analysts. Without this kind of follow-up, international projects which capture the public imagination at the time become little more than grandiose and expensive scientific stunts. The Meteorological Office must therefore be congratulated on a very considerable achievement.

The charts provide a major contribution to the study of the general circulation of the atmosphere or, what is much the same thing, the climatology of the atmosphere, between the surface and about 30 km height (10 mbar pressure). The vertical section is interesting near the latitude of the maximum of the sub-tropical jet stream. Routine daily synoptic data do not suffice to give any adequate idea of the constancy and meandering of this current centred at a height of about 12 km, a little below the tropopause, so that this daily series presents unique information. On the average December chart for 1958 are shown five distinct jet-stream wavelengths with the maxima of north-south component attaining 5 to 10 m/s, compared with a maximum west-east current varying from about 15 to over 50 m/s. The smallest speed at this latitude is at longitude 120° W, the greatest at 130° E, the extreme east and west of the Pacific Ocean. These agree well with established climatic features, the speeds being in fair agreement with the means shown on upper-air climatic charts, but the meanderings seem more pronounced. The daily charts naturally show much greater variability.

Apart from their intrinsic interest, the data on the charts can be used to compute statistics of central significance in general circulation theory such as the monthly mean fluxes and eddy fluxes of momentum, energy and water vapour. A paper by the compilers of these charts, Murray, Parker and Collison, recently appeared in the *Quarterly Journal of the Royal Meteorological Society* (p. 92; 1969) presenting some of these derived data, and much more of value can be extracted. It is interesting that another combined attack on the world's atmospheric circulation is being planned for the mid-1970s, but against a much advanced theoretical background. The hope then will be to predict and not merely to record the day to day changes. This change in objective is a good indication of the progress made since the IGY, but the IGY data still remain the most complete collection we have.

R. C. SUTCLIFFE

Correspondence

Probability and Prejudice

SIR,—Concerning the prisoners: Matthew, Mark and Luke (*Nature*, 221, 291; 1969); if two execution victims were to be selected in succession by a random ballot, Matthew's joint probability of being executed with either Mark or Luke—in any order—is $2/3$. Having survived the first ballot, Matthew is entitled to feel happier, for his conditional probability of execution on the second ballot is now $1/2$. Note that this is conditional to his surviving the first ballot. The first diagram depicts this situation.

These probabilities thus derived are termed "subjective", for they are derived from a two-stage ballot which Matthew subjectively evaluates as equivalent to his real-world event: execution of two prisoners whose identities have been predetermined.

One element of confusion in this problem is provided by the reference to a "posterior probability" after additional information is provided by the jailer. What additional information, relevant to his own fate, has Matthew received from the jailer? None! The jailer could equally have answered instead: "Luke is to be executed" without providing useful information to Matthew.

When he posed the question to the jailer, Matthew had already reasoned that at least one victim must occur

TWO VICTIMS TO BE SELECTED BY RANDOM BALLOT AT EVENT FORKS X, Y

within the pair, Mark and Luke, taken together. Presumably, he must have also been indifferent as to which one was this victim: because the omission of a statement of any subjective preferences would make the problem incomplete, it is assumed such subjective factors are absent. He now invokes his own decision to make this victim the choice of the first ballot, as shown below in the schematic diagram.

The question now arises whether this subjective viewpoint is equivalent to the real-world event which Matthew is evaluating. Because it is "subjective" by definition, this equivalence cannot be measured by any outsider by any absolute means—this is where the indefiniteness of subjective probabilities is galling to exact scientists!

We can, however, at least insist that Matthew's subjective evaluation be rational and consistent. The second diagram cannot rationally be reconciled with the prior schematic diagram as representative of the real-world by reason of the arbitrary order of selection introduced at X. Matthew may have subjective reasons for preferring the second diagram (such as the jailer hating Mark, who therefore becomes first choice), but he cannot regard both diagrams as reasonable and consistent. He therefore cannot feel happier.

Yours faithfully,

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ELDO's Future Programme

SIR,—May I clarify a point in your paragraph on ELDO's Future Programme (*Nature*, 221, 990; 1969).

The undertaking which the Government has given in regard to Blue Streak covers supply "to ELDO, to

Member States of ELDO, or, in the event of the dissolution of ELDO, to former Members of ELDO or to any grouping of former Members".

Yours faithfully,

R. H. W. BULLOCK

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Dissemination of Scientific Information

SIR,—In his letter entitled "Scientists Informed" (*Nature*, 220, 1056; 1968) Mr Hyde concludes that it is necessary to develop a computer and associated software, specifically for information retrieval.

He also concludes that present attempts (presumably without exception) in this field are a failure. I could cite a number of places where practising scientists would disagree with him. For example an SDI system (ASCA) has recently been evaluated at the National Physical Laboratory; in consequence it is being introduced more widely throughout that laboratory. In this system over 2,000 of the world's prime scientific and technological journals are searched on behalf of a subscriber in accordance with his personal instructions (profile). The subscriber receives a weekly list describing articles of interest to him.

