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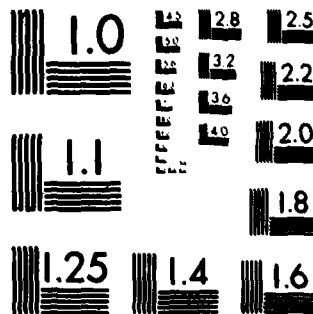
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THE INTER-NATION TENSIO-METER FOR THE PREDICTION OF WAR, (U)  
1977 A G NEWCOMBE, G KOEHLER, M A DUGAN

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THE INTER-NATION TENSIONOMETER FOR THE PREDICTION OF WAR  
by

Alan G. Newcombe, Gernot Koehler and Maire A. Dugan

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INTRODUCTION

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This is the seventh paper in the Tensionometer series; all of these papers have been concerned with the prediction of war or, more accurately, with the development of a tension scale which has a critical value such that, if the value for a nation exceeds that critical value, it then is in a class more likely to go to war in the following five years than if its value is sub-critical. Nations are treated as monads and if they are supra-critical we can not say with which other nation they are likely to become involved in a war; we can only say that they are "nations at risk". We are only concerned with wars in which two or more nations are involved; Raimo Vährynen (1971) has suggested that countries with low Tension Ratios (TRs) were more likely to become involved in civil wars. The last time we looked into this question the number of civil wars was so small that our results were not conclusive but we did note that the civil wars seemed to be fairly evenly distributed between countries with high, medium and low TRs.

Studies on arms races (Richardson, 1960; Smoker, 63-65; Wolfson, 1967) certainly have a great deal of value for illuminating the response and counter-response of an inter-acting dyad but have the severe limitation that the dyad must be known. The other limitation is that the world may not consist of dyads; the weapons which India acquires in order to defend itself against China may be viewed as offensive weapons by the Pakistanis!

All the papers in this series are concerned with all the nations in the world since 1950 (we would love to work on the nations for the decade of the thirties but no data are available). Otterbein (1972) has studied "primitive" societies and has found that, "the higher the degree of military sophistication, the more likely that the political communities of a cultural unit will engage in frequent ... offensive external war." His finding is in agreement with our studies of "civilized" societies.

Alcock (1970) has shown that war correlates with the rate of increase in arms expenditure and it was in attempting to investigate changes in TRs that this paper changed its nature from the time when the original abstract was sent to I.S.A. and today. When the abstract was written we had just finished writing the "Final" book on the Tensionometer. Before the book was printed we began a project to measure changes in the TRs with time to see if they coincided with political events. To our great surprise we found that they coincided most of all with the entry into the system of data from another source. For most of the period 1950-1968 we had obtained GNP data from the United Nations

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*Year Book of National Accounts Statistics, 1957-1968*, Military Expenditure (M.E.) data were from the *SIPRI Yearbook of World Armaments and Disarmament 1968/69* and the Population data were from the *U.N. Demographic Yearbook, 1970*. These three sources did not, however, have information for all nations for all years. Since we wanted as many nations and as many years as possible to be included in our study we had obtained missing data from other, equally reliable, sources, several of them in fact. Each time a new data source entered the system for a country it produced a major change in the T.R. for that country. We have concluded that there is a real need for one such agency, such as SIPRI or ACDA to collect and publish M.E., G.N.P. and Population data for every country for as many years as possible. In the meantime we stripped out the information coming from the supplementary sources for the years 1961, 2 and 1963 and changed for the years 1964 to 1970 to A.C.D.A.s GNP and M.E values while still obtaining data for Population from the U.N. Demographic Yearbook. Incidentally this meant that for the years 1950-1963 we use data in constant 1960 U.S. dollars but for 1964 to 1970 we are using current U.S. dollars. Non incidentally it also meant that we had to scrap several hundred dollars worth of printing plates, but when the book appears later this year it will be worth more.

We can not present in this paper the results which can only be obtained by publishing a book. We have chosen therefore to describe the methodology and the data for 1961 and another year together with the final results for the period 1950-1970.

#### METHODOLOGY

In former publications (Newcombe, *et al.* 1969, 1972, 1972 and 1973) we used GNP and M.E. values. Later (Newcombe, *et al.* 1974 and 1974) we found that GNP/Cap. and M.E./Cap. values gave much better results. and in the paper by Newcombe, Barber, Wert, Haven and Hiebert we reported on two relationships between GNP/Cap. and M.E./Cap., namely, that of a straight line and a hyperbolic one. In the present study we are still calculating both of these relationships and have concluded that the straight line relationship gives the better results.

In Table 1961 A you will find the national indicators that we used together with the rankings of each nation with respect to GNP/Capita (ranking in column G) and M.E./Cap. (ranking in column H). Albania is 15th in M.E./Cap but 40th in GNP/Cap and is, therefore, with respect to other nations an over-spender on M.E./Cap.; this is indicated by the letter "O" in column I. Argentina, on the other hand is 39th in M.E./Cap but 29th in GNP/Cap and is, therefore, with respect to other nations an under-spender on M.E./Cap; this is indicated by the letter "X" in column I. West Germany is 9th on both scales and this is indicated by the \* in column I.

We then plotted M.E./Cap values against GNP/Cap. values for each nation using the letters "O" or "X" according to column I for plotting each nation (\* in the case of West Germany, Sudan, and the USA). We then proceeded to plot the "best" straight line and



DEPARTMENT OF STATE

Washington, D.C. 20520

February 6, 1980

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Edward N. Lundstrom  
Research Documentation Officer  
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the "best" hyperbola which would separate the "Os" from the "Xs" while ignoring the asterisks. A line is considered "best" which:

1. Separates the "Os" from the "Xs" with the least number of wrong countries i.e. "Os" on the side of the line occupied by "Xs" and "Xs" on the side of the line occupied by "Os".
2. If two lines will separate "Os" and "Xs" with the same number of "wrongs" the line is chosen which has the better balance i.e. if two lines each have four "wrongs" but with one line there are 3 Os wrong and 1 X while the second line has 2 Os and 2 Xs wrong the second line would be called the "best" line.
3. Experience has taught us that Italy and German, W. are frequently on the wrong side of the line and they have been, therefore, almost ignored in choosing the "best" line, similarly we have tried to maintain the least change in the equation for the line from year to year and we may choose a "best" line which has more "wrongs" but is closer to the equations obtained for former years. This "averaging through time" technique eliminates changes in TRs due to a line being drawn which is radically different from lines for the previous year.

From the graph we determine the equation for the straight line and the hyperbola and then, for each country, calculate the "theoretical" value of the M.E./Capita. These values are shown in columns K and N of the 1961B table. The actual values of the M.E./Capita are then divided by the theoretical values of the M.E./Capita and multiplied by 100 to produce the TR values shown in columns M and P. In that table we have also calculated the theoretical total Military Expenditure and these values are given in columns L and O. For example, we know from table 1961A that the actual military expenditure was 47,335. millions and columns L and O in table 1961 B tell us that 18,699 (or 17,213.7) of this was due to the GNP contribution.

The tension ratios are arranged in descending order (column T) in Table 1961C. Also in this table are the deadly quarrels which were ongoing in 1961 and a column listing new war involvement in the five years following 1961. At the bottom of the first page is the  $TR_{Crit}$  established for the hyperbolic relationship (a value of 127) the corresponding value for the straight line relationship is 99.0. As you can see from the two pages of table 1961C the new war involvement is all above the critical values.

The critical values for the straight line were established by calculating using the Fisher exact test of significance, the value of P at various levels of T.R. These results are shown in the following Table in which the three most significant levels are marked. For the straight line the best value is at  $TR=99.0$  and the P value says that there is 1 chance in a thousand (or 1227 in a million) that the relationship between the TRs and the occurrence of war in the following five years when the countries are divided into those above and below  $TR=99.0$  is due to chance, i.e. a significance level of about 99.9. Similarly for the hyperbola the most significant level for a  $TR_{Crit}$  value is at  $TR=127$  when the value of P is 471 chances in a million (0.000471) or roughly 5 chances in 10,000 (i.e. 99.99). One question we have not yet resolved is whether there is a real difference between the TR of 127.0 and 103.0 as a critical value for the hyperbola; admittedly the corresponding p values are 0.000471 and 0.001651 but both values are rather good.

We then used the  $TR_{Crit}$  values of 127.0 for the hyperbola and 99.0 for the straight line (we also ran a straight line  $TR_{Crit}$  of 124.0 for comparison) to divide nations for each year into the supra-critical and sub-critical categories. Nations at war were excluded from the count unless they became involved in another war in the following five years (a list of wars is also included in this paper). For both the

supra-critical and the sub-critical nations the percentage of each category which became involved in a war in the following five years was calculated. P values for the distribution of the nations into the four categories of "supracritical" "sub-critical" "becoming involved in war" and "remaining at peace". Also calculated and shown in the Tables are the percentage of supra-critical countries which became involved in war divided by the percentage of sub-critical countries which became involved in war; this ratio is mainly indicated by "Ind." for Indeterminate because one can not divide by zero. We therefore took the sums of the various expressions were calculated for the 10 years 1950-1959 and the ten years consisting of 1960 and 1962-1970, and also for the 20 year period studied.

One conclusion we can immediately arrive at is that the p values for the decades and the 20 year period are rather good and such values are essentially the same. Another somewhat impressive number is that using the straight line relationship and a  $TR_{Crit.}$  of 99.0 we found that 19.1 percent of the over-armed nations became involved in a war in the following five years over the period 1950-1970 whereas only 0.679 % of the under-armed became involved in wars. The ratio of these two percentages is 28.1; we feel that we can sum up the work by saying that in the years 1950 to 1970 (less 1961) the supra-critical nations were 28.1 times more likely to be involved in wars than were the sub-critical nations.

In comparing the critical values of 99.0 and 124.0 for the straight line we note that the W/U column for the critical value of 124. has 11 sub-critical countries involved in a war whereas the corresponding column for the critical value of 99.0 lists only 5 sub-critical nations. The hyperbola has 12 such countries.

The hyperbola shows that the over-armed nations were only 18.6 times more likely to become involved in wars than the sub-critical nations. In view of these results it is very likely that in future we will calculate only straight lines despite the fact that we have been biased towards hyperbolas because they enable us to calculate a TR for every country and pass through the origin which the straight lines do not.

We have not said anything about the mechanism relating supra-critical TR Values and the incidence of war. It may be that a nation decides to wage aggressive war and increases its M.E. for this purpose; this in turn may start an arms race with one of its neighbours. Alternatively it may be that a nation inadvertently becomes supra-critical and then acquires a tougher foreign policy which in turn requires the M.E. to be increased, etc.

#### CONCLUSIONS

The use of GNP/Capita and M.E./Capita data and the assumption of a straight line relationship between these two indicators produces the best values of Tension Ratios. Using the  $TR_{Crit.}$  value of 99.0 divides countries into those likely to become involved in a war in the following five years and those unlikely to become involved in a war in the following five years; the over-armed are 28 times more likely to become involved in war. Since the T.R. indicator post-dicts rather well it is likely that it will also predict just as well.

