KISTNA '63 - B-1,2c,3,4,5,6
VARUNA '62 - B-1,2,6

PAKISTAN
ZULFIQUAR '63 - B-1,2,4

REP. OF SOUTH AFRICA
NATAL '62 - B-1,2,9 (visual)

U.S.S.R.
VITJAZ '60 - B-1,2,3,4,5
VITJAZ '61 - B-0

UNITED KINGDOM

DISCOVERY '63 - B-9 (visual)
DISCOVERY '64 - Mar. - B-1,2,8,9 (visual); Apr. - B-1,2,4,8,9 (fish eggs, larva, mid-water trawl)

U.S.A.

ANTON BRUUN '63 - B-1,2a,2b,2c,2d (surface),3,4,5,6,8
ANTON BRUUN '64 - B-1,2a,2b,2c,2d (surface),3,4,5,6,8
PIONEER '64 - B-0
SERRANO '61 - B-0
TE VEGA '64 - B-0
VEMA '58 - B-0
VEMA '60 - B-1,2,3,7
VEMA & CONRAD '63 - B-1,2,3,7

NOTE:

ANTON BRUUN '64 - along 80°E should be '63

RGS/jas
10 Nov. 1962

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I.I.O.E. WORK CHART No. 3
BIOLOGICAL OCEANOGRAPHY CRUISES
PAST and PROJECTED
June - August (Green)

L E G E N D

0 - Biology (unspecified)
1 - Phytoplankton net samples
2 - Zooplankton
  a - Deep water samples of any kind
  b - Isaacs-Kidd Midwater Trawls
  c - Indian Ocean Standard Net
  d - Other (specify)
3 - Benthic sampling
4 - Primary production
5 - Ichthyology
6 - Experimental Fishing
7 - Microbiology
8 - Pigments
9 - Other (specify)

AUSTRALIA
DIAMANTINA '60 - B-1,2,4,8
DIAMANTINA '61 - B-1,2,4,8
DIAMANTINA '62 - B-1,2c,2d (Clarke-Bumpus Net),4,8
GASCOYNE '62 - B-2c-2d (Clarke-Bumpus Net,3,9 (photography)

INDIA
KISTNA '63 - B-1,2,3,4,5,6
VARUNA '62 - B-1,2,6

INDONESIA
JALANIDHI '63 (unknown season) - B-1,2,3,5

PORTUGAL
ALMIRANTE LACERDA '63-64 - B-1,2a,6,8,9 (visual)

REP. OF SOUTH AFRICA
AFRICANA II '61 - B-1,2,3,4,6
AFRICANA II '62 - B-1,2a,4,6
NATAL '62 - July - B-1,2,9; Aug. - B-1,2,6

U.S.S.R.
VITJAZ '62 - B-0

UNITED KINGDOM

DISCOVERY '63 - Aug. - B-1,2a,2b,2c,4,8,9 (visual);
June-July - B-1,2a,2b,2c,3,4,8,9
(eggs, larva, visual)

U.S.A.

ANTON BRUUN '63 - B-1,2a,2b,2c,3,4,5,6,8
ANTON BRUUN '64 - B-1,2a,2b,2c,3,4,5,6,8
PIONEER '64 - B-0
TE VEGA '64 - B-0
VEMA '58 - B-0
VEMA '62 - B-1,2,3,7

RGS/jas
10 Nov. 1962

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I.I.O.E. WORK CHART No. 4
BIOLOGICAL OCEANOGRAPHY CRUISES
PAST and PROJECTED
September - November (Black)

L E G E N D

0 - Biology (unspecified)
1 - Phytoplankton net samples
2 - Zooplankton
  a - Deep water samples of any kind
  b - Isaacs=Kidd Midwater Trawls
  c - Indian Ocean Standard Net
  d - Other (specify)
3 - Benthic sampling
4 - Primary production
5 - Ichthyology
6 - Experimental Fishing
7 - Microbiology
8 - Pigments
9 - Other (specify)