If an organization appoints a man to implement an entirely new system for a specific purpose he will probably review what exists, but is likely to be overcome by the exciting prospect of creating the "ideal" system. He will need the attributes of a scientist, business man, computer expert, politician, budgetary controller and fund raiser.

Implementation means that the project must be treated as a properly costed and scheduled development programme, must be "sold" to, and must also be used by the appropriate section of the scientific community.

It will not be a spur to efficiency if the organizers know, in the likely event of over-expenditure, that they will be able to conceal development and overhead costs. The users will have to pay for the service, directly or indirectly. To establish cost-effectiveness they should know whether they will be called on to subsidize the service through subscriptions or taxation, or whether the preparational costs will be amortized with the running costs.

These problems and costs, however, may be greatly mitigated if a different view is taken. As Mr Hyde says, let us continue with research—hopefully to fulfill the 25 year old prophesy of Vannevar Bush—but let it also be appreciated that it is perfectly feasible today to get off the ground quickly with an effective system at an acceptable cost.

Hardware is available and a specific data base may be created by capitalizing on or combining (merging) existing files or by using an existing system as it stands. This is the kind of realistic approach which has been adopted at some places in Europe—for example at Datacentralen in Copenhagen and at the Tekniska Hogskolan in Stockholm.

We can innovate for tomorrow, but also adapt for today.

Yours faithfully,

A. E. CAWKELL

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Life in the Big Cities

SIR,—An article in *Nature* (221, 1085; 1969) reasonably questions the validity of ring roads as a remedy for jams of radially moving traffic.

Should not suspicion be directed also at one-way traffic

schemes? Any arbitrary interference with the concept that the optimum road cost economy is achieved by the identity of vehicle mileage with the minimum point to point mileage requires potent justification.

In a word, in any circumstances where vehicles are attempting to move X yards from A to B and the direct course is denied by one-way circuitry the road/vehicle occupancy cost may be multiplied 2, 3 or 4 times.

Yours faithfully,

R. BAILEY

7 St Mary's Road,
Ealing W5.

ERRATUM. In the article "Reversible Activation of Lysosomes by Dimethyl Sulphoxide" by Misch and Misch (*Nature*, 221, 862; 1969), the last sentence of paragraph six should have read "The data also indicate a greater loss of enzyme during washing . . .".

ERRATUM. In the course of editing the article "Native and Denatured DNA of Phage T3 and of *E. coli* B as Templates for RNA Polymerase" by Cheong and Chargaff (221, 1144; 1969) the sense of the fourth paragraph on page 1145 was seriously changed. The passage beginning with the second sentence should read: "Of course, the reconstruction of normal conditions cannot be complete. The DNA of *E. coli* probably exists in the cell as a much larger molecular species¹¹ than can be isolated, whereas T3 DNA (molecular weight 23×10^6)^{12,13} is presumably nearly intact. Interpretation also is made difficult by the close similarity in nucleotide composition of T3 and *E. coli* DNA^{4,14}."

ERRATUM. In the article "Two 3'-Terminal Sequences in Satellite Tobacco Necrosis Virus RNA" by Wimmer and Reichmann (221, 1122; 1969), the base pairing indicated in paragraph five on page 1125 is incorrect as it stands. It should read:

. . . GpApCpUpApCpCpCoh
. . . UpGpApp

ERRATUM. In the article "Lymphocyte *in vitro* Cytotoxicity: Specific Release of Lymphotoxin-like Materials from Tuberculin-sensitive Lymphoid Cells" by Granger *et al.* (221, 1155; 1969), two of the references were incorrectly renumbered. On page 1156, references "8" and "9" on lines 24 and 25 in the right-hand column should have been "7" and "8".

ERRATUM. In the article "Unexpected High Incidence of Tumours in Thymectomized Mice treated with Anti-lymphocytic Globulin and *Mycobacterium leprae*" by Gaugas *et al.* (221, 1033; 1969), the fourth line of the third paragraph should have read "fed on pellet diet, 41b", not "4 pounds". Only one of the authors, F. C. Chesterman, is from the Division of Experimental Biology and Virology, Imperial Cancer Research Fund. J. M. Gaugas is, with the other authors, from the National Institute for Medical Research.

ERRATUM. In the article "Molecular Determinants of Obligate Psychrophily" by Malcolm (221, 1031; 1969), an error was made in the legend to Table 1. The specific activities quoted should have been "μmoles of amino-acid charged/h/mg of protein".

ERRATUM. In the article "Graphite Formation from Low Temperature Pyrolysis of Methane over some Transition Metal Surfaces" by S. D. Robertson (221, 1044; 1969) the second sentence of the first paragraph should have read "These carbonaceous products, however, begin to show a significant degree of three-dimensional layer ordering only at deposition temperatures of around 2,000°C to 2,500°C (refs. 3-5)". The last sentence of the fourth paragraph should have read "The exact correspondence of all the observed $(h, k, h+k, 0)$ and $(h, k, h+k, 1)$ reflexions is self-evident and thus confirms the structural equivalence of these carbons".