

19. *A new instrument for plankton biomass determination* — V. N. Greze

Greze presented a new instrument that can be conveniently operated for plankton biomass determination. A very attractive feature of the instrument is that it can be conveniently used on board ship.

20. *Methods for studying the productivity of atolls* — S. Z. Qasim

Qasim spoke at length about the study conducted on the productivity of the Laccadives atolls. It was emphasized that such studies are very important for an understanding of tropical marine ecology.

21. *Statistics and Sampling* — G. R. Seth

Talking on the importance of the application of statistical methods in biological sampling, Seth stressed that there should be continuous, systematic and methodical way of taking collections so that various aspects of planktonology could be studied precisely.

22. *Relationship between numbers, displacement volume and wet weight* — R. Stephen & K. Sarala Devi.

Zooplankton collections taken during the International Indian Ocean Expedition were deposited and processed in this Centre. The presence of such a good collection of samples gives one a unique opportunity to study various problems. A study of the volume - weight - number relationship seemed to be an interesting line of investigation.

Fifty archives were selected for this study. Of these, thirty nine samples were collected during cruises of I. N. S. Kistna in 1964 and 1965 and the rest by R. V. Varuna in 1963 (IOBC, 1969). These collections were mainly from around the Indian Peninsula. In addition to this, the wet weight of forty samples collected from the South East Indian ocean by the ships 'Diamantina' and 'Gascoyne' during cruises Dm 2/62, Dm 4/62, and Ga/62 were obtained from cruise reports (CSIRO, Australia, 1962), and their displacement and number of organisms present in these samples were noted during basic sorting. Fresh determinations were made only in the case of the archives.

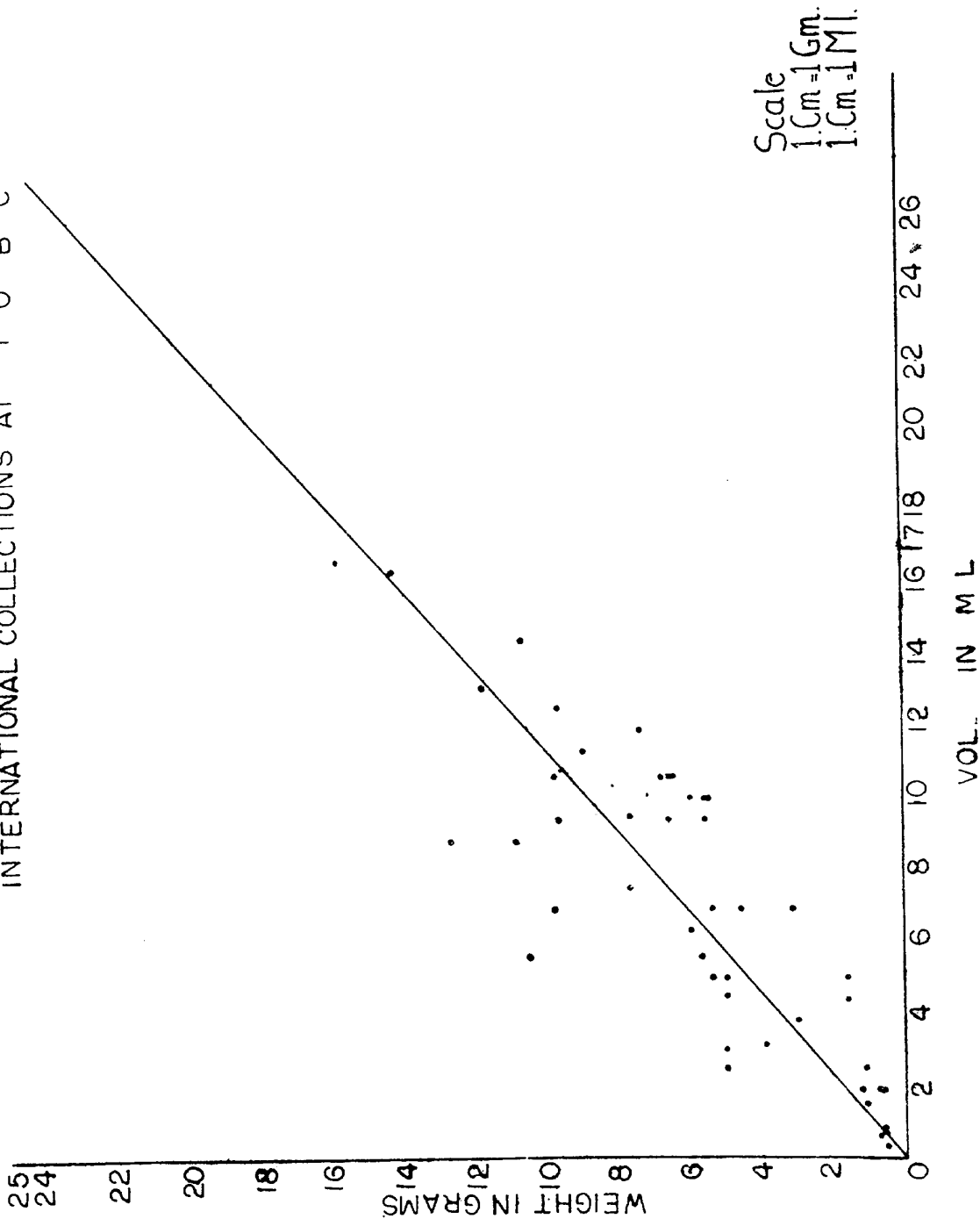
The method adopted was that of Nakai and Honjo (1961) with some modifications. The plankton (archive) was poured into a wire gauze netting of mesh width 200  $\mu$ . The wet weight and the displacement volume of the gauze were determined previously. Moisture adhering to the plankton was removed by placing the gauze containing the plankton on a blotting paper. The catch together with the gauze was weighed in Mettler Multipurpose Balance.