AUSTRALIA
- DIAMANTINA '59 - B-1,2,4,8
- DIAMANTINA '60 - B-1,2,4,8
- DIAMANTINA '62 - B-1,2b,2c,2d (Clarke-Bumpus Net),4,8
- GASCOYNE '62 - B-2a,2d (Clarke-Bumpus Net),4,8

FED. REP OF GERMANY
- UNK. SHIP '63 - B-0

INDIA
- CONCH '62 - B-2c,3
- KISTNA '62 - B-1,2,3,4,5,6
- VARUNA '62 - B-1,2,6

PAKISTAN
- ZULFIQUAR '62 - B-1,2,4

REP. OF SOUTH AFRICA
- NATAL '62 - B-2,9 (visual)

U.S.S.R.
- VITJAZ '59 - B-1,2,3,4,5
- VITJAZ '60 - B-0
- VITJAZ '62 - B-0

UNITED KINGDOM
DISCOVERY '63 - Sept.-Oct. - B-1,2,4,8,9 (visual); Nov. - B-1,2,8

U.S.A.
ANTON BRUUN '63 - B-1,2a,2b,2c,3,4,5,6,8
ANTON BRUUN '64 - B-1,2a,2b,2c,3,4,5,6,8
SERRANO '61 - B-0
ARGO '60 (Track shown only on Charts #9 & #12) - B-1,2a,2b,3,9

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I.I.O.E. WORK CHART No. 5
PHYSICAL AND CHEMICAL OCEANOGRAPHY CRUISES
PAST and PROJECTED
December - February (Red)

L E G E N D

PHYSICAL OCEANOGRAPHY
- 0 - Physical Oceanography (unspecified)
- 1 - Temperature
- 2 - Salinity
- 3 - GEK
- 4 - Bathythermograph
- 5 - Transparency
- 6 - Currents (instrument measurements - specify)
- 7 - Sound Velocity
- 8 - Radio-activity sampling
- 9 - Other (specify)

CHEMICAL OCEANOGRAPHY
- 0 - Chemical Oceanography (unspecified
- 1 - Oxygen
- 2 - Nutrient salt analysis
- 3 - pH
- 4 - H_2S
- 5 - CO_2
- 6 - Trace elements
- 7 - C_{14} and other isotopes
- 8 - Other (specify)

AUSTRALIA
- DIAMANTINA '60 - P-1,2,4; C-1,2
- DIAMANTINA '61 - P-1,2,4; C-1,2
- DIAMANTINA '62 - P-1,2,4; C-1,2
- GASCOYNE '61 - P-1,2,4; C-1,2

FRANCE
- CALYPSO '62-63 - P-1,2,4,6
- CDT. ROBERT GIRAUD '62-63 - P-1,2,3,4,6

FED. REP. OF GERMANY
- UNK. SHIP '63-64 - P-0; C-0

INDIA
- KISTNA '62 - P-1,2,4,5,6 (surface & subsurface),7; C-1,2,3,5
- VARUNA '62 - P-1,2,6; C-0

JAPAN
- KAGOSHIMA-MARU '63-64 - P-0; C-0
- KOYO-MARU '62-63 - P-1,2,3,4,6; C-1,2
- KOYO-MARU '63-64 - P-0; C-0
- UMITAKA-MARU '60-61 - P-1,2; C-1,2,3
- UMITAKA-MARU '62-63 - P-0; C-0
- UMITAKA-MARU '63-64 - P-0; C-0

PAKISTAN
- ZULFIQUAR '62 - P-1,2,4,5,6; C-1,2,3,4,6,7
- ZULFIQUAR '63 - P-1,2,4,5,6; C-1,2,3,4,6,7

PORTUGAL
- ALMIRANTE LACERDA '63-64 - P-1,2,3,5,6; C-1,2

REP. OF SOUTH AFRICA
- NATAL '63 - Jan. - P-1,2,3,4; C-1,2,7
- NATAL '63 - Feb. - P-1,2,3,4,6; C-1,2

THAILAND
- OC. VES #2 - P-1,2,4,6; C-1

U.S.S.R.
- VITJAZ '59-60 - P-1,2,3,4,5,6; C-1,2,3
- VITJAZ '60-61 - P-0; C-0
- VITJAZ '62 - P-0; C-0

UNITED KINGDOM
- DISCOVERY '63 - P-1,2,6 (direct reading & Swallow Float); C-1,2
- DISCOVERY '64 - P-1,2,3,4,6 (direct reading & Swallow Float); C-1,2,4