#### FUTURE WORK

Using the data now available from ACDA (we hope that the U.S. Congress and people appreciate their invaluable work as much as we do.) we will calculate the TRs for 1971, 1972 and 1973 and predict the future (or rather predict which nations are most at risk). This work will be presented, we hope, at one of the regional meetings of the Peace Science Society (International). Readers who will not be present at these meetings may want to look at the last tables in this paper; the tables for 1973 are still slightly tentative since we may adjust the lines slightly (the work has been done in a mad rush in the last few days). The only countries likely to become sub-critical are Kenya, Sweden and perhaps Yugoslavia.

After the book is ready for printing and the 1971-1973 paper is written we

intend to to a regression analysis, using the  $\bar{R}^2$  values, to attempt to measure quantitatively such things as the Richardson Island effect, the alliance relaxation effect (which could also turn out to be a big power paranoia effect), the influence of the number of borders first reported by Richardson and disproven by Rummel, Alcock and especially by Köhler and similar ideas.

We also want to see if we can develop another indicator or scale which would separate the supra-critical nations into a group ready and able to become involved in a war and those certain to become involved in a war. Köhler's method, which predicts war six months in advance on the basis of events data analysis is not long range enough in time for this purpose.

#### REFERENCES

- Alcock, Norman Z. An Empirical Measure of International Threat: Some Preliminary Implications for the Middle East Conflict. *Peace Research Society (International) PAPERS*, XV, 1970 pp51-72.
- Alcock, Norman Z. Prediction of International Violence. *Peace Research*, III, No. 5, p. 6.
- Köhler, Gernot. War, the Nation State Paradigm, and the Imperialism Paradigm: British War Involvements. *Peace Research*. VII, 1, Jan. 1975 pp31-41.
- Köhler, Gernot. Events Research and War/Peace Prediction. *Canadian Peace Research Institute*, 119 Thomas Street, Oakville, Ontario. \$4.00, 1973 236 pp.
- Köhler, Gernot. Events Data and the Prediction of War. in CPREA Papers I. *Peace Research Reviews*. V, No. 4. Feb. 1974. pp54-83.
- Newcombe, Alan G. Towards the Development of an Inter-Nation Tensiometer. *Peace Research Society (International) PAPERS*, XIII, Copenhagen Conference, 1969, pp11-27.
- Newcombe, Alan G.; Barber, John D.; Wert, James; Haven, Mark; and Hiebert, Cathy. An Improved Inter-Nation Tensiometer for the Prediction of War. in CPREA Papers I. *Peace Research Reviews*. V, No. 4. Feb. 1974. pp1-52.
- Newcombe, Alan G.; Newcombe, Nora S.; and Landrus, Gary. The Development of an Inter-Nation Tensiometer. *International Interactions*. I, 1974, pp. 3-18.
- Newcombe, Alan G. and Wert, James. The Prediction of War. *Peace Research Society (International)*, PAPERS, XXI, The Philadelphia Conference, 1972. pp73-83.
- Newcombe, Alan G. and Wert, James. An Inter-Nation Tensiometer for the Prediction of War. *Canadian Peace Research Institute*, 25 Dundas Ave., Dundas, Ontario. 1972, \$4.00, 32 pages + 175 pages of tables + 114 figures.
- Newcombe, Alan G.; Köhler, Gernot and Wert, James. The Prediction of War using an Inter-Nation Tensiometer. I.P.R.A. *Studies in Peace Research* No. 6, IPRA Secretariat, P.O. Box 5052, Majorstua, Oslo 3, Norway. \$10.00
- Newcombe, Alan G.; Köhler, Gernot and Dugan, Maire. The Tensiometer for the Prediction of War: 1950-1970. C.P.R.I., 25 Dundas Ave., Dundas, Ontario. In writing.
- Otterbein, Keith F. Cross-Cultural Studies of Warfare. Paper presented at the International Convocation on Education for Peace, Manhattan College, Bronx, N.Y. Oct. 13-15, 1972.
- Richardson, Lewis F. Statistics of Deadly Quarrels. *Quadrangle Books*, 1960, pp. 176-9.
- Rummel, R.J. Some Empirical Findings on Nations and Their Behaviour. *World Politics*, 1969, pp. 226-241.
- SIPRI Yearbook of World Armaments and Disarmament, 1968/69. *Stockholm International Peace Research Institute*, Almqvist and Wiksell, Stockholm, 1969, 140 pp.
- Smoker, Paul. Rear in the Arms Race: A Mathematical Study. *Journal of Peace Research*, 1964, No. 1, pp. 55-64.
- Smoker, Paul. A Pilot Study of the Present Arms Race. *General Systems Yearbook*, Vol. 8, 1963, pp. 61-76.
- Smoker, Paul. Trade, Defence and the Richardson Theory of Arms Races: A Seven Nation Study. *Journal of Peace Research*, 1965, No. 2, pp. 161-176.



- Smoker, Paul. The Arms Race: A Wave Model. The General Systems Yearbook, Vol. 10, 1965.
- Smoker, Paul. A Mathematical Study of the Arms Race, 1949-64. Paper, International Peace Research Conference, Oslo, Norway, September 1963.
- Smoker, Paul. A Mathematical Study of the Present Arms Race. Peace Research Centre, Lancaster, U.K., June 1963. (Original version April 1961.)
- Smoker, Paul. The Arms Race As an Open and Closed System. Ditto Report, Northwestern University, Evanston, Illinois, July 1964, 24 pp.
- United Nations Demographic Yearbook 1970, 22nd issue, Statistical Office of the United Nations, Department of Economic and Social Affairs, United Nations, New York, 1971.
- United Nations Yearbook of National Accounts Statistics. Department of Economic and Social Affairs, Statistical Office of the United Nations, New York, 1957-1968.
- United States Arms Control and Disarmament Agency, Economics Bureau, World Military Expenditures 1971. Publication No. 65, July 1972. Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Price \$ 1.25. Stock Number 0200-00043.
- Hyrynen, Raimo. Dimensions of International Tension, 1948-1968. Paper, 4th International Peace Research Association Conference, Bled, Yugoslavia. October 22-25, 1971. Reprints from Tampere Peace Research Institute, Tammelanpuistikatu 58 B, 33100 Tampere 10; Finland.
- Wolfson, Murray. A Mathematical Model of the Cold War. Peace Research Society (International) Papers, Vol. IX, 1968, pp. 107-123.

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\*\*\* United States Arms Control and Disarmament Agency, World Military Expenditures and Arms Trade: 1963-1973. Publication No. 74, February, 1975.  
Superintendent of Documents, U.S. Government Printing Office,  
Washington, D.C. 20402. Price \$2.00 Stock Number 0200-00048.

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YEAR- 1961

## TABLE 1961A - NATIONAL INDICATORS

YEAR - 1961

| COUNTRY<br>(A) | POP.<br>x10 <sup>6</sup><br>(B) | GNP<br>1960 U.S. \$ x 10 <sup>6</sup><br>(C) | M.E.<br>\$ x 10 <sup>6</sup><br>(D) | GNP/Cap.<br>(E) | M.E./Cap.<br>(F) | n=73<br>Ranks of<br>"E" "F" |     | Rank<br>Discrepancy<br>(I) |
|----------------|---------------------------------|----------------------------------------------|-------------------------------------|-----------------|------------------|-----------------------------|-----|----------------------------|
|                |                                 |                                              |                                     |                 |                  | (G)                         | (H) |                            |
| Albania        | 1.66                            | 462.                                         | 70.                                 | 278.31          | 42.17            | 40                          | 15  | 0                          |
| Argentina      | 21.20                           | 11660.                                       | 299.                                | 550.00          | 14.10            | 29                          | 39  | X                          |
| Australia      | 10.55                           | 16052.                                       | 425.                                | 1521.52         | 40.28            | 7                           | 16  | X                          |
| Austria        | 7.09                            | 6668.                                        | 71.                                 | 940.48          | 10.01            | 20                          | 43  | X                          |
| Belgium        | 9.18                            | 12115.                                       | 391.                                | 1319.72         | 42.59            | 15                          | 14  | 0                          |
| Bolivia        | 3.92                            | 387.                                         | 5.9                                 | 98.72           | 1.51             | 67                          | 70  | X                          |
| Brazil         | 71.87                           | 14086.                                       | 278.                                | 195.99          | 3.86             | 54                          | 59  | X                          |
| Bulgaria       | 7.94                            | 4756.                                        | 186.                                | 598.99          | 23.43            | 27                          | 24  | 0                          |
| Burma          | 22.78                           | 1466.                                        | 82.9                                | 64.36           | 3.64             | 72                          | 61  | 0                          |
| Canada         | 18.27                           | 37261.                                       | 1708.                               | 2039.46         | 93.48            | 2                           | 3   | X                          |
| Ceylon         | 10.13                           | 1380.                                        | 15.2                                | 136.23          | 1.50             | 62                          | 71  | X                          |
| China          | 647.21                          | 68100.                                       | 3300.                               | 105.22          | 5.10             | 65                          | 53  | 0                          |
| Chile          | 7.89                            | 4079.                                        | 117.                                | 516.98          | 14.83            | 33                          | 37  | X                          |
| Columbia       | 15.91                           | 4116.                                        | 67.8                                | 258.71          | 4.26             | 43                          | 55  | X                          |
| Costa Rica     | 1.30                            | 1200.                                        | 5.6                                 | 923.08          | 4.31             | 22                          | 54  | X                          |
| Czechoslovakia | 13.78                           | 20736.                                       | 1125.                               | 1504.79         | 81.64            | 8                           | 6   | 0                          |
| Denmark        | 4.61                            | 6335.                                        | 164.                                | 1374.19         | 35.57            | 12                          | 17  | X                          |
| Dominican R.   | 3.15                            | 737.                                         | 34.4                                | 233.97          | 10.92            | 44                          | 41  | 0                          |
| Ecuador        | 4.50                            | 918.                                         | 27.7                                | 204.00          | 6.16             | 51                          | 48  | 0                          |
| El Salvador    | 2.53                            | 584.                                         | 6.3                                 | 230.83          | 2.49             | 45                          | 64  | X                          |
| Ethiopia       | 21.16                           | 975.0                                        | 32.7                                | 46.08           | 1.54             | 73                          | 69  | 0                          |
| Finland        | 4.47                            | 5379.                                        | 96.0                                | 1203.36         | 21.48            | 17                          | 25  | X                          |
| France         | 46.16                           | 62392.                                       | 3876.                               | 1351.65         | 83.97            | 13                          | 5   | 0                          |
| Germany, E.    | 16.06                           | 22148                                        | 710.                                | 1379.08         | 44.21            | 11                          | 13  | X                          |
| Germany, W.    | 54.03                           | 76307.                                       | 3082.                               | 1412.31         | 57.04            | 9                           | 9   | *                          |
| Ghana          | 6.96                            | 948.                                         | 20.6                                | 136.21          | 2.96             | 63                          | 62  | 0                          |
| Greece         | 8.40                            | 3927.                                        | 220.                                | 467.50          | 26.19            | 34                          | 22  | 0                          |
| Guatemala      | 3.98                            | 1076.                                        | 10.3                                | 270.35          | 2.59             | 41                          | 63  | X                          |
| Honduras       | 1.91                            | 388.                                         | 8.1                                 | 203.14          | 4.24             | 52                          | 56  | X                          |
| Hungary        | 10.03                           | 9269.                                        | 204.                                | 924.13          | 20.34            | 21                          | 27  | X                          |
| India          | 439.00                          | 32155.                                       | 625.0                               | 73.25           | 1.42             | 71                          | 72  | X                          |
| Indonesia      | 95.57                           | 8528.                                        | 554.                                | 89.23           | 5.80             | 69                          | 50  | 0                          |
| Iran           | 22.13                           | 4260.                                        | 227.                                | 192.50          | 10.26            | 55                          | 42  | 0                          |
| Iraq           | 7.10                            | 1535.                                        | 124.                                | 216.20          | 17.46            | 48                          | 34  | 0                          |
| Ireland        | 2.82                            | 1945.                                        | 27.                                 | 689.72          | 9.57             | 26                          | 44  | X                          |
| Israel         | 2.19                            | 2829.                                        | 163.                                | 1291.78         | 74.43            | 16                          | 8   | 0                          |

YEAR=1961 cont.