After weighing, the plankton together with the gauze was transferred into a measuring jar. It was believed that this method would make the procedure easier and would prevent the loss of specimens. The displacement of the whole mass was noted.

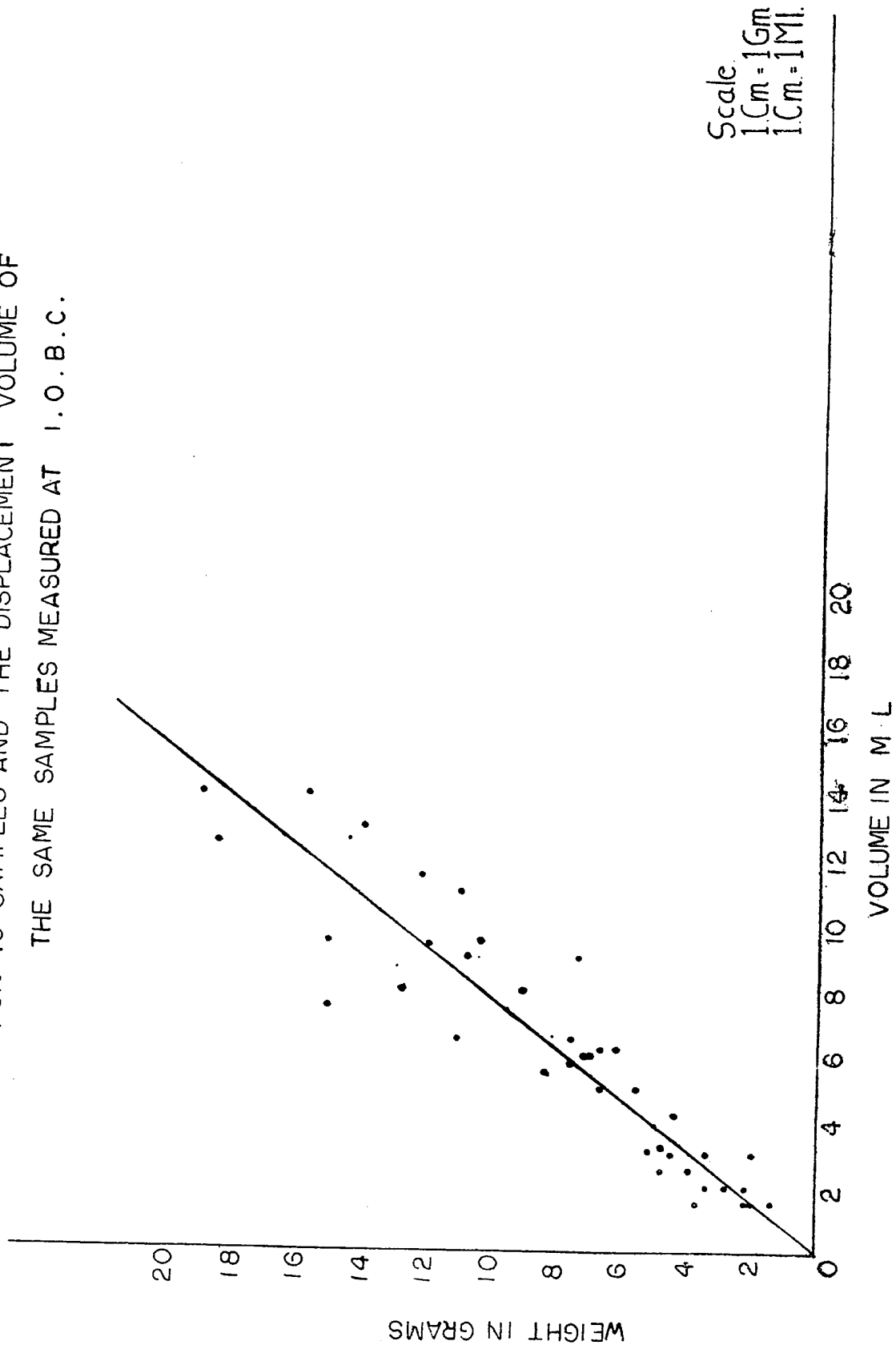
The results of the experiments are given in two tables. Table 1 gives the displacement volume, wet weight and number of organisms in fifty zooplankton archives. Table 2 lists the displacement volume, wet weight and number of organisms in forty Australian samples. Fig 1 shows the displacement volumes and wet weight of the archives plotted against the mean wet weight. In the archive the mean wet weight of 1 ml. of zooplankton ranges from 0.3 g to 2.0 g. The mean wet weight of 1 ml of zooplankton was calculated to be 0.88 g, with standard deviation  $\pm$  0.4. (Fig 1)