U.S.A.
- ANTON BRUUN '63 - P-1,2,4,5; C-1,2,3,4,6
- ANTON BRUUN '64 - P-1,2,4,5; C-1,2,3,4,6
- ARGO '62-63 - (Start 15 Feb. '63) - P-1,2,6; C-1,2
- ATLANTIS II '65 - P-0; C-0
- CHAIN '63-64 - P-0; C-0
- CHAIN '64-65 - P-0; C-0
- REQUISITE '61 - P-0; C-0
- SERRANO '61 - P-0; C-0
- SERRANO '63 - P-0; C-0
- VEMA '60 - P-1,2,4,7; C-1,2,6,7
- ARGO '60 (Track shown only on Charts #9 and #12) - P-1,2,4; C-1,2,6,7

RGS/jas
10 Nov. 1962

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INTERNATIONAL INDIAN OCEAN EXPEDITION
30 EAST 40TH STREET · NEW YORK 16, N. Y. · LEXINGTON 2-6533

COORDINATOR
ROBERT G. SNIDER

CABLES
SCORINDOC · NEWYORK

I.I.O.E. WORK CHART No. 6
PHYSICAL AND CHEMICAL OCEANOGRAPHY CRUISES
PAST and PROJECTED
March - May (Blue)

L E G E N D

PHYSICAL OCEANOGRAPHY
- 0 - Physical Oceanography (unspecified)
- 1 - Temperature
- 2 - Salinity
- 3 - GEK
- 4 - Bathythermograph
- 5 - Transparency
- 6 - Currents (instrument measurements - specify)
- 7 - Sound Velocity
- 8 - Radio-activity sampling
- 9 - Other (specify)

CHEMICAL OCEANOGRAPHY
- 0 - Chemical Oceanography (unspecified)
- 1 - Oxygen
- 2 - Nutrient salt analysis
- 3 - pH
- 4 - H_2S
- 5 - CO_2
- 6 - Trace elements
- 7 - C_{14} and other isotopes
- 8 - Other (specify)

AUSTRALIA
- DIAMANTINA '60 - P-1,2,4; C-1,2
- DIAMANTINA '61 - P-1,2,4; C-1,2
- DIAMANTINA '62 - P-1,2,4; C-1,2
- GASCOYNE '61 - P-1,2,4; C-1,2

FRANCE
- CALYPSO '62-63 - P-1,2,4,6
- CALYPSO '63 - P-1,2,4; C-1,2
- CDT. ROBERT GIRAUD '61 - P-1,2,3,4,6 (surface)

REP. OF GERMANY
- UNK. SHIP '63 - P-0; C-0

INDIA
- KISTNA '63 - P-1,2,4,5,6 (surface & subsurface), 7; C-1,2,3,5
- VARUNA '62 - P-1,2,6; C-0

PAKISTAN
- ZULFIQUAR '63 - P-1,2,4,5,6; C-1,2,3,4,6,7

REP. OF SOUTH AFRICA
NATAL '62 - P-1,2,3,4; C-1,2,3,7

U.S.S.R.
VITJAZ '60 - P-1,2,3,4,5,6; C-1,2,3
VITJAZ '61 - P-0; C-0

UNITED KINGDOM
DISCOVERY '63 - (Start 5/26 - P-1,2,3,4,5,6 (Swallow Float); C-1,2,3,4,6
DISCOVERY '64 - P-1,2,3,4,5,6 (direct reading & Swallow Float); C-1,2,6

U.S.A
ANTON BRUUN '63 - P-1,2,4,5; C-1,2,3,4,6
ANTON BRUUN '64 - P-1,2,4,5; C-1,2,3,4,6
ARGO '63 - P-1,2,6; C-1,2,3,7
ATLANTIS II '65 - P-0; C-0
EASTWIND '61 - P-0; C-0
PIONEER '64 - P-0; C-0
REQUISITE '61 - P-0; C-0
SERRANO '61 - P-0; C-0
VEMA '58 - P-1,2,4; C-1
VEMA '60 - P-1,2,4,7; C-1,2,6,7
VEMA & CONRAD '63 - P-1,2,4,7; C-1,2,6,7

NOTE:

ANTON BRUUN '64 - along 80°E and from Ceylon to Laccadives should be '63.