TABLE 1961A - NATIONAL INDICATORS cont. n=73

| COUNTRY     | POP.<br>x10 <sup>6</sup> | GNP<br>1960 U.S. \$ | M.E.<br>x 10 <sup>6</sup> | GNP/Cap. | M.E./Cap. | Ranks of<br>"E" & "P" |     | Rank<br>Discrepancy. |
|-------------|--------------------------|---------------------|---------------------------|----------|-----------|-----------------------|-----|----------------------|
| (A)         | (B)                      | (C)                 | (D)                       | (E)      | (F)       | (G)                   | (H) | (I)                  |
| Italy       | 49.90                    | 38331.              | 1182.                     | 768.15   | 23.69     | 25                    | 23  | 0                    |
| Japan       | 94.06                    | 50705.              | 582.                      | 539.07   | 6.19      | 30                    | 47  | x                    |
| Jordan      | 1.72                     | 351.                | 56.3                      | 204.07   | 32.73     | 50                    | 19  | 0                    |
| Korea-S.    | 25.40                    | 4210.               | 445.                      | 165.75   | 17.52     | 57                    | 33  | 0                    |
| Luxemburg   | 0.32                     | 524.                | 6.                        | 1637.5   | 18.75     | 5                     | 32  | x                    |
| Malaysia    | 7.14                     | 1928.               | 48.1                      | 270.03   | 6.74      | 42                    | 46  | x                    |
| Mauritius   | 0.68                     | 152.                | 0.2                       | 223.53   | 0.29      | 46                    | 73  | x                    |
| Mexico      | 37.27                    | 12989.              | 88.1                      | 348.51   | 2.36      | 38                    | 65  | x                    |
| Mongolia    | 0.98                     | 372.                | 15.                       | 379.59   | 15.31     | 36                    | 35  | 0                    |
| Morocco     | 12.03                    | 1765.               | 73.7                      | 146.72   | 6.13      | 61                    | 49  | 0                    |
| Netherlands | 11.64                    | 12014.              | 534.                      | 1032.13  | 45.88     | 19                    | 10  | 0                    |
| New Zealand | 2.42                     | 3751.               | 73.                       | 1550.00  | 30.17     | 6                     | 21  | x                    |
| Norway      | 3.61                     | 4812.               | 161.                      | 1332.96  | 44.60     | 14                    | 12  | 0                    |
| Pakistan    | 102.77                   | 7962.               | 203.                      | 77.47    | 1.98      | 70                    | 67  | 0                    |
| Philippines | 28.31                    | 6304.               | 117.                      | 222.68   | 4.13      | 47                    | 57  | x                    |
| Poland      | 29.97                    | 23495.              | 1062.                     | 783.95   | 35.44     | 24                    | 18  | 0                    |
| Portugal    | 8.89                     | 2635.               | 168.                      | 296.4    | 18.90     | 39                    | 31  | 0                    |
| Rhodesia    | 10.57                    | 1369.               | 22.3                      | 129.52   | 2.11      | 64                    | 66  | x                    |
| Rumania     | 18.57                    | 9875.               | 395.                      | 531.77   | 21.27     | 31                    | 26  | 0                    |
| S. Africa   | 16.28                    | 7442.               | 89.5                      | 457.13   | 5.50      | 35                    | 52  | x                    |
| Spain       | 30.56                    | 11560.              | 114.                      | 378.27   | 3.73      | 37                    | 60  | x                    |
| Sudan       | 12.20                    | 1185.               | 21.1                      | 97.13    | 1.73      | 68                    | 68  | *                    |
| Sweden      | 7.52                     | 13924.              | 587.                      | 1851.60  | 78.06     | 3                     | 7   | x                    |
| Switzerland | 5.50                     | 9464.               | 250.0                     | 1720.73  | 45.46     | 4                     | 11  | x                    |
| Syria       | 4.69                     | 792.                | 71.6                      | 168.87   | 15.27     | 56                    | 36  | 0                    |
| Thailand    | 27.21                    | 2798.               | 107.0                     | 102.83   | 3.93      | 66                    | 58  | 0                    |
| Taiwan      | 10.97                    | 1625.               | 339.                      | 148.13   | 30.90     | 60                    | 20  | 0                    |
| Tunisia     | 3.89                     | 838.                | 22.3                      | 215.42   | 5.73      | 49                    | 51  | x                    |
| Turkey      | 28.24                    | 5710.               | 415.                      | 202.20   | 14.70     | 53                    | 38  | 0                    |
| U.A.R.      | 26.58                    | 4266.               | 341.                      | 160.50   | 12.83     | 58                    | 40  | 0                    |
| U.K.        | 52.81                    | 74495.              | 4628.0                    | 1410.62  | 87.64     | 10                    | 4   | 0                    |
| Uruguay     | 2.58                     | 1371.               | 18.4                      | 531.40   | 7.13      | 32                    | 45  | x                    |
| U.S.A.      | 183.76                   | 523370.             | 47335.0                   | 2848.12  | 257.59    | 1                     | 1   | *                    |
| U.S.S.R.    | 218.15                   | 237371.             | 27619.0                   | 1088.11  | 126.61    | 18                    | 2   | 0                    |
| Venezuela   | 7.61                     | 6997.               | 152.0                     | 919.45   | 19.97     | 23                    | 28  | x                    |
| Vietnam-S.  | 14.49                    | 2282.               | 279.0                     | 157.49   | 19.26     | 59                    | 30  | 0                    |
| Yugoslavia  | 18.61                    | 10557.              | 365.0                     | 567.28   | 19.61     | 28                    | 29  | x                    |

YEAR = 1961

## TABLE 1961B - DERIVED DATA

YEAR = 1961

M.E./Cap numbers are  
in 1960 U.S. \$M.E. Total Th. numbers are in  
millions of 1960 U.S. \$.

| COUNTRY<br>(A) | BEST STRAIGHT LINE |                  |              | BEST HYPERBOLA   |                  |              |
|----------------|--------------------|------------------|--------------|------------------|------------------|--------------|
|                | M.E./Cap.<br>(K)   | Total Th.<br>(L) | T.R..<br>(M) | M.E./Cap.<br>(N) | Total Th.<br>(O) | T.R..<br>(P) |
| Albania        | 8.84               | 14.7             | 477.1        | 7.44             | 12.4             | 566.7        |
| Argentina      | 18.66              | 395.7            | 75.6         | 16.46            | 349.0            | 85.7         |
| Australia      | 53.79              | 567.5            | 74.9         | 49.06            | 517.6            | 82.1         |
| Austria        | 32.78              | 232.4            | 30.5         | 29.55            | 209.5            | 33.9         |
| Belgium        | 46.50              | 426.8            | 91.6W        | 42.28            | 388.2            | 100.7        |
| Bolivia        | 2.35               | 9.2              | 64.2         | 1.80             | 7.0              | 83.7         |
| Brazil         | 5.86               | 421.3            | 66.0         | 4.77             | 342.9            | 81.1         |
| Bulgaria       | 20.43              | 162.3            | 114.6        | 18.10            | 143.7            | 129.4        |
| Burma          | 1.10               | 25.1             | 330.1        | 0.90             | 20.4             | 406.4        |
| Canada         | 72.52              | 1325.0           | 128.9W       | 66.48            | 1214.6           | 140.6W       |
| Ceylon         | 3.70               | 37.5             | 40.5         | 2.90             | 29.4             | 51.7         |
| China          | 2.58               | 1669.8           | 197.6        | 1.98             | 1282.9           | 257.2        |
| Chile          | 17.47              | 137.8            | 84.9         | 15.36            | 121.2            | 96.6         |
| Colombia       | 8.13               | 129.3            | 52.4         | 6.80             | 108.2            | 62.7         |
| Costa Rica     | 32.15              | 41.8             | 13.4         | 28.96            | 37.6             | 14.9         |
| Czechoslovakia | 53.19              | 732.9            | 153.5        | 48.50            | 668.4            | 168.3        |
| Denmark        | 48.47              | 223.4            | 73.4         | 44.11            | 203.4            | 80.6         |
| Domin. Rep.    | 7.24               | 22.8             | 150.9        | 6.00             | 18.9             | 182.2        |
| Ecuador        | 6.15               | 27.7             | 100.1        | 5.03             | 22.6             | 122.4        |
| El Salvador    | 7.12               | 18.0             | 35.0         | 5.89             | 14.9             | 42.3         |
| Ethiopia       | 0.44               | 9.3              | 350.1        | 0.50             | 10.5             | 311.1        |
| Finland        | 42.29              | 189.0            | 50.8         | 38.37            | 171.5            | 56.0         |
| France         | 47.65              | 2199.5           | 176.2        | 43.36            | 2001.3           | 193.7        |
| Germany-E.     | 48.64              | 781.2            | 90.9         | 44.28            | 711.1            | 99.8         |
| Germany-W.     | 49.84              | 2693.1           | 114.4        | 45.39            | 2452.7           | 125.7        |
| Ghana          | 3.70               | 25.8             | 80.0W        | 2.90             | 20.2             | 102.1        |
| Greece         | 15.68              | 131.7            | 167.0        | 13.71            | 115.1            | 191.1        |
| Guatemala      | 8.55               | 34.0             | 30.3         | 7.18             | 28.6             | 36.0         |
| Honduras       | 6.12               | 11.7             | 69.3         | 5.00             | 9.6              | 84.8         |
| Hungary        | 32.19              | 322.9            | 63.2         | 29.00            | 290.8            | 70.1         |
| India          | 1.42               | 625.0            | 100.0        | 1.11             | 488.8            | 127.9W       |
| Indonesia      | 2.00               | 191.3            | 289.6        | 1.53             | 146.6            | 377.8        |
| Iran           | 5.74               | 126.9            | 178.8        | 4.66             | 103.1            | 220.1        |