RELATION BETWEEN DISPLACEMENT VOLUME AND WET  
WEIGHT OF 50 ZOOPLANKTON ARCHIVES FROM THE  
INTERNATIONAL COLLECTIONS AT I O B C

Fig. 1



RELATION BETWEEN WET WEIGHT RECORDED IN AUSTRALIA  
 FIG. 2 FOR 40 SAMPLES AND THE DISPLACEMENT VOLUME OF  
 THE SAME SAMPLES MEASURED AT I.O.B.C.



In the archives, crustacea contributed almost 70% of the total volume of the plankton. But when the volume, weight and number of organisms were examined for individual samples certain exceptions were found. The lowest value namely 0.3 g/ml was observed in the case of three samples (Ki-560, Ki-662, Ki-717). In these samples medusae, salps and pyrosomes were found in plenty. Nakai (1955) has recorded that the body weight range of these organisms is remarkably wide and their occurrence would greatly affect the weight of the collections. The highest value, 2.0 g/ml was observed in one sample (Ki-543) and about 75% of this sample was contributed by crustacea. The number of organisms present in 1 ml of zooplankton ranges from 800 to 4760. On the average 1 ml of zooplankton contained 2810 organisms (sd  $\pm$  880). Fig 2 shows the values for the Australian samples. The weight/ml for these samples varied from 0.67 to 2.4 g (Fig 2) The mean weight is 1.3 g (sd  $\pm$  0.34). The number of organisms present in 1 ml varied from 370 to 4170. The average number per ml was 2050 (sd  $\pm$  860).

It may be concluded that the mean wet weight per ml for the two sets of samples showed distinct variation. The mean wet weight/ml of the archives is lower than that of the Australian samples. This may be the combined effect of various factors. The archives were weighed four or five years after collection, but the Australian samples a few months after collection. Ahlstrom and Thraillkill (1962) have observed reduction in weight and volume in preserved samples. The difference in the weight/ml in the two sets of samples may be due to the fact that they were collected from two different localities. Nakai (1955) has pointed out that the amount and composition of plankton samples vary from locality to locality and from time to time.

The number of organisms present in 1 ml of archive at IOBC is 2810 which is greater than that present in 1 ml of Australian sample (2050). The difference in this numerical ratio can be attributed to the fact that the large and gelatinous organisms were removed from the archives whereas no such removal has been made in the Australian samples.

TABLE 1. Displacement volume, wet weight, and organisms present in 50 zooplankton archives.

Station No.	Disp. vol. (ml)	Wet weight (g)	Number of Organisms
<i>Ship - Kistna</i>			
Ki-15-363-64	10.6	6.6	19263
367 "	16.3	14.3	63212
368 "	10.6	6.8	22250
Ki-16-407-64	9.4	6.6	21323
Ki-17-432-64	2.5	1.1	5051
439 "	10.6	6.7	39223
440 "	11.9	7.4	20224
441 "	6.9	5.4	16672
442 "	14.4	10.7	59786
443 "	12.5	9.7	34199

Table 1. (Contd)

