distribution which (erroneously) is supposed to demonstrate lunar influence.

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[1] Bradley, D. A., *Nature*, **204**, 136 (1964).
[2] Bartels, J., *Nachrichten Akad. Wissenschaft. Goettingen, II Math.-Phys. Kl.*, **23**, 333 (1963).
[3] Bartels, J., and Fanselau, W. W., *Geophys. Inst. Potsdam, Abhandlungen*, **2** (Springer, Berlin, 1938).

A seemingly minor but crucial discrepancy exists between Rudloff's and my distributions of the lunisolar angle on the 269 dates. I used true apparent longitudes of the Moon and Sun at Greenwich noon given by standard ephemerides, rather than cyclical mean values of shortcut-table derivation.

The issue here is whether or not hurricane maturation has had a significant preference for the 3, 4 or 5 days centred on syzygy. My method, using true Moon-minus-Sun values, shows the sharpest demarcation for a 4-day period lying athwart new and full moon. Inasmuch as gravitational or tidal mechanisms are operatively sinusoidal, and in view of the smallness of the number of hurricanes available for study, any analysis of frequencies within lesser divisions of time is quite untenable and self-defeating. The figures used in my graphs are accurate and of course duplicable; they clearly show a significant preference for lunisolar alignment. Faulty though it is for the reason cited, Rudloff's M distribution nevertheless shows a total of 82 events in the three classes centred on syzygy. This incidence is significant at the 5 per cent level.

Another analytical approach to the 269 events is to array them in day classes with respect to the Greenwich civil date of nearest syzygy (although a 'lunar-calendar day' scheme is not to be recommended for exacting research by reason of its innate inefficiencies). This tally, which is easily replicable, shows the following frequencies per single day and in 5 groups of 3 days each:

Days to syzygy	Cases	3-day group
−7	11	
−6	9	35
−5	15	
−4	21	
−3	17	58
−2	20	
−1	25	
0	23	71
+1	23	
+2	14	
+3	16	47
+4	17	
+5	23	
+6	14	58
+7	21	

Application of the χ^2 test for arrays with more than one degree of freedom is risky on numerous technical grounds, though it can be useful as an indicator when the number of classes is small. For the five 3-day totals, $\chi^2 = 13{\cdot}77$ which for $n = 4$ is highly significant ($P < 0{\cdot}01$). As can be seen, the variance is accounted for chiefly by the tendency of hurricanes to mature at or near syzygy and to avoid the days after the Moon's quarter phases.

Fragmentation of already sparse data into monthly divisions is quite unacceptable in the light of a tidal hypothesis, even if the number of cases one has to work with were several times greater, since the three dominant components of tidal action have cycles of combination with large calendar-month variations over periods as short as sixty years. Division of the data into two halves for cross-correlation, such as into odd and even years or odd- and even-numbered Julian Days, is just about the limit the statistical traffic can bear when 269 items are strewn among, say, 5, 8 or 12 categories.

Consider now Rudloff's shaking-test curves, and assume his 'real' distribution M to be correct. Immediately it is clear that the range difference in curves M, $M1$ and $M2$, cannot so easily be dismissed. M's range of a minimum of 15 cases against a maximum of 32, compared with the 18–27 spread in $M1$ and 18–29 in $M2$, would seem to call for tests of the contrast in dispersion. The standard deviations for Rudloff's three curves are 4·86, 2·87 and 3·82, respectively. M compared with $M1$ gives a value of F equal to 2·86, which for 11×11 is significant at the 5 per cent level, yet Rudloff appears to dismiss the very information he claims to be seeking. It seems rather odd that only two shaking tests were made when a great many more are required for the estimation of a reliability measure, but it may be that the value of F for the M to $M2$ comparison (1·62) was considered too insignificant to warrant extending the tests any farther.

Rudloff provides no quantitative information for his 'tests', but it is plain that his graphs corroborate the work that I originally reported. In the light of recent advances and discoveries in the atmospheric sciences, it is scarcely surprising that hurricane activity is found to involve tidal factors. It would be much more surprising if this were not the case.

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GEOCHEMISTRY

Sulphide-sediment Relationships at Mount Isa

This communication summarizes the principal results obtained from a detailed petrological, mineragraphic and chemical study of the concordant type No. 7 lead–zinc orebody, Mount Isa, and the host shales which constitute the Urquhart Formation, usually referred to as the Urquhart shales[1].

The overall mineralogical and textural constitution of the sulphide-bearing sediments is microscopically very similar to the barren sediments situated inside and outside the limits of No. 7 lead–zinc orebody, but I have not found evidence to support the contentions of Blanchard and Hall[2] that hydrothermal replacement of the sediments occurred, accompanied by complete removal of the replaced material from the system.

Using undeformed material, the percentage modal composition was determined for a representative range of single sulphide-free and sulphide-bearing sedimentary layers. The results obtained for the sulphide-bearing sediments were recalculated on a sulphide-free basis to give a range of compositions identical to those for the barren sediments. This would suggest that the lead–zinc ores, at least in No. 7 orebody, can be represented as:

Ore = original sediments + included sulphides

This compositional study has shown that the sediments are essentially composed of variable potash feldspar (microcline) and dolomite mixtures which contain quantitatively unimportant amounts of quartz and muscovite. It is also held that the potash feldspar was formed by potash enrichment of glassy acid volcanic debris, a suggestion based on work on the nature of potash-rich vitric tuffs from the Urquhart shales[3].

The mineralogical similarity of the non-sulphide and sulphide shales (sulphides excluded) has also been demonstrated by comparing bulk chemical compositions of unmineralized and mineralized Urquhart shale. Since the Urquhart shales are very thinly bedded, several hundred feet of drill core taken across the strike should provide a representative bulk chemical composition and for this work 672 ft. of drill core was used.

The non-sulphide constituents of the rocks can be expressed diagrammatically by the following components: (CO_3) = dolomite; $(SiO_2) = SiO_2$ as potash feldspar + free quartz; $(Al_2O_3) = Al_2O_3$ as potash feldspar.