YEAR = 1961

## TABLE 1961B - DERIVED DATA

YEAR = 1961

M.E./Cap numbers are  
in 1960 U.S. \$M.E. Total numbers are in  
Th.  
millions of 1960 U.S. \$COUNTRYBEST STRAIGHT LINEBEST HYPERBOLA

| <u>(A)</u>  | M.E./Cap.<br>(K) | Th<br>M.E. Total<br>(L) | T.R.<br>(M) | M.E./Cap.<br>(N) | Th<br>M.E. Total<br>(O) | T.R.<br>(P) |
|-------------|------------------|-------------------------|-------------|------------------|-------------------------|-------------|
| Iraq        | 6.59             | 46.8                    | 264.9       | 5.42             | 38.5                    | 322.2       |
| Ireland     | 23.72            | 66.9                    | 40.4        | 21.14            | 59.6                    | 45.3        |
| Israel      | 45.49            | 99.6                    | 163.6       | 41.34            | 90.5                    | 180.0       |
| Italy       | 26.55            | 1324.9                  | 89.2W       | 23.76            | 1185.8                  | 99.7W       |
| Japan       | 18.27            | 1718.3                  | 33.9        | 16.10            | 1513.9                  | 38.4        |
| Jordan      | 6.15             | 10.6                    | 531.9       | 5.03             | 8.7                     | 650.7       |
| Korea-S.    | 4.77             | 121.1                   | 367.4       | 3.81             | 96.9                    | 459.4       |
| Luxemburg   | 57.99            | 18.6                    | 32.3        | 52.96            | 16.9                    | 35.4        |
| Malaysia    | 8.54             | 61.0                    | 78.9        | 7.17             | 51.2                    | 94.0        |
| Mauritius   | 6.86             | 4.7                     | 4.3         | 5.66             | 3.8                     | 5.2         |
| Mexico      | 11.38            | 424.0                   | 20.8        | 9.75             | 363.5                   | 24.2        |
| Mongolia    | 12.50            | 12.3                    | 122.4       | 10.78            | 10.6                    | 141.9       |
| Morocco     | 4.08             | 49.1                    | 150.1       | 3.22             | 38.8                    | 190.1       |
| Netherlands | 36.10            | 420.2                   | 127.1       | 32.62            | 379.7                   | 140.6       |
| New Zealand | 54.82            | 132.7                   | 55.0        | 50.02            | 121.1                   | 60.3        |
| Norway      | 46.97            | 169.6                   | 94.9W       | 42.73            | 154.2                   | 104.4       |
| Pakistan    | 1.58             | 162.0                   | 125.3       | 1.22             | 125.5                   | 161.7       |
| Philippines | 6.83             | 193.3                   | 60.5        | 5.63             | 159.4                   | 73.4        |
| Poland      | 27.12            | 812.9                   | 130.6       | 24.29            | 728.1                   | 145.9       |
| Portugal    | 9.49             | 84.4                    | 199.1       | 8.04             | 71.4                    | 235.2       |
| Rhodesia    | 3.46             | 36.6                    | 61.0        | 2.70             | 28.5                    | 78.2        |
| Rumania     | 18.00            | 334.3                   | 118.1       | 15.85            | 294.4                   | 134.2       |
| S. Africa   | 15.30            | 249.2                   | 35.9        | 13.36            | 217.5                   | 41.1        |
| Spain       | 12.45            | 380.6                   | 30.0        | 10.74            | 328.2                   | 34.7        |
| Sudan       | 2.29             | 27.9                    | 75.6        | 1.75             | 21.4                    | 98.7        |
| Sweden      | 65.73            | 494.3                   | 118.8W      | 60.16            | 452.4                   | 129.7W      |
| Switzerland | 61.00            | 335.5                   | 74.5        | 55.76            | 306.7                   | 81.5        |
| Syria       | 4.88             | 22.9                    | 312.7       | 3.91             | 18.3                    | 390.3       |
| Thailand    | 2.49             | 67.8                    | 157.7       | 1.91             | 52.1                    | 205.5       |
| Taiwan      | 4.13             | 45.3                    | 748.0       | 3.27             | 35.8                    | 946.3       |
| Tunisia     | 6.56             | 25.5                    | 87.3        | 5.40             | 21.0                    | 106.2W      |
| Turkey      | 6.09             | 171.9                   | 241.4       | 4.97             | 140.4                   | 295.7       |
| U.A.R.      | 4.58             | 121.7                   | 280.2       | 3.65             | 97.0                    | 351.5       |

YEAR = 1961

## TABLE 1961B - DERIVED DATA

YEAR = 1961

M.E./Cap numbers are  
in 1960 U.S. \$M.E. Total numbers are in  
Th. millions of 1960 U.S. \$COUNTRYBEST STRAIGHT LINEBEST HYPERBOLA

|            | M.E./Cap.<br>Th | M.E. Total<br>Th | T.R.   |       | M.E./Cap.<br>Th | M.E. Total<br>Th | T.R. |
|------------|-----------------|------------------|--------|-------|-----------------|------------------|------|
| (A)        | (K)             | (L)              | (M)    | (N)   | (O)             | (P)              |      |
| U.S.       | 49.78           | 2629.0           | 176.0  | 45.34 | 2394.3          | 193.3            |      |
| Uruguay    | 17.99           | 46.4             | 19.6   | 15.84 | 40.9            | 45.0             |      |
| U.S.A.     | 101.76          | 18699.8          | 253.1  | 93.67 | 17213.7         | 275.0            |      |
| U.S.C.R.   | 38.12           | 8316.1           | 332.1  | 34.50 | 7526.6          | 367.0            |      |
| Venezuela  | 32.02           | 243.7            | 62.4   | 28.84 | 219.5           | 69.3             |      |
| Vietnam-S. | 4.47            | 64.8             | 430.8  | 3.56  | 51.5            | 541.5            |      |
| Yugoslavia | 19.29           | 358.9            | 101.7W | 17.04 | 317.1           | 115.1W           |      |

TABLE 1961C-TENSION RATIOS

YEAR=1961

(in descending order, Column T)

| COUNTRY<br>(A) | TENSION RATIOS          |                        | DEADLY QUARRELS         |                                         |
|----------------|-------------------------|------------------------|-------------------------|-----------------------------------------|
|                | Straight<br>Line<br>(S) | Hyper-<br>bola.<br>(T) | At War<br>War Began in: | New War<br>Involvement<br>in 1962-1966. |
| Taiwan         | 748.0                   | 946.3                  |                         |                                         |
| Jordan         | 531.9                   | 650.7                  |                         |                                         |
| Albania        | 477.1                   | 566.7                  |                         |                                         |
| Vietnam, S.    | 430.8                   | 541.5                  | 1959                    |                                         |
| Yemen, S.      | 367.4                   | 459.4                  |                         | 1962                                    |
| Burma          | 330.1                   | 406.4                  |                         |                                         |
| Syria          | 312.7                   | 390.3                  |                         |                                         |
| Indonesia      | 289.6                   | 377.8                  |                         |                                         |
| USSR           | 332.1                   | 367.0                  |                         |                                         |
| UAR            | 280.2                   | 351.5                  |                         | 1962                                    |
| Iraq           | 264.9                   | 322.2                  |                         |                                         |
| Ethiopia       | 350.1                   | 311.1                  | 1960                    |                                         |
| Turkey         | 241.4                   | 295.7                  |                         |                                         |
| USA            | 253.1                   | 275.0                  | 1959                    | 1965                                    |
| China          | 197.6                   | 257.2                  |                         | 1962                                    |
| Portugal       | 199.1                   | 235.2                  | 1960                    | 1963, 1965                              |
| Iran           | 178.8                   | 220.1                  |                         |                                         |
| Thailand       | 157.7                   | 205.5                  |                         |                                         |
| France         | 176.2                   | 193.7                  | 1954, 1955, 1961        |                                         |
| U.K.           | 176.0                   | 193.3                  | 1955                    | 1963                                    |
| Greece         | 167.0                   | 191.1                  |                         |                                         |
| Morocco        | 150.1                   | 190.1                  |                         |                                         |
| Dominican R.   | 150.9                   | 182.2                  |                         | 1965                                    |
| Israel         | 163.6                   | 180.0                  |                         |                                         |
| Czechoslovakia | 153.5                   | 168.3                  |                         |                                         |
| Pakistan       | 125.3                   | 161.7                  |                         | 1965                                    |
| Poland         | 130.6                   | 145.9                  |                         |                                         |
| Mongolia       | 122.4                   | 141.0                  |                         |                                         |
| Netherlands    | 127.1                   | 140.6                  |                         |                                         |
| Canada         | 128.9                   | 140.6                  |                         |                                         |
| Rumania        | 118.1                   | 134.2                  |                         |                                         |
| Sweden         | 118.8                   | 129.7                  |                         |                                         |
| Bulgaria       | 114.6                   | 129.4                  |                         |                                         |
| India          | 100.0                   | 127.9                  | TR Critical             | 1962, 1965 Hyperbolic =127              |

YEAR = 1961

## TABLE 1961C-TENSION RATIOS

YEAR=1961

(in descending order, Column T)

| COUNTRY       | TENSION RATIOS       |                   | DEADLY QUARRELS                      |                                         |
|---------------|----------------------|-------------------|--------------------------------------|-----------------------------------------|
|               | Straight Line<br>(S) | Hyperbola.<br>(T) | At War<br>War began in:              | New War<br>Involvement<br>in 1962-1966. |
|               |                      |                   | ---Hyperbolic TR Critical = 127----- |                                         |
| Germany, West | 114.4                | 125.7             |                                      |                                         |
| Canada        | 100.1                | 122.4             |                                      |                                         |
| Yugoslavia    | 101.7                | 115.1             |                                      | No War                                  |
| Tunisia       | 87.3                 | 106.2             | 1961                                 | Involvement in                          |
| Norway        | 94.7                 | 104.4             |                                      | 1962-1966.                              |
| Ghana         | 80.0                 | 102.1             |                                      |                                         |
| Belgium       | 91.6                 | 100.7             |                                      |                                         |
| Germany, East | 90.9                 | 99.8              |                                      |                                         |
| Italy         | 89.2                 | 99.7              |                                      |                                         |
| Sudan         | 75.6                 | 98.7              |                                      |                                         |
| Chile         | 84.9                 | 96.6              |                                      |                                         |
| Malaysia      | 78.9                 | 94.0              |                                      |                                         |
| Argentina     | 75.6                 | 85.7              |                                      |                                         |
| Honduras      | 69.3                 | 84.8              |                                      |                                         |
| Bolivia       | 64.2                 | 83.7              |                                      |                                         |
| Australia     | 74.9                 | 82.1              |                                      |                                         |
| Switzerland   | 74.5                 | 81.5              |                                      |                                         |
| Brazil        | 66.0                 | 81.1              |                                      |                                         |
| Denmark       | 73.4                 | 80.6              |                                      |                                         |
| Rhodesia      | 61.0                 | 78.2              |                                      |                                         |
| Philippines   | 60.5                 | 73.4              |                                      |                                         |
| Hungary       | 63.2                 | 70.1              |                                      |                                         |
| Venezuela     | 62.4                 | 69.3              |                                      |                                         |
| Columbia      | 52.4                 | 62.7              |                                      |                                         |
| New Zealand   | 55.0                 | 60.3              |                                      |                                         |
| Finland       | 50.8                 | 56.0              |                                      |                                         |
| Ceylon        | 40.5                 | 51.7              |                                      |                                         |
| Ireland       | 40.4                 | 45.3              |                                      |                                         |
| Uruguay       | 39.6                 | 45.0              |                                      |                                         |
| El Salvador   | 35.0                 | 42.3              |                                      |                                         |
| S. Africa     | 35.9                 | 41.1              |                                      |                                         |
| Japan         | 33.9                 | 38.4              |                                      |                                         |
| Guatemala     | 30.3                 | 36.0              |                                      |                                         |
| Luxembourg    | 32.3                 | 35.4              |                                      |                                         |
| Spain         | 30.0                 | 34.7              |                                      |                                         |
| Austria       | 30.5                 | 33.9              |                                      |                                         |
| Mexico        | 20.8                 | 24.2              |                                      |                                         |
| Costa Rica    | 13.4                 | 14.9              |                                      |                                         |
| Mauritius     | 4.3                  | 5.2               |                                      |                                         |