Station No.	Disp. vol. (ml)	Wet weight (g)	Number of Organisms
Ki-21-541-65	6.3	6.0	17770
543 "	2.5	5.0	5734
550 "	0.6	0.7	1450
553 "	0.3	0.5	551
560 "	1.9	0.6	6508
561 "	1.9	1.2	3341
562 "	4.4	5.0	10370
564 "	6.9	3.1	24912
Ki-22-571-65	10.0	5.6	21856
573 "	7.5	7.7	23078
574 "	3.1	3.9	9480
585 "	10.0	5.6	28476
586 "	13.1	10.8	42468
588 "	5.6	5.7	17970
596 "	8.8	10.9	31994
597 "	10.6	9.8	19680
Ki-25-645-65	9.4	5.6	40275
652 "	1.9	0.6	3140
661 "	5.0	5.4	11223
663 "	10.0	5.9	24580
667 "	10.6	6.5	15707
Ki-26-686-65	13.8	19.2	26383
689 "	3.8	3.0	10199
704 "	25.5	26.0	52305
706 "	9.5	7.7	19376
707 "	3.0	5.0	9245
Ki-27-717-65	5.0	1.6	12480
718 "	5.0	5.0	6175
720 "	6.9	9.8	15156
<i>Ship - Varuna</i>			
Va-30-1770-63	1.9	0.7	4093
1773 "	0.9	0.6	1964
1782 "	0.8	0.6	1399
1787 "	5.6	10.5	7837
1788 "	4.4	1.6	3232
1794 "	11.3	9.0	27773
Va-31-1801-63	8.8	12.7	8220
1803 "	6.9	4.6	16511
1809 "	9.4	5.6	17221
Va-104-2006-63	9.4	9.7	21506
Va-106-2037-63	0.6	0.6	2498

TABLE 2. Displacement volume and number of organisms measured at IOBC compared with wet weight of the same samples previously measured in Australia

Station No.	Disp. Vol. (ml)	Wet weight (g)	Number of organisms
<i>Ship - Diamantina</i>			
Dm-2-46-62	1.5	2.0	5488
48 "	3.0	2.0	2760
49 "	6.0	7.2	6934
61 "	1.5	2.2	4840
64 "	1.5	1.4	6261
66 "	2.0	3.4	6725
67 "	2.0	2.8	6915
68 "	2.0	2.8	3809
86 "	9.0	7.4	19867
87 "	8.0	12.8	25569
88 "	9.5	10.4	18182
89 "	9.0	10.8	22118
90 "	11.0	11.0	19225
91 "	6.5	7.6	11446
92 "	5.0	5.6	10924
93 "	3.1	5.2	5641
94 "	3.0	3.4	677
98 "	3.2	4.8	7718
99 "	2.5	4.8	5757
100 "	2.0	2.2	7398
101 "	5.0	5.6	12374
Dm-4-126-62	5.5	8.4	15511
127 "	2.5	3.9	5451
128 "	14.0	19.0	14350
129 "	1.5	3.7	3120
130 "	9.5	15.2	11629
132 "	5.0	6.7	3937
133 "	7.5	15.2	23238
<i>Ship - Gascoyne</i>			
Ga-4-182-62	3.0	4.5	6466
183 "	6.2	6.2	11310
185 "	11.5	12.2	15953
186 "	6.5	11.1	15084
187 "	13.0	14.1	24731
188 "	6.2	6.7	11952
190 "	4.2	4.4	1212
191 "	12.5	18.5	9812
192 "	8.0	9.1	13491
193 "	9.4	12.0	15914
194 "	6.0	7.6	13834
195 "	14.0	15.7	17353

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### 23. *Distribution of bivalve larvae in the Indian Ocean* — M. Saraswathy.

In view of the paucity of information regarding the distribution of bivalve larvae, it was thought worthwhile to present this information from the Indian Ocean. Specific determination of bivalve larvae collected from the plankton is extremely difficult (Loosanoff *et al* 1966). In this report, the bivalve larvae are considered without any reference to the specific content of the population. Examination of 1548 standard samples showed presence of bivalve larvae in about 50% of the collections.

Figures 1 - 5 show the frequency of sampling and also the quantitative distribution of larvae. In these figures the geographic position of each station is not indicated, but for purposes of comparison, both the number of larvae and stations worked are grouped into 5° intervals. The method adopted for representation is to show by means of solid circles of different sizes, the average numerical value of bivalve larvae present in the area as catch per unit standard haul. The clear circle in the centre of a square denotes a negative result. Areas from where standard samples are not available are left blank. The number in a square represents the number of collections from that particular area.

In Fig. 1 total number of larvae collected is indicated, Figs. 2 and 3 represent the distribution of larvae during night hours (6 P. M. - 6 A. M.) and during day time (6 A. M. - 6 P. M.) respectively. In this division allowance has been given for local variations in the onset of dawn and dusk. In Figs. 4 and 5 the variations in density during the two