RGS/jas
10 nov. 1962

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I.I.O.E. WORK CHART No. 7
PHYSICAL AND CHEMICAL OCEANOGRAPHY CRUISES
PAST and PROJECTED
June - August (Green)

L E G E N D

PHYSICAL OCEANOGRAPHY
- 0 - Physical Oceanography (unspecified)
- 1 - Temperature
- 2 - Salinity
- 3 - GEK
- 4 - Bathythermograph
- 5 - Transparency
- 6 - Currents (instrument measurements - specify)
- 7 - Sound Velocity
- 8 - Radio-activity sampling
- 9 - Other (specify)

CHEMICAL OCEANOGRAPHY
- 0 - Chemical Oceanography (unspecified)
- 1 - Oxygen
- 2 - Nutrient salt analysis
- 3 - pH
- 4 - H_2S
- 5 - CO_2
- 6 - Trace elements
- 7 - C_{14} and other isotopes
- 8 - Other (specify)

AUSTRALIA
- DIAMANTINA '60 - P-1,2,4,5; C-1,2
- DIAMANTINA '61 - P-1,2,4,5; C-1,2
- DIAMANTINA '62 - P-1,2,4,5; C-1,2
- GASCOYNE '62 - P-1,2,4; C-1,2

FRANCE
- CDT. ROBERT GIRAUD '60 - P-1,2,3,4,6 (surface)
- CDT. ROBERT GIRAUD '61 - P-1,2,3,4,6 (surface)
- CDT. ROBERT GIRAUD '62 - P-1,2,3,4,6

INDIA
- KISTNA '63 - P-1,2,4,5,6 (surface & subsurface),7; C-1,2,3,5
- VARUNA '62 - P-1,2,6; C-0

INDONESIA
- JALANIDHI '63 (season unknown) - P-1,2,4,6; C-1,2

PORTUGAL
- ALMIRANTE LACERDA '63-64 - P-1,2,3,4,5,6; C-1,2

REP. OF SOUTH AFRICA
AFRICANA II '61 - P-1,2; C-1,2,6
AFRICANA II '62 - P-1,2; C-1,2,6
NATAL '62 - June - P-3; July - P-1,2,3,4; C-1,2; Aug. - P-1,2,3,4,6; C-1,2
QUEEN '62 - P-9 (air-sea energy exchange)

U.S.S.R.
VITJAZ '62 - P-0; C-0

UNITED KINGDOM
DISCOVERY '63 - P-1,2,3,4,5,6 (direct reading & Swallow Float); C-1,2,6

U.S.A.
ANTON BRUUN '63 - P-1,2,4,5; C-1,2,3,4,6
ANTON BRUUN '64 - P-1,2,4,5; C-1,2,3,4,6
ARGO '62 - P-1,2,4,6 (direct reading & Swallow Float); C-1,2,3
ATLANTIS '58 - P-0; C-0
ATLANTIS II '63 - P-0; C-0
PIONEER '64 - P-0; C-0
VEMA '58 - P-1,2,4; C-1
VEMA '62 - P-1,2,4,7; C-1,2,6,7

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10 Nov. 1962

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I.I.O.E. WORK CHART No. 8
PHYSICAL AND CHEMICAL OCEANOGRAPHY CRUISES
PAST and PROJECTED
September - November (Black)

L E G E N D

PHYSICAL OCEANOGRAPHY
- 0 - Physical Oceanography (unspecified)
- 1 - Temperature
- 2 - Salinity
- 3 - GEK
- 4 - Bathythermograph
- 5 - Transparency
- 6 - Currents (instrument measurements - specify)
- 7 - Sound Velocity
- 8 - Radio-activity sampling
- 9 - Other (specify)