# LIST OF DEADLY QUARRELS USED.

The list is derived from SIPRI 1968/69, pp. 365-373 with a few changes and additions. Internal wars are not included in the list

| <u>Date(s)</u> | <u>Deadly Quarrel</u>      | <u>Participants</u>                                                                                                       | <u>Date(s)</u> | <u>Deadly Quarrel</u>                | <u>Participants</u>                         |
|----------------|----------------------------|---------------------------------------------------------------------------------------------------------------------------|----------------|--------------------------------------|---------------------------------------------|
| 1945-54        | Vietnam I                  | France<br>Cambodia<br>Laos<br>Vietnam                                                                                     | 1961           | Bizerta Crisis                       | France<br>Tunisia                           |
| 1950-53        | Korean War                 | Canada<br>China<br>Korea, S.<br>Korea, N.<br>Turkey<br>U.K.<br>U.S.                                                       | 1962           | India-China<br>Border                | China<br>India                              |
| 1952-54        | Tunisia                    | France<br>Tunisia                                                                                                         | 1962-67        | Yemen Civil<br>War.                  | Saudi<br>Arabia,<br>U.A.R.<br>Yemen         |
| 1952-57        | Kenya                      | Kenya Mau-Mau<br>U.K.                                                                                                     | 1963-66        | Malaysian<br>Confrontation           | Indonesia<br>Malaysia                       |
| 1954-58        | Quemoy & Matsu             | China<br>Taiwan                                                                                                           | 1963-67        | Aden<br>Independence.                | Aden<br>U.K.                                |
| 1954-62        | Algerian<br>Independence   | Algeria<br>France                                                                                                         | 1963-74        | Portuguese<br>Guinea                 | Guinea-<br>Bissau<br>Portugal.              |
| 1955-59        | Cyprus<br>Independence     | Cyprus<br>U.K.                                                                                                            | 1965           | Dominican<br>Republic                | Dominican R.<br>U.S.A.                      |
| 1955-59        | Tibet                      | China<br>Tibetans                                                                                                         | 1965           | India-<br>Pakistan I                 | India<br>Pakistan                           |
| 1955-61        | Cameroon<br>Independence   | Cameroons<br>France<br>U.K.                                                                                               | 1965-74        | Mozambique                           | Mozambique<br>Portugal                      |
| 1956           | Hungarian<br>Crisis        | Hungary<br>USSR                                                                                                           | 1967           | Arab-Israeli                         | Iraq<br>Israel<br>Jordan<br>Syria<br>U.A.R. |
| 1956           | Suez<br>Invasion           | France<br>Israel<br>UAR<br>UK                                                                                             | 1971           | India-<br>Pakistan II<br>Bangla Desh | India<br>Pakistan                           |
| 1958           | Lebanon<br>Crisis          | Lebanon<br>U.S.                                                                                                           | 1970           | U.S.-Laos                            | U.S.A.<br>Laos                              |
| 1959-73        | Vietnam II & III           | Cambodia (1970)<br>Korea, S. (1962-<br>1972)<br>Laos (1970)<br>U.S. (1959-73)<br>Vietnam, N (1959-)<br>Vietnam, S (1959-) | 1970           | U.S.-Cambodia                        | U.S.A.<br>Cambodia                          |
| 1960-64        | Somalia-Ethiopia<br>Border | Ethiopia<br>Somalia                                                                                                       | 1973           | Yom Kippur                           | Israel<br>Syria<br>U.A.R.<br>Jordan         |
| 1960-<br>1962  | Bay of Pigs                | Cuba<br>U.S.A.                                                                                                            | 1974           | Cyprus                               | Cyprus<br>Turkey                            |
|                |                            |                                                                                                                           | 1960           | Angola                               | Angola<br>Portugal                          |

# DETERMINATIONS OF THE CRITICAL VALUES FOR T.R.s FOR THE STRAIGHT LINE AND THE HYPERBOLIC CURVE

1961 data

| STRAIGHT LINE                       |                                  | HYPERBOLIC CURVE                    |                                  |
|-------------------------------------|----------------------------------|-------------------------------------|----------------------------------|
| If the value of T.R.<br>was set at: | then the value<br>of P would be: | If the value of T.R.<br>was set at: | then the value<br>of P would be: |
| 359.0                               | 0.403134                         | 309.0                               | 0.403134                         |
| 247.0                               | 0.159055                         | 285.0                               | 0.457373                         |
| 220.0                               | 0.196345                         | 266.0                               | 0.196345                         |
| 198.0                               | 0.063457                         | 246.0                               | 0.063457                         |
| 188.0                               | 0.015470                         | 228.0                               | 0.015470                         |
| 177.0                               | 0.021808                         | 213.0                               | 0.021808                         |
| 175.0                               | 0.004257                         | 198.0                               | 0.029786                         |
| 165.0                               | 0.006259                         | 192.0                               | 0.006259                         |
| 160.0                               | 0.008926                         | 191.0                               | 0.008926                         |
| 155.0                               | 0.012391                         | 186.0                               | 0.012391                         |
| 152.0                               | 0.016801                         | 181.0                               | 0.002102                         |
| 150.5                               | 0.003040                         | 174.0                               | 0.003040                         |
| 140.0                               | 0.004297                         | 164.0                               | 0.004297                         |
| 129.0                               | 0.005948                         | 154.0 <sup>2</sup>                  | 0.000524 <sup>2</sup>            |
| 123.0                               | 0.008080                         | 144.0                               | 0.000770                         |
| 126.0                               | 0.010790                         | 141.0                               | 0.001110                         |
| 124.0 <sup>2</sup>                  | 0.001571 <sup>2</sup>            | 138.0                               | 0.002136                         |
| 120.0                               | 0.002186                         | 132.0                               | 0.002990                         |
| 118.5                               | 0.002996                         | 128.0                               | 0.005390                         |
| 116.0                               | 0.004049                         | 127.0 <sup>1</sup>                  | 0.009471 <sup>1</sup>            |
| 114.5                               | 0.005399                         | 124.0 <sup>3</sup>                  | 0.000656 <sup>3</sup>            |
| 108.0                               | 0.007113                         | 119.0                               | 0.000902                         |
| 101.0                               | 0.009266                         | 109.0                               | 0.001227                         |
| 99.0 <sup>1</sup>                   | 0.001227 <sup>1</sup>            | 103.0                               | 0.001651                         |
| 93.0 <sup>3</sup>                   | 0.001651 <sup>3</sup>            |                                     |                                  |
| 91.0                                | 0.002202                         |                                     |                                  |

1 2 3 Best values of P

# SUMMARY OF POSTDICTIONS BASED ON A STRAIGHT LINE

TR<sub>Critical</sub> = 99

| YEAR       | $\frac{W^1}{O^2}$ | Z    | $\frac{W^3}{\eta^4}$ | Z'    | $\frac{Z}{Z'}$ | p <sup>5</sup>      |                                                                                                    |
|------------|-------------------|------|----------------------|-------|----------------|---------------------|----------------------------------------------------------------------------------------------------|
| 1950       | 2/18              | 11.1 | 0/14                 | 0     | Ind.           | 0.308               |                                                                                                    |
| 1951       | 4/14              | 28.6 | 0/17                 | 0     | Ind.           | 0.0379              |                                                                                                    |
| 1952       | 4/14              | 28.6 | 0/19                 | 0     | Ind.           | 0.0245              |                                                                                                    |
| 1953       | 5/21              | 23.8 | 1/21                 | 4.76  | 5.0            | 0.0815              | Nations already at war were excluded from the analysis unless they became involved in another war. |
| 1954       | 5/17              | 29.4 | 1/24                 | 4.17  | 7.1            | 0.0762              |                                                                                                    |
| 1955       | 5/25              | 20.0 | 1/20                 | 5.0   | 4.0            | 0.130               |                                                                                                    |
| 1956       | 3/23              | 33.0 | 0/23                 | 0     | Ind.           | 0.117               |                                                                                                    |
| 1957       | 4/29              | 13.8 | 0/27                 | 0     | Ind.           | 0.0647              |                                                                                                    |
| 1958       | 5/32              | 15.6 | 0/25                 | 0     | Ind.           | 0.0481              |                                                                                                    |
| 1959       | 5/39              | 12.8 | 0/26                 | 0     | Ind.           | 0.0697              |                                                                                                    |
| 1960       | 10/43             | 23.3 | 0/25                 | 0     | Ind.           | 0.00659             |                                                                                                    |
| 1961       | 9/34              | 26.  | 0/35                 | 0     | Ind.           | 0.00093             |                                                                                                    |
| 1962       | 11/36             | 31.  | 0/37                 | 0     | Ind.           | 0.00017             |                                                                                                    |
| 1963       | 10/41             | 24.  | 0/38                 | 0     | Ind.           | 0.00078             |                                                                                                    |
| 1964       | 9/54              | 17.  | 0/57                 | 0     | Ind.           | 0.00105             |                                                                                                    |
| 1965       | 8/53              | 15.  | 0/56                 | 0     | Ind.           | 0.00233             |                                                                                                    |
| 1966       | 10/41             | 20.  | 0/62                 | 0     | Ind.           | 0.00042             |                                                                                                    |
| 1967       | 5/49              | 10.  | 0/60                 | 0     | Ind.           | 0.01630             |                                                                                                    |
| 1968       | 10/45             | 22.  | 0/67                 | 0     | Ind.           | 0.00006             |                                                                                                    |
| 1969       | 11/54             | 20.  | 1/60                 | 1.7   | 11.8           | 0.00110             |                                                                                                    |
| 1970       | 8/53              | 15.  | 1/58                 | 1.7   | 8.8            | 0.01110             |                                                                                                    |
| 1950-1959  | 42/232            | 18.1 | 3/216                | 1.39  | 13.0           | $2 \times 10^{-2}$  |                                                                                                    |
| 1960-1970* | 92/469            | 19.6 | 2/520                | 0.385 | 50.9           | $1 \times 10^{-26}$ |                                                                                                    |
| 1950-1970* | 134/701           | 19.1 | 5/736                | 0.679 | 28.1           | $1 \times 10^{-34}$ |                                                                                                    |

\*Data for 1961 excluded from the analysis.

