completely independent events. Or expressed the other way around:

$$H(x+y) < H(x) + H(y),$$

the uncertainty of a joint event is always smaller or equal to the sum of the uncertainties of the individual events. Let me illustrate this on an oversimplified example, which however, can be developed into a calculus of general validity.

Assume that there is a highly specialized physicist P, who knows only one proposition:

$x =$ "electrons are negative"

Assume furthermore that there is a highly specialized biologist B, who also knows only one proposition:

$y =$ "elephants are gray"

Using the conventional logical symbols $\vee$: &: $^-$: for "or"; "and"; "negation," respectively, the physicist's knowledge of the universe can be stated as follows:

$$x \,\&\, (y \vee \bar{y})$$

which, in words, says: "electrons are negative: and elephants are gray or elephants are not gray."

While the biologist's picture of the universe is:

$$y \,\&\, (x \vee \bar{x})$$

which, in words, says: "elephants are gray: and electrons are negative or electrons are not negative."

This situation of the knowledge of the two independent scholars can be neatly expressed in form of a "truth-table" associating the numbers 1 and 0 with "true" and "false" respectively for the propositions x and y and the associated logical functions as expressed above. The truth-table for the two gentlemen reads thus as follows:

		P	B
x	y	$x \,\&\, (y \vee \bar{y})$	$y \,\&\, (x \vee \bar{x})$
0	0	0	0
0	1	0	1
1	0	1	0
1	1	1	1

In other words, the physicist will always believe to have made a true statement when x is true, independent of whether y is true or false. Similarly the biologist, *mutatis mutandis*.

However, if the two gentlemen are forming a coalition by establishing, say, a "Biophysical Society" the truth-table of the Society is clearly dictated by the knowledge of both scholars together and thus reads:

		Bph. S.
x	y	$x \,\&\, y$
0	0	0
0	1	0
1	0	0
1	1	1

Comparing the truth-table of the society with the truth-tables of the individuals one easily sees that the number of instances in which the response "true" is elicited for a particular state of the universe has decreased after coalition, hence the society is less credulous than the individuals, its uncertainty is diminished and it will respond with "true" only if the universe is adequately described: "electrons are negative and elephants are gray." These considerations can be expanded considerably and it is not difficult to show that with a sufficient number of elements each of which possesses only a very limited knowledge, an arbitrary degree of certainty with respect to their universe can be obtained if these elements are capable of exchanging the little bit of knowledge they possess, or, in other words, if they form a coalition by communication.

Amongst the flood of examples which could be cited in support of this thesis, let me briefly mention only the strikingly increased survival value for living organisms when associated in coalitions. The number of unicellular organisms on this planet is about of the order of 10^{17}. This is quite an impressive number if one considers that this is approximately the age of the universe expressed in seconds.

Although there are by far less insects on this globe than unicellular organisms, the number of cells which have organized themselves into insects is of the order of 10^{20}. Hence, a cell participating in a "coalition" called, *e.g.*, "mosquito," is about a thousand times more stable than being isolated. However, these numbers are dwarfed, if we look at a cellular aggregate of the size of Homo sapiens. With each of us representing a colony of approximately