CHEMICAL OCEANOGRAPHY
- 0 - Chemical Oceanography (unspecified)
- 1 - Oxygen
- 2 - Nutrient salt analysis
- 3 - pH
- 4 - H_2S
- 5 - CO_2
- 6 - Trace elements
- 7 - C_{14} and other isotopes
- 8 - Other (specify)

AUSTRALIA
- DIAMANTINA '59 - P-1,2,4; C-1,2
- DIAMANTINA '60 - P-1,2,4,5; C-1,2
- DIAMANTINA '62 - P-1,2,4,5; C-1,2
- GASCOYNE '62 - P-1,2,4; C-1,2

FRANCE
- CDT. ROBERT GIRAUD '60 - P-1,2,3,4,6 (surface)
- CDT. ROBERT GIRAUD '62 - P-1,2,3,4,6 (surface)

FED. REP. OF GERMANY
- UNK. SHIP '63-64 - P-0; C-0

INDIA
- CONCH '62 - P-1,2,4,5; C-1
- KISTNA '62 - P-1,2,4,5,6 (surface & subsurface), 7; C-1,2,3,5
- VARUNA '62 - P-1,2,6; C-0

PAKISTAN
- ZULFIQUAR '62 - P-1,2,4,5,6; C-1,2,3,4,6,7

REP. OF SOUTH AFRICA
NATAL '62 - P-1,2,3,4; C-1,2

U.S.S.R.
VITJAZ '59 - P-1,2,3,4,5,6; C-1,2,3
VITJAZ '60 - P-0; C-0
VITJAZ '62 - P-0; C-0

UNITED KINGDOM
DISCOVERY '63 - P-1,2,3,4,5,6 (direct reading & Swallow Float); C-1,2,6

U.S.A.
ANTON BRUUN '63 - P-1,2,4,5; C-1,2,3,4,6
ANTON BRUUN '64 - P-1,2,4,5; C-1,2,3,4,6
ATLANTIS II '63 - P-0; C-0
CHAIN '63-65 - P-0; C-0
SERRANO '61 - P-0; C-0
ARGO '60 (Track shown only on Charts #9 and #12) - P-1,2,4; C-1,2,6,7

RGS/jas
10 Nov. 1962

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I.I.O.E. WORK CHART No. 9
GEOLOGICAL, GEOPHYSICAL AND BATHYMETRIC CRUISES
PAST and PROJECTED

December - February (Red) - Presented by seasons only for simplicity in production

L E G E N D

0 - Geology, Geophysics & Bathymetry (unspecified)
1 - Precision Depth Recording
2 - Cores
3 - Dredging
4 - Gravity
5 - Magnetics
6 - Heat Flow
7 - Seismic refraction
8 - Deep reflection
9 - Bottom photography
10 - Bathymetry
11 - Other (specify)

AUSTRALIA
- DIAMANTINA '60 - GGB-10
- DIAMANTINA '61 - GGB-10
- DIAMANTINA '62 - GGB-10
- GASCOYNE '61 - GGB-10

FRANCE
- CDT. ROBERT GIRAUD '63 - GGB-10

FED. REP. OF GERMANY
- UNK. SHIP '63-64 - GGB-0,10

INDIA
- KISTNA '62 - GGB-2,3,4,5,6,7,10
- VARUNA '62 - GGB-3,10

JAPAN
- KAGOSHIMA-MARU '63-64 - GGB-0
- UMITAKA-MARU '62-63 - GGB-0
- UMITAKA-MARU '63-64 - GGB-0

PAKISTAN
- ZULFIQUAR '62 - GGB-2,10
- ZULFIQUAR '63 - GGB-2,10

THAILAND
- OC. VES. #2 '62-63 - GGB-2,3,10

U.S.S.R.
VITJAZ '59-60 - GGB-2,3,7,10
VITJAZ '60-61 - GGB-0
VITJAZ '62 - GGB-0

UNITED KINGDOM
DALRYMPLE '61-62 - GGB-1,2,5,8
DISCOVERY '63 - GGB-1,4,5
DISCOVERY '64 - GGB-1,4,5
OWEN '61-62 - GGB-1,3,4,5