1. Number of nations with TRs of 99.0 or above which became involved in war in the next 5 years.
2. Number of nations with TRs of 99.0 or above.
3. Number of nations with TRs less than 99.0 which were involved in a war within 5 years.
4. Number of nations with TRs of less than 99.0.
5. Level of significance, determined by Fisher's exact test of significance.

# SUMMARY OF POSTDICTIONS BASED ON A STRAIGHT LINE

$TR_{Critical} = 124$

| YEAR       | $\frac{W}{O}$ | %    | $\frac{W}{U}$ | %    | $\frac{Z}{Z'}$ | $p^5$               |
|------------|---------------|------|---------------|------|----------------|---------------------|
| 1950       | 2/14          | 14.  | 0/18          | 0    | Ind.           | 0.18347             |
| 1951       | 4/12          | 33.  | 0/20          | 0    | Ind.           | 0.01377             |
| 1952       | 3/9           | 33.  | 1/24          | 4.2  | 7.9            | 0.05235             |
| 1953       | 5/12          | 42.  | 1/30          | 3.3  | 12.7           | 0.00471             |
| 1954       | 4/13          | 31.  | 1/28          | 3.5  | 8.8            | 0.02843             |
| 1955       | 5/18          | 28.  | 1/27          | 3.7  | 7.5            | 0.03068             |
| 1956       | 3/16          | 19.  | 0/30          | 0    | Ind.           | 0.03689             |
| 1957       | 4/20          | 20.  | 0/36          | 0    | Ind.           | 0.01319             |
| 1958       | 4/25          | 20.  | 0/32          | 0    | Ind.           | 0.01269             |
| 1959       | 5/31          | 16.  | 0/34          | 0    | Ind.           | 0.02057             |
| 1960       | 9/34          | 26.  | 1/34          | 2.9  | 8.9            | 0.00659             |
| 1961       | 8/26          | 26.  | 1/43          | 2.3  | 11.3           | 0.00124             |
| 1962       | 11/28         | 39.  | 0/45          | 0    | Ind.           | 0.000006            |
| 1963       | 8/30          | 27.  | 2/49          | 4.   | 6.7            | 0.00529             |
| 1964       | 8/37          | 22.  | 1/74          | 1.4  | 15.7           | 0.00059             |
| 1965       | 8/43          | 19.  | 0/66          | 0.   | Ind.           | 0.00038             |
| 1966       | 10/38         | 26.  | 0/75          | 0.   | Ind.           | 0.000008            |
| 1967       | 5/37          | 14.  | 0/72          | 0.   | Ind.           | 0.00373             |
| 1968       | 10/38         | 26.  | 0/74          | 0.   | Ind.           | 0.000008            |
| 1969       | 11/39         | 28.  | 1/75          | 1.3  | 21.5           | 0.00002             |
| 1970       | 8/37          | 22.  | 1/74          | 1.4  | 15.7           | 0.00059             |
| 1950-1959  | 39/170        | 22.9 | 4/279         | 1.43 | 16.0           | $1 \times 10^{-12}$ |
| 1960-1970* | 90/361        | 24.9 | 6/638         | 0.94 | 26.5           | $1 \times 10^{-31}$ |
| 1950-1970* | 129/531       | 24.3 | 10/917        | 1.09 | 22.3           | $1 \times 10^{-44}$ |

Nations already at war were excluded from the analysis unless they became involved in another war.

\* Data for 1961 excluded from the analysis.

1. Number of nations with TRs of 124 or above which went to war within 5 years
2. Number of nations with TRs of 124 or above.
3. Number of nations with TRs less than 124 which were involved in a war within 5 years.
4. Number of nations with TRs less than 124.
5. Level of significance, determined by the exact test of significance.

# SUMMARY OF POSTDICTIONS BASED ON A HYPERBOLIC CURVE

$$TR_{\text{Critical}} = 127$$

| YEAR       | $\frac{W^1}{O^2}$ | $\frac{W^3}{U^4}$ | $\frac{Z^1}{Z^2}$ | $\frac{Z^3}{Z^4}$ | $p^5$ |                     |
|------------|-------------------|-------------------|-------------------|-------------------|-------|---------------------|
| 1950       | 2/16              | 12.5              | 0/17              | 0                 | Ind.  | 0.22727             |
| 1951       | 4/13              | 31.               | 0/20              | 0                 | Ind.  | 0.01747             |
| 1952       | 4/14              | 29.               | 1/22              | 4.5               | 6.4   | 0.06373             |
| 1953       | 6/15              | 40.               | 1/30              | 3.3               | 12.1  | 0.00345             |
| 1954       | 5/19              | 26.               | 1/25              | 4.                | 6.5   | 0.04503             |
| 1955       | 5/17              | 29.               | 1/31              | 3.2               | 9.1   | 0.01664             |
| 1956       | 3/17              | 18.               | 0/30              | 0.                | Ind.  | 0.04194             |
| 1957       | 4/18              | 22.               | 0/39              | 0.                | Ind.  | 0.00775             |
| 1958       | 5/26              | 19.               | 0/34              | 0.                | Ind.  | 0.01205             |
| 1959       | 5/30              | 17.               | 0/35              | 0.                | Ind.  | 0.01725             |
| 1960       | 9/34              | 26.               | 1/35              | 2.9               |       | 0.00579             |
| 1961       | 9/31              | 29.               | 0/38              | 0.                | Ind.  | 0.00036             |
| 1962       | 9/29              | 31.               | 2/44              | 4.6               | 6.81  | 0.00292             |
| 1963       | 8/31              | 25.8              | 2/48              | 4.2               | 6.19  | 0.00688             |
| 1964       | 8/30              | 21.1              | 1/73              | 1.37              | 15.4  | 0.00074             |
| 1965       | 8/36              | 22.2              | 0/73              | 0.                | Ind.  | 0.00008             |
| 1966       | 10/37             | 27.0              | 0/76              | 0.                | Ind.  | 0.00001             |
| 1967       | 5/32              | 15.6              | 0/77              | 0.                | Ind.  | 0.00172             |
| 1968       | 10/41             | 24.4              | 0/75              | 0.                | Ind.  | 0.00001             |
| 1969       | 11/40             | 27.5              | 1/76              | 1.32              | 20.8  | 0.00003             |
| 1970       | 8/38              | 21.1              | 1/75              | 1.33              | 15.9  | 0.00064             |
| 1950-1959  | 43/185            | 23.24             | 4/283             | 1.41              | 16.5  | $1 \times 10^{-13}$ |
| 1960-1970* | 86/356            | 24.16             | 8/652             | 1.23              | 19.6  | $1 \times 10^{-29}$ |
| 1950-1970* | 129/541           | 23.86             | 12/935            | 1.28              | 18.6  | $1 \times 10^{-46}$ |

Nations already at war were excluded from the analysis unless they became involved in another war.

\* Data for 1961 excluded from the analysis.

1. Number of nations with TRs of 127 or higher which became involved in war in the following five years.
2. Number of nations with TRs of 127 or higher.
3. Number of nations with TRs less than 127 which became involved in war in the next 5 years.
4. Number of nations with TRs less than 127.
5. Level of significance, determined by the exact test of significance.

1970

TABLE 1973A - NATIONAL INDICATORS

YEAR= 1973

| COUNTRY        | POP.<br>x10 <sup>6</sup><br>(B) | GNP<br>1973 U.S.\$ x 10 <sup>6</sup><br>(C) | M.E.<br>x 10 <sup>6</sup><br>(D) | GNP/Cap.<br>(E) | M.E./Cap.<br>(F) | n=71<br>Ranks of |            | Rank<br>Discrepancy<br>(I) |
|----------------|---------------------------------|---------------------------------------------|----------------------------------|-----------------|------------------|------------------|------------|----------------------------|
|                |                                 |                                             |                                  |                 |                  | "E"<br>(G)       | "F"<br>(H) |                            |
| Australia      | 13.20                           | 58477.5                                     | 1873.9                           | 4430.11         | 141.97           | 12               | 13         | X                          |
| Austria        | 7.45                            | 28336.5                                     | 270.1                            | 3803.56         | 36.25            | 13               | 31         | X                          |
| Belgium        | 9.73                            | 46033.8                                     | 1259.0                           | 4731.12         | 129.40           | 9                | 14         | X                          |
| Bolivia        | 5.01                            | 873.5                                       | 28.9                             | 174.35          | 5.78             | 65               | 54         | 0                          |
| Brazil         | 103.00                          | 62042.0                                     | 1328.4                           | 602.35          | 12.90            | 41               | 45         | X                          |
| Bulgaria       | 8.62                            | 15700.0                                     | 1333.0                           | 1820.92         | 154.60           | 26               | 10         | 0                          |
| Burma          | 29.60                           | 2479.0                                      | 130.8                            | 83.75           | 4.42             | 71               | 58         | 0                          |
| Canada         | 22.10                           | 117040.8                                    | 2391.0                           | 5295.96         | 108.19           | 6                | 19         | X                          |
| Chile          | 9.52                            | 13398.0                                     | 245.3                            | 1459.87         | 25.77            | 30               | 36         | X                          |
| China          | 898.60                          | 181000.0                                    | 15000.0                          | 201.42          | 16.69            | 61               | 41         | 0                          |
| Colombia       | 24.10                           | 10065.7                                     | 100.9                            | 417.66          | 4.19             | 48               | 59         | X                          |
| Cyprus         | 0.65                            | 923.1                                       | 10.0                             | 1420.15         | 15.34            | 31               | 42         | X                          |
| Czechoslovakia | 14.60                           | 44800.0                                     | 2703.0                           | 3068.49         | 185.14           | 16               | 6          | 0                          |
| Denmark        | 5.02                            | 27896.4                                     | 615.6                            | 5557.05         | 122.64           | 5                | 15         | X                          |
| Dominican Rep. | 4.66                            | 2233.0                                      | 32.8                             | 479.18          | 7.04             | 45               | 50         | X                          |
| Ecuador        | 6.73                            | 2551.5                                      | 51.2                             | 379.12          | 7.61             | 51               | 49         | 0                          |
| UAR            | 35.10                           | 8794.0                                      | 1324.1                           | 250.54          | 37.72            | 59               | 30         | 0                          |
| El Salvador    | 3.87                            | 1257.6                                      | 15.5                             | 324.96          | 4.01             | 53               | 62         | X                          |
| Ethiopia       | 27.30                           | 2452.8                                      | 58.8                             | 89.85           | 2.15             | 70               | 68         | 0                          |
| Finland        | 4.64                            | 15812.5                                     | 276.1                            | 3407.87         | 59.50            | 15               | 25         | X                          |
| France         | 52.00                           | 258076.0                                    | 9339.9                           | 4963.00         | 179.61           | 7                | 8          | X                          |
| Germany-West   | 17.00                           | 47500.0                                     | 3109.0                           | 2794.12         | 182.88           | 18               | 7          | 0                          |
| Germany-East   | 62.00                           | 346748.3                                    | 11825.2                          | 5592.72         | 190.73           | 4                | 5          | X                          |
| Ghana          | 9.95                            | 2743.2                                      | 44.8                             | 275.70          | 4.50             | 57               | 57         | *                          |
| Greece         | 9.23                            | 16087.4                                     | 659.6                            | 1742.95         | 71.46            | 27               | 24         | 0                          |
| Guatemala      | 5.60                            | 2474.5                                      | 21.0                             | 441.88          | 3.75             | 46               | 64         | X                          |
| Honduras       | 2.98                            | 869.0                                       | 12.4                             | 291.61          | 4.18             | 56               | 60         | X                          |
| Hungary        | 10.40                           | 21700.0                                     | 1209.0                           | 2086.54         | 116.25           | 23               | 16         | 0                          |
| India          | 603.30                          | 73402.6                                     | 2287.6                           | 121.67          | 3.79             | 66               | 63         | 0                          |
| Indonesia      | 129.90                          | 12544.9                                     | 384.6                            | 96.57           | 2.96             | 63               | 65         | 0                          |
| Iran           | 33.30                           | 22812.2                                     | 2611.8                           | 685.05          | 78.43            | 38               | 21         | 0                          |
| Ireland        | 3.04                            | 6404.2                                      | 86.8                             | 2106.64         | 28.54            | 22               | 33         | X                          |
| Israel         | 3.24                            | 8706.0                                      | 3953.1                           | 2607.04         | 1220.09          | 20               | 1          | 0                          |
| Italy          | 54.80                           | 136969.3                                    | 4092.7                           | 2499.44         | 74.68            | 21               | 23         | X                          |
| Japan          | 110.60                          | 408106.0                                    | 3593.1                           | 3689.93         | 32.49            | 14               | 32         | X                          |
| Jordan         | 2.51                            | 803.0                                       | 135.8                            | 319.92          | 54.09            | 54               | 26         | 0                          |

