

any of its fluid impulse to a boundary on which it impinges. What, then, was the force which Gamota and Barmatz measured?

This question now seems to have been answered in a typically lucid fashion by Huggins. He suggests that the force was not due to the momentum impulses of rings striking the diaphragm, but, rather, was caused by the electric field applied during their creation and subsequent motion. The fluid was in a sealed container so that its momentum, and thus the net force acting on it, must have remained zero. The force exerted on the liquid by way of the charged cores of the rings must, therefore, have been balanced by another equal but opposite force, a reaction which could only have been provided by the diaphragm and the chamber walls. It was this force, according to Huggins, which was measured.

He goes on to suggest an ingenious modification to the experiment which could enable these ideas to be verified or contradicted. If the single capacitor were to be replaced by two identical detectors side by side, which could both equally "see" the creation process and subsequent motion of rings in the electric field, then, if Huggins is correct, no change in relative capacitance would be observed as the beam is deflected from one detector to the other. It is much to be hoped that someone will carry out this test in the very near future.

METEOROLOGY

Rain in the Philippines

from a Correspondent

IN July 1972, excessive falls of rain occurred in Luzon Island of the Philippines, covering the region from Manila to Baguio. Both Manila and Baguio reported a monthly total which exceeded the mean annual totals.

In the spring of this year, a Casella Jardi type gauge, which records the instantaneous rate of fall on an autographic chart, was installed by the United

Percentage Frequency of Peak Rates of Rain-fall during Successive Intervals of 15 Min in Baguio, July 1972

Peak rate of fall in an interval of 15 min mm h ⁻¹	Frequency % (2,976 cases)
0-20	23.21
21-40	36.38
41-60	17.60
61-80	7.14
81-100	5.64
101-120	4.00
121-140	2.60
141-160	1.77
161-180	1.09
181-200	0.38
201-220	0.10
221-240	0.06
241-260	0
261-280	0
281-300	0.03

Maximum value 288 mm h⁻¹

Nations Development Programme of the World Meteorological Organization at the weather station in Baguio. This instrument has had very limited use during its period of manufacture, and few analyses of records have been made. The series of charts for July 1972 for Baguio provide a unique set of records for tropical rainfall of high intensity.

During July, 4,774.5 mm of rain fell. The previous highest monthly fall was 3,462.0 mm in August 1919. The table shows the frequency of occurrence of the

peak rates of fall during successive intervals of 15 min, as extracted from the gauge traces. A noteworthy feature is that the frequency of peak falls of 21 to 40 mm h⁻¹ is greater than those of less than 20 mm h⁻¹, which includes all periods of 15 min when no rain fell at all.

It is not possible to assess the length of time during which the peak rates actually took place. The charts suggest very sharp pulses which probably lasted from 10 to 60 s as successive cumulonimbus chimneys passed over the station.

Identification of a Southern Sky Uhuru Source

A POSSIBLE identification of the Uhuru source 2U 0328 -52 with a rich cluster of galaxies extends a pattern which has already become apparent in the northern sky. So far, five out of nineteen northern Uhuru sources with high galactic latitudes have been identified with rich clusters; in next Monday's *Nature Physical Science* (November 13) Guthrie, of the Royal Observatory, Edinburgh, points out that a similar identification is possible for 2U 0328 -52, in the southern sky. The Uhuru team at American Science and Engineering has already suggested the galaxies

IC 1954 and NGC 1249 as possible counterparts to this source, but Guthrie's contour map of the number density of galaxies in the region strongly suggests that neither identification is correct, for the centre of the error box for the source is even more close to a notably rich cluster of galaxies.

The discoveries of extragalactic X-ray sources associated with clusters of galaxies, rather than individual members, may be interpreted as supporting the idea that there is a large amount of intergalactic gas in some clusters at least.

Crustal Plates near Easter Island

BY a combination of good luck and careful planning the first detailed magnetic studies of mid-oceanic ridges were of areas which revealed relatively simple patterns, namely the Reykjanes Ridge to the south of Iceland and the Juan de Fuca Ridge off Vancouver. By contrast, in the region to the north of Iceland at least three spreading ridges have existed in different places during the past 55 million years. Similarly, near the Azores, three ridges intersect to form a triple junction which, in hindsight, now appears simple by comparison with those of the Eastern Pacific near the Galapagos and Easter Island. In these areas, it was originally thought that a "simple" Azores pattern existed and that the divergence of the Pacific-Cocos - Nasca and Pacific - Nasca - Antarctic plates could be understood in terms of it. The magnetic patterns in both areas, however, turned out to be very difficult to reconcile with a simple model, and in the Easter Island region, in particular, the distribution of earthquakes (which mark actively spreading ridges) is also peculiar.

The "non-luck" part of scientific advance comes from painstaking studies of such abnormalities, and much energy and thought, particularly by Ellen Herron and her colleagues at the Lamont-Doherty Geological Observatory, have been devoted to these problematical areas. Her latest ideas on the region around Easter Island are out-

lined in next Monday's issue of *Nature Physical Science* (November 13) and involve the addition of two small plates within the three plate picture of a few months ago. Such detailed analyses can only follow very well planned field work, and the implications of such work go far beyond explaining the evolution of a remote part of the Pacific Ocean.

The rate of formation of new crust along spreading ridges can be defined from the observation of polarity events (brief periods when the geomagnetic field was in the opposite direction and during which the seafloor may only have moved 10 km or so) within the magnetic polarity sequence measured by magnetometers towed some 3 km or so above the igneous rocks of the ocean floor. Obviously the detection of brief events means that the formation of new crust must take place quite locally, yet this would seem to be contradicted by the scale of things required for the differentiation of mantle material to form new crust or by the offsets of the magnetic patterns by several hundred km along transform faults, which suggests that the mechanism is on so large a scale that such offsets are trivial. Although Herron's ideas do not yet answer these problems, they certainly impose precise limits on future considerations of any mechanisms of crust formation and they are also of considerable intrinsic interest.