U.S.A.
ARGO '60 - GGB-1,2,3,4,5,6,7,9
ARGO '61 - GGB-1,2,3,4,5,6,7,9
ARGO '62 - GGB-1,2,3,4,5,6,7,9 (Dec. '62)
ARGO '62-63 - GGB-1,2,3,4,5,6,7,9 (27 Dec. '62 - 15 Feb. '63)
ARGO '63 - GGB-1,4,5 (17 Feb. on)
ATLANTIS II '65 - GGB-1,4,5,8
CHAIN '63-65 - GGB-1,2,3,4,5,6,7,8,9
HORIZON '62 - GGB-1,3,7
REQUISITE '61 - GGB-0
SERRANO '61 - GGB-0
SERRANO '63 - GGB-0
TE VEGA '63 - GGB-0
VEMA '60 - GGB-1,2,3,4,5,6,7,8,9

NOTE:

ARGO '63 - at 45° S, 145° E should be '61.

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10 Nov. 1962

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I.I.O.E. WORK CHART No. 10
GEOLOGICAL, GEOPHYSICAL AND BATHYMETRIC CRUISES
PAST and PROJECTED

March - May (Blue) - Presented by seasons only for simplicity in production

L E G E N D

0 - Geology, Geophysics & Bathymetry (unspecified)
1 - Precision Depth Recording
2 - Cores
3 - Dredging
4 - Gravity
5 - Magnetics
6 - Heat Flow
7 - Seismic refraction
8 - Deep reflection
9 - Bottom photography
10 - Bathymetry
11 - Other (specify)

AUSTRALIA
- DIAMANTINA '60 - GGB-10
- DIAMANTINA '61 - GGB-10
- DIAMANTINA '62 - GGB-10
- GASCOYNE '61 - GGB-10

FRANCE
- CALYPSO '63 - GGB-10
- CDT. ROBERT GIRAUD '63 - GGB-10

FED. REP. OF GERMANY
- UNK. SHIP '63 - GGB-0,10

INDIA
- KISTNA '63 - GGB-2,3,4,5,6,7,10
- VARUNA '62 - GGB-3,10

PAKISTAN
- ZULFIQUAR '63 - GGB-2,10

REP. OF SOUTH AFRICA
- NATAL '62 - April - GGB-2,10; May - GGB-2,3,4,5,7,10

U.S.S.R.
- VITJAZ '60 - GGB-2,3,7,10
- VITJAZ '61 - GGB-0

UNITED KINGDOM
DISCOVERY '63 - GGB-1,2,3,4,5,6,7,9,11 (rock drilling)
DISCOVERY '64 - GGB-1,4,5
OWEN '61-62 - GGB-1,3,4,5
OWEN '63 - GGB-1,3,4,5,7

U.S.A.
ARGO '63 - 15 Feb. - 15 May - GGB-1,4,5,7; 15 May - 1 June GGB-1,4,5
ATLANTIS II '65 - GGB-1,4,5,8
PIONEER '64 - GGB-1,2,3,4,5,9
REQUISITE '60 - GGB-0
REQUISITE '61 - GGB-0
SERRANO '61 - GGB-0
TE VEGA '64 - GGB-0
VEMA '58 - GGB-0,1
VEMA '60 - GGB-1,2,3,4,5,6,7,8,9
VEMA & CONRAD '63 - GGB-1,2,3,4,5,6,7,8,9

NOTE:

ANTON BRUUN '63 - track leaving from below Vizagapatnam to 87° E, 17° N and then to Calcutta should be deleted.

ARGO '62 - near 39°E in Mozambique Channel should be ARGO '63. This correction is also required on H.O. 17,138-C.