YEAR - 1973

## TABLE 1973A - NATIONAL INDICATORS

YEAR - 1973

GNP, M.E. & POP. NUMBERS  
ARE IN MILLIONSNUMBER OF COUNTRIES  
IN 1973 = 71

| COUNTRY      | POP.    | GNP                          | M.E.    | GNP/CAP. | M.E./CAP. | RANKS OF |         | RANK            |
|--------------|---------|------------------------------|---------|----------|-----------|----------|---------|-----------------|
| (A)          | (B) x10 | 1973 U.S.\$ x10 <sup>6</sup> | (D)     | (E)      | (F)       | "E" (G)  | "F" (H) | DISCREPANCY (I) |
| Kenya        | 13.10   | 2392.5                       | 31.6    | 182.63   | 2.41      | 63       | 67      | X               |
| Kenya - G.   | 33.80   | 12314.3                      | 478.1   | 364.33   | 14.15     | 52       | 43      | 0               |
| Kyrgyzstan   | 0.35    | 1619.0                       | 14.8    | 4625.71  | 42.14     | 10       | 29      | X               |
| Malawi       | 0.77    | 497.9                        | 3.9     | 646.62   | 5.00      | 39       | 56      | X               |
| Malaysia     | 11.84   | 6451.0                       | 237.6   | 544.85   | 20.06     | 42       | 39      | 0               |
| Mexico       | 55.90   | 49329.9                      | 344.0   | 882.47   | 6.15      | 37       | 53      | X               |
| Moldavia     | 17.50   | 5114.7                       | 169.0   | 292.27   | 9.56      | 55       | 46      | 0               |
| Netherlands  | 13.40   | 59395.9                      | 2032.0  | 4469.84  | 131.64    | 11       | 12      | X               |
| Nicaragua    | 2.11    | 1094.3                       | 18.6    | 518.63   | 8.80      | 43       | 47      | X               |
| Norway       | 3.96    | 19166.5                      | 624.6   | 4840.02  | 157.74    | 8        | 9       | X               |
| Pakistan     | 65.40   | 6313.8                       | 448.0   | 96.54    | 6.85      | 69       | 51      | 0               |
| Panama       | 1.56    | 1590.5                       | 2.1     | 1019.55  | 1.35      | 35       | 71      | X               |
| Paraguay     | 2.43    | 980.8                        | 13.7    | 403.62   | 5.65      | 50       | 55      | X               |
| Peru         | 14.70   | 9181.5                       | 260.8   | 624.59   | 17.74     | 40       | 40      | *               |
| Philippines  | 42.10   | 10860.2                      | 172.0   | 257.96   | 4.09      | 58       | 61      | X               |
| Poland       | 33.40   | 62100.0                      | 3860.0  | 1859.28  | 115.57    | 24       | 17      | 0               |
| Portugal     | 8.43    | 10468.8                      | 631.7   | 1241.85  | 74.93     | 32       | 22      | 0               |
| Rumania      | 20.90   | 38200.0                      | 1839.0  | 1827.75  | 87.99     | 25       | 20      | 0               |
| Sierra Leone | 2.84    | 529.8                        | 4.5     | 186.59   | 1.57      | 62       | 70      | X               |
| S. Africa    | 23.60   | 26099.7                      | 642.2   | 1105.92  | 27.21     | 34       | 34      | *               |
| U.S.S.R.     | 249.70  | 697000.0                     | 86000.0 | 2791.35  | 344.41    | 19       | 3       | 0               |
| Spain        | 34.90   | 60103.4                      | 1875.5  | 1722.16  | 53.74     | 28       | 27      | 0               |
| Ceylon       | 13.20   | 2327.6                       | 25.5    | 176.33   | 1.93      | 64       | 69      | X               |
| Sweden       | 8.13    | 50743.7                      | 1757.6  | 6241.54  | 216.19    | 2        | 4       | X               |
| Switzerland  | 6.44    | 41532.3                      | 721.1   | 6449.11  | 111.98    | 1        | 18      | X               |
| Tanzania     | 14.40   | 1715.2                       | 41.2    | 119.11   | 2.86      | 67       | 66      | 0               |
| Thailand     | 39.60   | 9199.6                       | 331.6   | 232.31   | 8.38      | 60       | 48      | 0               |
| Tunisia      | 5.48    | 2396.8                       | 34.2    | 437.37   | 6.24      | 47       | 52      | X               |
| Turkey       | 33.20   | 19525.1                      | 891.6   | 511.13   | 23.34     | 44       | 38      | 0               |
| U.K.         | 56.00   | 170884.5                     | 8536.1  | 3051.51  | 152.43    | 17       | 11      | 0               |
| U.S.A.       | 210.40  | 1294900.0                    | 78462.0 | 6154.47  | 372.92    | 3        | 2       | 0               |
| Uruguay      | 2.99    | 2793.9                       | 70.1    | 934.42   | 23.46     | 36       | 37      | X               |
| Venezuela    | 11.89   | 17673.6                      | 310.0   | 1486.43  | 26.07     | 29       | 35      | X               |
| Yugoslavia   | 20.90   | 23953.9                      | 883.1   | 1146.12  | 42.26     | 33       | 28      | 0               |
| Zambia       | 4.82    | 1980.6                       | 68.0    | 410.91   | 14.12     | 49       | 44      | 0               |

YEAR=1973

## TABLE 1973B - DERIVED DATA

YEAR= 1973

M.E./Cap numbers are  
in current U.S. \$M.E. Total numbers are in  
Th.  
millions of current U.S. \$

| COUNTRY        | BEST STRAIGHT LINE |            |        | T.R.   | BEST HYPERBOLA |            |     |
|----------------|--------------------|------------|--------|--------|----------------|------------|-----|
|                | M.E./Cap.          | M.E. Total | Th.    |        | M.E./Cap.      | M.E. Total | Th. |
| (A)            | (K)                | (L)        | (M)    | (N)    | (O)            | (P)        |     |
| Australia      | 152.28             | 2010.1     | 93.2   | 152.37 | 2011.3         | 93.2       |     |
| Austria        | 130.17             | 969.8      | 27.8   | 130.26 | 970.5          | 27.8       |     |
| Belgium        | 162.90             | 1585.0     | 79.4   | 162.99 | 1585.9         | 79.4       |     |
| Bolivia        | 2.12               | 10.6       | 272.5  | 3.33   | 16.7           | 173.3      |     |
| Brazil         | 17.22              | 1773.9     | 74.9   | 17.61  | 1813.4         | 73.3       |     |
| Bulgaria       | 60.22              | 519.1      | 256.7  | 60.36  | 520.3          | 256.1      |     |
| Burma          | 0.00               | 0.0        | IND.   | 0.97   | 28.6           | 456.5      |     |
| Canada         | 182.83             | 4040.5     | 59.2   | 182.92 | 4042.5         | 59.1       |     |
| Chile          | 47.48              | 452.0      | 54.3   | 47.65  | 453.6          | 54.1       |     |
| China          | 3.08               | 2764.1     | 542.7  | 4.14   | 3721.2         | 403.1      |     |
| Colombia       | 10.71              | 258.0      | 39.1   | 11.25  | 271.1          | 37.2       |     |
| Cyprus         | 46.08              | 29.9       | 33.3   | 46.25  | 30.1           | 33.2       |     |
| Czechoslovakia | 104.23             | 1521.8     | 177.6  | 104.34 | 1523.3         | 177.4      |     |
| Denmark        | 192.04             | 964.0      | 63.9   | 192.13 | 964.5          | 63.8       |     |
| Dominican Rep. | 12.88              | 60.0       | 54.7   | 13.35  | 62.2           | 52.7       |     |
| Ecuador        | 9.35               | 62.9       | 81.4   | 9.94   | 66.9           | 76.5       | W   |
| UAR            | 4.81               | 168.8      | 784.4  | 5.69   | 199.6          | 663.4      |     |
| El Salvador    | 7.43               | 28.8       | 53.9   | 8.13   | 31.4           | 49.4       |     |
| Ethiopia       | 0.00               | 0.0        | IND.   | 1.10   | 30.0           | 196.2      |     |
| Finland        | 116.21             | 539.2      | 51.2   | 116.31 | 539.7          | 51.2       |     |
| France         | 171.08             | 8896.1     | 105.0  | 171.17 | 8900.8         | 104.9      | W   |
| Germany-West   | 94.55              | 1607.4     | 193.4  | 94.66  | 1609.2         | 193.2      |     |
| Germany-East   | 193.30             | 11984.4    | 98.7   | 193.39 | 11990.0        | 98.6       |     |
| Ghana          | 5.70               | 56.7       | 79.0   | 6.50   | 64.7           | 69.2       |     |
| Greece         | 57.47              | 530.4      | 124.4  | 57.61  | 531.8          | 124.0      |     |
| Guatemala      | 11.56              | 64.7       | 32.4   | 12.08  | 67.6           | 31.1       |     |
| Honduras       | 6.26               | 18.6       | 66.8   | 7.02   | 20.9           | 59.5       |     |
| Hungary        | 69.59              | 723.7      | 167.1  | 69.72  | 725.1          | 166.7      |     |
| India          | 0.26               | 158.1      | 1447.0 | 1.86   | 1121.3         | 204.0      |     |
| Indonesia      | 0.00               | 0.0        | IND.   | 1.25   | 162.1          | 237.3      |     |
| Iran           | 20.14              | 670.7      | 389.4  | 20.48  | 682.0          | 383.0      |     |
| Ireland        | 70.30              | 213.7      | 40.6   | 70.43  | 214.1          | 40.5       |     |
| Israel         | 90.78              | 294.1      | 1344.1 | 90.89  | 294.5          | 1342.5     |     |
| Italy          | 84.16              | 4611.8     | 88.7   | 84.27  | 4618.0         | 88.6       |     |
| Japan          | 126.16             | 13953.4    | 25.8   | 126.26 | 13963.9        | 25.7       |     |
| Jordan         | 7.26               | 18.2       | 745.3  | 7.96   | 20.0           | 679.7      |     |
| Kenya          | 2.41               | 31.6       | 100.0  | 3.57   | 46.8           | 67.6       |     |



