ASSIGNMENT: HIT A TARGET 6000 MILES AWAY

Can you guide a 110-ton Air Force Titan missile far up into the sky, to bring its nuclear warhead down with pinpoint accuracy on a target one-fourth the way around the globe—a target you not only can’t see but which continually moves with the spinning earth?

This was the problem in missile guidance the Air Force presented to Bell Telephone Laboratories and its manufacturing partner, Western Electric. The answer was the development of a command guidance system which steers the Titan with high accuracy.

Unlike self-contained systems which demand complex guidance equipment in the missile itself, Bell Laboratories Command Guidance System keeps its master control equipment on the ground where it can be used over and over again. Thus a minimum of equipment is carried in the missile, and the ground station has full control of the missile during its guided flight. Techniques drawn from the communications art render the system immune to radio jamming.

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(Karmen, A . . . J. Clin. Invest. 34, 131-33; 1955.)

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APPLICATION FOR HOTEL RESERVATIONS
127th AAAS MEETING
New York, 26-31 December 1960

The five hotels for the AAAS New York meeting have established special, low, flat rates and have reserved appropriately large blocks of rooms for this meeting. Thus everyone making room reservations for the AAAS meeting is assured substantial savings.

The list of hotels and the reservation coupons below are for your convenience in making your hotel reservation in New York. Please send your application, not to any hotel directly, but to the AAAS Housing Bureau in New York and thereby avoid delay and confusion. The experienced Housing Bureau will make assignments promptly; a confirmation will be sent you in two weeks or less.

If requested, the hotels will add a comfortable rollaway bed to any room, at $8.00 per night. Mail your application now to secure your first choice of desired accommodations. All requests for reservations must give a definite date and estimated hour of arrival, and also probable date of departure.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE
For a list of the headquarters of each participating society and section, see page 230, Science, 22 July. Both the Commodore and the Biltmore are AAAS headquarters hotels.

<table>
<thead>
<tr>
<th>Hotel</th>
<th>Single</th>
<th>Double Bed</th>
<th>Twin Beds</th>
<th>Suites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commodore</td>
<td>$8.50</td>
<td>$14.00</td>
<td>$15.50</td>
<td>$21.00 to $52.50</td>
</tr>
<tr>
<td>Biltmore</td>
<td>8.50</td>
<td>14.00</td>
<td>15.50</td>
<td>45.00 and up</td>
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<tr>
<td>Roosevelt</td>
<td>8.50</td>
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<td>Belmont Plaza</td>
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<td>30.00 and up</td>
</tr>
<tr>
<td>Waldorf-Astoria</td>
<td>10.00</td>
<td>16.00</td>
<td>18.00</td>
<td>45.00 and up</td>
</tr>
</tbody>
</table>

* All rates are subject to a 5% New York City tax on hotel room occupancy.

---------------------- THIS IS YOUR HOUSING RESERVATION COUPON ----------------------

AAAS Housing Bureau
90 East 42nd Street
New York 17, N.Y.

Date of Application .................................................................

Please reserve the following accommodations for the 127th Meeting of the AAAS in New York, 26–31 December 1960:

TYPE OF ACCOMMODATION DESIRED

Single Room .................................. Double-Bedded Room .................. Twin-Bedded Room ..............

Suite .................................. Desired Rate .......................... Maximum Rate ..................

(Desired rate and maximum rate apply only to suites)

Number in party .................................. Sharing this room will be: ..................

(Attach list if this space is insufficient. The name and address of each person, including yourself, must be listed.)

First Choice Hotel .......................... Second Choice Hotel ................. Third Choice Hotel ..............

DATE OF ARRIVAL .......................... DEPARTURE DATE ..................

(These must be indicated—add approximate hour, A.M. or P.M.)

NAME ........................................ (Individual requesting reservation)

ADDRESS ................................. (Please print or type)

(Street) .................................. (City and Zone) .................. (State)

Mail this now to the Housing Bureau. Rooms will be assigned and confirmed in order of receipt of reservation.
and the comprehension of such content by children in the normal intelligence range is truly surprising, particularly in the light of our current expectations of children.

I have written at greater length elsewhere on this theme [see my article in The Science Teacher (March 1960)], and I expect to spend the next several years assessing the feasibility of elementary-school science programs based on content selection by professional scientists.

