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DATE: January 18, 1956

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SUBJECT: ABSTRACT OF DATA FROM RONGELAP ATOLL

SYMBOL: BMBP:GMD

Attached is an abstract and summary that I have made from the report of Dr. Donaldson on the latest survey at Rongelap Atoll.

The external gamma radiation on Rongelap Island is probably by now below 30 mr/week and on Naen Island (the highest) about 300 mr/week or a little greater.

Unfortunately only a minimum of $Sr^{90}$ analysis was made on food samples and none on land soils. A study of the data suggests somewhat a reversal from the previous surveys in that now the plant life (and coconut crab that subsist off the plant life) might constitute a greater source of $Sr^{90}$ than the fish life. Table II would suggest that plant and animal food intake might be permitted on an unlimited consumption except for coconut crab livers and possibly their muscle. However, there is still some uncertainty (in my mind) as to the $Sr^{90}$ content in the fish as briefly discussed under "Fish" in the attached abstract. This does not mean that I think the data invalid but rather that more $Sr^{90}$ analysis needs to be done and cross-checked. (NYOO have duplicate samples but have not started analyzing.)

Dr. Donaldson's report contains many other data, but those given in the attachment represent those of immediate interest.

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TABLE I

External Gamma Radiation on About Nov. 1, 1955
(milliroentgens/week)

| | |
|---|---|
| Rongelap | 30 |
| Labaredj | 185 |
| Naen* (Highest) | 360 |

*Extrapolated from previous data.

## TABLE II

### Strontium-90 Data
(About Nov. 1, 1955)

| | | d/m/gram (wet) | m.p.c.* |
|---|---|---|---|
| RONGELAP | coconut meat | 0 | 0 |
| | pandanus fruit | 3.8 | 2.1 |
| | morinda | 2.2 | 1.2 |
| LABAREDJ | arrowroot corn | 1.3 | 0.7 |
| KABELLE | coconut crab muscle | 13. | 7.2 |
| | " " liver | 144. | 80. |

All others essentially zero $Sr^{90}$ activity, including giant clam muscle and kidney, bonito muscle and liver, grouper muscle and liver, tern muscle.

(5.5 lbs of food a day)

*Based on the assumption that the daily intake is 2500 grams, i.e. the same as water. This is undoubtedly too high and the values ~~might~~ should probably be decreased by a factor of two. Further, the m.p.c. values are based on the concept that the $Sr^{90}$ content in the food supply remains constant.

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## TABLE III

Total Gross Activity (uc/kg-wet)

| Location | Type | Organ | Activity |
|---|---|---|---|
| KABELLE | Invertebrate: | | |
| | Giant Clam | Muscle | 0.053 |
| | " " | Liver | 0.9 |
| | Hermit Crab | Muscle | 0.14 |
| | " " | Liver | 0.32 |
| | Vertebrate: | | |
| | All fish | Muscle | 0.026 |
| | " " | Liver | 1.6 |
| RONGELAP (outside of Kabelle) | Invertebrate: | | |
| | Giant Clam | Muscle | 0.014 |
| | " " | Liver | 1.4 |
| | Hermit Crab | Muscle | 0.093 |
| | " " | Liver | 0.54 |
| | Vertebrate: | | |
| | All fish | Muscle | 0.009 |
| | " " | Liver | 0.6 |

## FISH

Only two samples were found to contain $Sr^{90}$ - as shown in the table. There is always the uncertainty inherent in a zero number, i.e. was the $Sr^{90}$ activity missed. The gross fission product activity for all fish muscle collected near Kabelle was about 60 d/m/gm (wet) and for the remainder of the lagoon about 20 d/m/gm; the liver activities from the fish near Kabelle were about 3,500 d/m/gm and for the remainder of the lagoon 1,330 d/m/gm. It is my understanding that coconut crabs eat land plants which would undoubtedly account for the finding that 3-5% of the activity in their muscle was $Sr^{90}$ and 12% of the activity in their liver was $Sr^{90}$. The lagoon water near Kabelle was about 1.3 d/m/ml of gross activity. On a weight basis, these data would suggest a high concentration of gross activity in the fish muscle and a very high concentration in the fish liver. The radiochemical analysis leaves in doubt what are the principal isotopes present, but the report states " ... non-fission-product radionucleides may account for more than half of the total activity in some fish ...".

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## SOILS

There were wide variances (factors of 10 and more) in soil activity (d/m/g) on any given island. Essentially all of the activity was found in the top three inches, with 65% of this found in the top one inch.

As a rough approximation, the gross activity on Rongelap Island was $2 \times 10^4$ d/m/gram. Unfortunately, $Sr^{90}$ analysis was not made for soils, but was for the lagoon bottom and found to be about 0.7%. A rash extrapolation of 1% $Sr^{90}$ activity for land soils would mean about the equivalent of one $\mu c/ft^2$. This is about 2 to 5 times greater than the amount estimated to result in a body burden of one $\mu c$ of $Sr^{90}$ if this $Sr^{90}$ level were maintained in the soils (no loss through weathering). This factor of 2 - 5 is somewhat higher than suggested by the $Sr^{90}$ found in plant life (Table I).