YEAR= 1973

TABLE 1973B - DERIVED DATA  
(continued - 2)

YEAR= 1973

M.E./Cap numbers are  
in current U.S. \$M.E. Total Th. numbers are in  
millions of current U.S. \$

| COUNTRY<br>(A) | BEST STRAIGHT LINE |                |        | BEST HYPERBOLA |                |        |
|----------------|--------------------|----------------|--------|----------------|----------------|--------|
|                | M.E./Cap. Th.      | M.E. Total Th. | T.R.   | M.E./Cap. Th.  | M.E. Total Th. | T.R.   |
| (K)            | (L)                | (M)            | (N)    | (O)            | (P)            |        |
| Korea-South    | 8.82               | 298.2          | 160.3  | 9.44           | 319.2          | 149.8  |
| Luxembourg     | 159.18             | 55.7           | 26.5   | 159.27         | 55.7           | 26.5   |
| Malawi         | 18.78              | 14.5           | 26.6   | 19.14          | 14.7           | 26.1   |
| Malaysia       | 15.19              | 179.9          | 132.1  | 15.62          | 184.9          | 128.5  |
| Mexico         | 27.11              | 1515.2         | 22.7   | 27.37          | 1530.1         | 22.5   |
| Morocco        | 6.28               | 109.9          | 153.8  | 7.04           | 123.3          | 137.1  |
| Netherlands    | 153.68             | 2059.3         | 98.7   | 153.77         | 2060.5         | 98.6   |
| Nicaragua      | 14.27              | 30.1           | 61.7   | 14.71          | 31.0           | 59.8   |
| Norway         | 166.74             | 660.3          | 94.6   | 166.83         | 660.6          | 94.5   |
| Pakistan       | 0.00               | 0.0            | IND.   | 1.25           | 81.6           | 549.3  |
| Panama         | 31.94              | 49.8           | 4.2    | 32.18          | 50.2           | 4.2    |
| Paraguay       | 10.21              | 24.8           | 55.3   | 10.77          | 26.2           | 52.4   |
| Peru           | 18.01              | 264.7          | 98.5   | 18.38          | 270.2          | 96.5   |
| Philippines    | 5.07               | 213.5          | 80.6   | 5.93           | 249.5          | 68.9   |
| Poland         | 61.57              | 2056.4         | 187.7  | 61.71          | 2061.1         | 187.3  |
| Portugal       | 39.79              | 335.4          | 188.3  | 39.98          | 337.0          | 187.4  |
| Rumania        | 60.46              | 1263.6         | 145.5  | 60.60          | 1266.5         | 145.2  |
| Sierra Leone   | 2.55               | 7.2            | 61.7   | 3.69           | 10.5           | 42.7   |
| S. Africa      | 34.99              | 825.7          | 77.8   | 35.21          | 830.9          | 77.3   |
| USSR           | 94.46              | 23585.8        | 364.6  | 94.56          | 23612.4        | 364.2  |
| Spain          | 56.73              | 1980.0         | 94.7 W | 56.88          | 1985.1         | 94.5 W |
| Ceylon         | 2.19               | 28.9           | 88.2   | 3.38           | 44.7           | 57.1   |
| Sweden         | 216.19             | 1757.6         | 100.0  | 216.28         | 1758.4         | 100.0  |
| Switzerland    | 223.51             | 1439.4         | 50.1   | 223.61         | 1440.0         | 50.1   |
| Tanzania       | 0.17               | 2.5            | 1663.8 | 1.79           | 25.8           | 159.4  |
| Thailand       | 4.17               | 165.0          | 201.0  | 5.11           | 202.2          | 164.0  |
| Tunisia        | 11.40              | 62.5           | 54.7   | 11.92          | 65.3           | 52.3   |
| Turkey         | 14.00              | 534.9          | 166.7  | 14.45          | 552.1          | 161.5  |
| U.K.           | 103.64             | 5803.6         | 147.1  | 103.74         | 5809.3         | 146.9  |
| U.S.A.         | 213.12             | 44839.8        | 175.0  | 213.21         | 44859.1        | 174.9  |
| Uruguay        | 28.94              | 86.5           | 81.1   | 29.19          | 87.3           | 80.4   |
| Venezuela      | 48.41              | 575.7          | 53.9   | 48.58          | 577.6          | 53.7   |
| Yugoslavia     | 36.41              | 760.9          | 116.1  | 36.62          | 765.3          | 115.4  |
| Zambia         | 10.47              | 50.5           | 134.9  | 11.02          | 53.1           | 128.1  |

1973

TABLE 193C - TENSION RATIOS

YEAR = 1973

(in descending order, Column T)

| COUNTRY<br>(A) | TENSION RATIOS          |                        | DEADLY QUARRELS         | New War<br>Involvement<br>in 1974-1978 |
|----------------|-------------------------|------------------------|-------------------------|----------------------------------------|
|                | Straight<br>Line<br>(S) | Hyper-<br>bola.<br>(T) | At War<br>War Began in: |                                        |
| Israel         | 1344.1                  | 1342.5                 | 1973                    |                                        |
| Jordan         | 745.3                   | 679.7                  | 1973                    |                                        |
| U. S. R.       | 784.4                   | 663.4                  | 1973                    |                                        |
| Pakistan       | Ind.                    | 549.3                  |                         |                                        |
| Gurma          | Ind.                    | 456.5                  |                         |                                        |
| China          | 542.7                   | 403.1                  |                         |                                        |
| Iran           | 389.4                   | 383.0                  |                         |                                        |
| U.S.S.R.       | 364.6                   | 364.2                  |                         |                                        |
| Bulgaria       | 256.7                   | 256.1                  |                         |                                        |
| Indonesia      | Ind.                    | 237.3                  |                         |                                        |
| India          | 1447.0                  | 204.0                  |                         |                                        |
| Portugal       | 188.3                   | 187.4                  | 1960, 1965, 1965        |                                        |
| Poland         | 187.7                   | 187.3                  |                         |                                        |
| Czechoslovakia | 177.6                   | 177.4                  |                         |                                        |
| U.S.A.         | 175.0                   | 174.9                  |                         |                                        |
| Bolivia        | 272.5                   | 173.8                  |                         |                                        |
| Ethiopia       | Ind.                    | 196.2                  |                         |                                        |
| Germany-W.     | 193.4                   | 193.2                  |                         |                                        |
| Hungary        | 167.1                   | 166.7                  |                         |                                        |
| Thailand       | 201.0                   | 164.0                  |                         |                                        |
| Turkey         | 166.7                   | 161.5                  |                         | 1974                                   |
| Tanzania       | 1663.8                  | 159.4                  |                         |                                        |
| Korea-S.       | 160.3                   | 149.8                  |                         |                                        |
| U.K.           | 147.1                   | 146.9                  |                         |                                        |
| Rumania        | 145.5                   | 145.2                  |                         |                                        |
| Morocco        | 153.8                   | 137.1                  |                         |                                        |
| Malaysia       | 132.1                   | 128.5                  |                         |                                        |
| Zambia         | 134.9                   | <u>128.1</u>           |                         |                                        |
| Greece         | 124.4                   | 124.0                  |                         |                                        |
| Yugoslavia     | 116.1                   | 115.4                  |                         |                                        |
| France         | 105.0                   | 104.9                  |                         |                                        |
| Sweden         | <u>100.0</u>            | 100.0                  |                         |                                        |
| Germany-E.     | 98.7                    | 98.6                   |                         |                                        |
| Netherlands    | 98.7                    | 98.6                   |                         |                                        |

YEAR = 1973

## TABLE 1973C - TENSION RATIOS

YEAR = 1973

(in descending order, Column T)

| COUNTRY<br>(A) | TENSION RATIOS          |                        | DEADLY QUARRELS         |                                        |
|----------------|-------------------------|------------------------|-------------------------|----------------------------------------|
|                | Straight<br>Line<br>(S) | Hyper-<br>bola.<br>(T) | At War<br>War Began in: | New War<br>Involvement<br>in 1974-1978 |
| Peru           | 98.5                    | 96.5                   |                         |                                        |
| Norway         | 94.6                    | 94.5                   |                         |                                        |
| Spain          | 94.7                    | 94.5                   |                         |                                        |
| Australia      | 93.2                    | 93.2                   |                         |                                        |
| Italy          | 88.7                    | 88.6                   |                         |                                        |
| Uruguay        | 81.1                    | 80.4                   |                         |                                        |
| Belgium        | 79.4                    | 79.4                   |                         |                                        |
| S. Africa      | 77.8                    | 77.3                   |                         |                                        |
| Ecuador        | 81.4                    | 76.5                   |                         |                                        |
| Brazil         | 74.9                    | 73.3                   |                         |                                        |
| Ghana          | 79.0                    | 69.2                   |                         |                                        |
| Philippines    | 80.6                    | 68.9                   |                         |                                        |
| Kenya          | 100.0                   | 67.6                   |                         |                                        |
| Denmark        | 63.9                    | 63.8                   |                         |                                        |
| Nicaragua      | 61.7                    | 59.8                   |                         |                                        |
| Honduras       | 66.8                    | 59.5                   |                         |                                        |
| Canada         | 59.2                    | 59.1                   |                         |                                        |
| Ceylon         | 88.2                    | 57.1                   |                         |                                        |
| Chile          | 54.3                    | 54.1                   |                         |                                        |
| Venezuela      | 53.9                    | 53.7                   |                         |                                        |
| Dominican Rep. | 54.7                    | 52.7                   |                         |                                        |
| Paraguay       | 55.3                    | 52.4                   |                         |                                        |
| Tunisia        | 54.7                    | 52.3                   |                         |                                        |
| Finland        | 51.2                    | 51.2                   |                         |                                        |
| Switzerland    | 50.1                    | 50.1                   |                         |                                        |
| El Salvador    | 53.9                    | 49.4                   |                         |                                        |
| Sierra Leone   | 61.7                    | 42.7                   |                         |                                        |
| Ireland        | 40.6                    | 40.5                   |                         |                                        |
| Colombia       | 39.1                    | 37.2                   |                         |                                        |
| Cyprus         | 33.3                    | 33.2                   |                         | 1974                                   |
| Guatemala      | 32.4                    | 31.1                   |                         |                                        |
| Austria        | 27.8                    | 27.8                   |                         |                                        |
| Luxembourg     | 26.5                    | 26.5                   |                         |                                        |
| Malawi         | 26.6                    | 26.1                   |                         |                                        |
| Japan          | 25.8                    | 25.7                   |                         |                                        |
| Mexico         | 22.7                    | 22.5                   |                         |                                        |
| Panama         | 4.2                     | 4.2                    |                         |                                        |