RGS/jas
10 Nov. 1962

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I.I.O.E. WORK CHART No. 11
GEOLOGICAL, GEOPHYSICAL AND BATHYMETRIC CRUISES
PAST and PROJECTED
June - August (Green) - Presented by seasons only
for simplicity in production

L E G E N D

0 - Geology, Geophysics & Bathymetry (unspecified)
1 - Precision Depth Recording
2 - Cores
3 - Dredging
4 - Gravity
5 - Magnetics
6 - Heat Flow
7 - Seismic refraction
8 - Deep reflection
9 - Bottom photography
10 - Bathymetry
11 - Other (specify)

AUSTRALIA
- DIAMANTINA '60 - GGB-10
- DIAMANTINA '61 - GGB-10
- DIAMANTINA '62 - GGB-10
- GASCOYNE '62 - GGB-10

FRANCE
- CDT. ROBERT GIRAUD '60 - GGB-10
- CDT. ROBERT GIRAUD '61 - GGB-10
- CDT. ROBERT GIRAUD '62 - GGB-10

INDIA
- KISTNA '63 - GGB-2,3,4,5,6,7,10
- VARUNA '62 - GGB-3,10

INDONESIA
- JALANIDHI '63 - GGB-1,2

PORTUGAL
- ALMIRANTE LACERDA '63-64 - GGB-2,3,10

REP. OF SOUTH AFRICA
- AFRICANA II '62 - GGB-10,11 (bottom drilling)
- NATAL '62 - June - GGB-2,3,4,5,7,10; July - GGB-10; Aug - GGB-4,10

U.S.S.R.
VITJAZ '62 - GGB-0

UNITED KINGDOM
DISCOVERY '63 - GGB-1,4,5

U.S.A.
ARGO '62 - GGB-1,4,5
ARGO '63 - GGB-1,4,5
ATLANTIS '58 - GGB-0
ATLANTIS II '63 - GGB-0
PIONEER '64 - GGB-1,2,3,4,5,9
TE VEGA '64 - GGB-0
VEMA '58 - GGB-0,1
VEMA '62 - GGB-1,2,3,4,5,6,7,8,9

NOTE:

ARGO '62 - from about 39° E, 45° S to Cape Town should be ARGO '63. This correction is also required on H.O. 17,138-C.

RGS/jas
10 Nov. 1962

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COORDINATOR
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CABLES
SCORINDOC · NEWYORK

I.I.O.E. WORK CHART No. 12
GEOLOGICAL, GEOPHYSICAL AND BATHYMETRIC CRUISES
PAST and PROJECTED

September - November (Black) - Presented by seasons only for simplicity in production

L E G E N D

0 - Geology, Geophysics & Bathymetry (unspecified)
1 - Precision Depth Recording
2 - Cores
3 - Dredging
4 - Gravity
5 - Magnetics
6 - Heat Flow
7 - Seismic refraction
8 - Deep reflection
9 - Bottom photography
10 - Bathymetry
11 - Other (specify)

AUSTRALIA
- DIAMANTINA '59 - GGB-10
- DIAMANTINA '60 - GGB-10
- DIAMANTINA '62 - GGB-10
- GASCOYNE '62 - GGB-10

FRANCE
- CDT. ROBERT GIRAUD '60 - GGB-10
- CDT. ROBERT GIRAUD '62 - GGB-10

FED. REP. OF GERMANY
- UNK. SHIP '63 - GGB-0

INDIA
- KISTNA '62 - GGB-2,3,4,5,6,7,10

PAKISTAN
- ZULFIQUAR '62 - GGB-2,10

U.S.S.R
- VITJAZ '59 - GGB-2,3,7,10
- VITJAZ '60 - GGB-0
- VITJAZ '62 - GGB-0

UNITED KINGDOM

DAIRYMPLE '61-62 - GGB-1,2,3,5,8
DISCOVERY '63 - GGB-1,4,5
OWEN '61-62 - GGB-1,3,4,5
OWEN '62 - GGB-1,4,5

U.S.A.

ARGO '60 - GGB-1,2,3,4,5,6,7,9
ARGO '62 - GGB-1,2,3,4,5,6,7,9
ATLANTIS II '63 - GGB-0
CHAIN '63-65 - GGB-1,2,3,4,5,6,7,8,9
HORIZON '62 - GGB-1,3,6,7
SERRANO '61 - GGB-0
TE VEGA '64 - GGB-0

NOTE:

CONCH '62 - along Malabar coast should be deleted.

RGS/jas
10 Nov. 1962