J. MYRON ATKIN
College of Education,
University of Illinois, Urbana

Weather Forecasting

In his recent article "The atmosphere in motion" [Science 131, 1287 (1960)], Robert R. Long has presented an interesting summary of his well-known work on the channel flow of stratified fluids, and the comparisons between theory and experiment which he presents are impressive. I think most dynamic meteorologists would certainly agree with him in stressing the need for a great deal more basic hydrodynamical research in order to strengthen the foundations of dynamical weather prediction. I also feel that he would find few who would quarrel with the statement that forecasting accuracy has improved little in the past 40 years or so, although more variables are now predicted over greater regions of the atmosphere. Long's introductory remarks on the role of numerical weather forecasting in the past decade, however, may be misleading to the general scientific reader and deserve some comment.

The numerical (or dynamic) forecasts now used subjectively by the forecasting meteorologist differ from his other sources of information in at least two important and fundamental respects. In the first place, the numerical forecasts represent the result of a systematic application of dynamical equations to the problem of large-scale atmospheric flow and are in this sense objective and reproducible. Secondly, the numerical forecasts may be (and have been) systematically improved by the introduction of more realistic models and previously neglected physical effects, as well as by improvement of the numerical procedures employed in the solutions. From a practical viewpoint the test of a forecast is, of course, its accuracy, and in this respect the present numerical predictions are disappointing in some ways. The low-level forecasts issued, for example, by the Joint Numerical Weather Prediction Unit in Suitland, Md., are not superior to those produced by the usual synoptic means; the higher-level (500 millibar) numerical forecasts, on the other hand, are now more accurate for periods up to 3 days than other comparable forecasts. This recent improvement has resulted from the systematic error reduction noted above. In view of the many physical and mathematical approximations incorporated in present operational models, I feel that their performance is more surprising than disappointing: relatively simple dynamical methods are here effectively competing with all of the synoptic calculations and intuitive skill of the forecaster.

From a broader viewpoint, the numerical integrations represent an attempt to verify the same set of basic dynamical equations with which Long is concerned, although for larger-scale phenomena, in which different physical effects are important. While the comparison of theory and observation is here poorer than in the more restricted experiments of Long, I feel there is good reason to entertain more optimism than he suggests is in order. The small but systematic improvement in the prediction of the large-scale flow is here, I believe, a significant improvement. As this scale of motion is progressively better understood, the results of research on small-scale phenomena--of which Long's studies of tornado-like circulations is an excellent example--may then be incorporated into the overall dynamical picture and should result in further systematic forecast improvement, especially for the smaller-scale motions which are closely associated with our subjective impressions of "weather."

W. LAWRENCE GATES
Department of Meteorology,
University of California, Los Angeles

Binocular Fusion of Colors

In an article entitled "Colors of all hues from binocular mixing of two colors" that appeared in Science [131, 608 (1960)], the following statement was made by Geschwind and Segal. "The problem of binocular fusion of colors has interested investigators since Hecht's demonstration in 1928 that presenting red to one eye and green to the other led to a subjective sensation of yellow..." Hurvich and Jameson... confirmed these results; it is today generally accepted that such fusion is readily obtainable in most subjects." A major finding of the article by Hurvich and Jameson cited by Geschwind and Segal was the following: "The fact that does clearly emerge from these results is that, unless there is a yellow
further discussion on radiation-produced radicals in living and dead materials. E. L. Powers (Argonne) gave a concluding paper on the role of free radicals in the lethal effect of x-rays on dry bacterial spores.

The symposium was a unique, congenial, and timely meeting, devoted to a subject matter of rapidly growing interest. The proceedings will be published by Academic Press and should appear later this year.

M. S. Blois

Biophysics Laboratory, Stanford
University, Stanford, California

Forthcoming Events

August

21–6. Pacific Science Cong., 10th, Honolulu, Hawaii. (Secretary-General, 10th Pacific Science Cong., Bishop Museum, Honolulu 17)


22–26. Plasma Physics, symp., Gatlinburg, Tenn. (University Relations Div., Oak Ridge, Inst. of Nuclear Studies, P.O. Box 117, Oak Ridge, Tenn.)

22–26. Western Resources, 2nd annual conf., Boulder, Colo. (M. E. Garnsey, Dept. of Economics, Univ. of Colorado, Boulder)


23–25. Cryogenic Engineering Conf., Boulder, Colo. (K. D. Timmerhaus, CEC, Dept. of Chemical Engineering, Univ. of Colorado, Boulder)


23–26. Institute of Mathematical Statistics, annual, Stanford, Calif. (W. Kruskal, Dept. of Statistics, Eckhart Hall, Univ. of Chicago, Chicago 37, Ill.)


24–27. Internal Medicine, 6th intern. cong., Basel, Switzerland. (Secretariat, 6th ICIM, 13 Steinentorstrasse, Basel)

24–2. International Union for the History and Philosophy of Science, Stanford, Calif. (R. Taton, 64, rue Gay-Lussac, Paris 5e, France)

25–27. Chemical Organization of Cells,