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OF THE WEEK

RESEARCH NOTES

ARTICLES

DEPARTMENTS

COVER: In 1933 Robert J. Van de Graaff completed this, his first electrostatic accelerator. The Van de Graaff accelerator was one of the inventions that made modern subatomic physics possible. A tower like those in the picture can be more closely examined at the National Museum of History and Technology's exhibit, Atom Smashers: Fifty Years. See p. 410. (Photo: Smithsonian Institution National Museum of History and Technology)

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LETTERS

Gas-phase kinetics

The article on dioxirane (SN: 10/19/77, p. 340) prompts me to comment on your coverage of gas-phase kinetics.

The concept of a chemical mechanism is often misunderstood. A mechanism may be defined as a set of elementary reactions that are postulated to transform reactants into products under certain conditions. Although a very large number of elementary reactions are occurring at the same time, it is sometimes possible to identify a few reactions which, by themselves, are consistent with experimental observations.

Part of the realm of kinetics is to determine if such a set of reactions exists. Even when a mechanism exists for a simple system such as gas-phase $H_2 + \frac{1}{2}O_2 \longrightarrow H_2O$ or $2HI \longrightarrow H_2 + I_2$, it has been found that a slight change in conditions (usually temperature) significantly changes the mechanism.

The mechanism *proposed* by the NBS is therefore subject to the criticisms which have historically plagued gas-phase kinetic studies: (1) does the mechanism at low temperature have any relation to what happens 2000° C above their experimental conditions, (2) were they unable to detect kinetically important molecular species, (3) does the lack of thermodynamic properties of the proposed intermediate dioxirane allow unreasonable assumptions, e.g., perhaps dioxirane simply appears during the reaction, but has nothing to do with why the reaction occurs.

The last sentence of the article might better end "...The reactions of other terminal olefins (those with a carbon-carbon double bond at one end of the chain) with *ozone* are found to contain compounds functionally similar to dioxirane."

Dr. David E. Hughes
Binghamton, N.Y.

The smell of the fox

When I read "Smell Signals in Fox Scavenging" by Joan Arehart-Treichel (SN: 11/19/77, p. 348) something about the thesis struck me wrong. Why should one fox care that some strange fox be able to more efficiently search for food, and thus deposit a urine signal so that "the latter [fox] will not waste its time looking for food at that spot"?

More likely, it seems to me, that a fox will deposit a urine signal as a bookkeeping system for *itself*. If it comes across that place again, it will recognize its own odor and not bother searching there a second time. Now a second fox, which does its own bookkeeping, will also not bother searching at the spot with the urine signal, because it will recognize that another fox has been there before and checked out the spot. If the food odor is still very strong, though, it might suspect that the first fox missed something, and investigate anyway and, finding nothing, urine mark the spot a second time *for its own reference*.

The results of the two systems will be precisely the same, but the motivations are very different. Human beings are seldom altruistic toward strangers; why should foxes be more so?

Trudy Bell
New York, N.Y.

Your report on scent marking and scavenging behavior in red foxes was very interesting. However, there was nothing conclusive in Henry's experiments that demonstrated scent marking food odors was an altruistic behavior. The fact that other foxes benefit from this behavior may be purely coincidental.

Jill A. Stoecker
Boulder, Colo.

Listening to the moon

I was reading your article on the Apollo ALSEP packages transmitting from the lunar surface (SN: 10/1/77, p. 213), and wanted to thank you for including the frequencies on which they are transmitting. There are many amateur operators such as myself who are deeply interested in space communications and satellite tracking. We have several satellites of our own up, open to any ham who has the facilities, and there is a regular group who work EME, or "moon bounce" communications (the moon acting as a reflector in space).

Darryl Likkel
WB7EPL
Lynden, Wash.

The German accomplishment

I read with interest Janet Raloff's dispatch from the International Scientific Forum on an Acceptable Nuclear Energy Future (SN: 11/26/77, p. 361) concerning Germany's ability to raise its gross national product without jacking up its energy use so much as all the rest of the countries in the Meinel study. For some reason, the story used Germany as its peg, but veered off before any explanation, however short, could be offered of just what Germans were doing to accomplish this. Following up this angle would, I'm sure, make an absorbing story in itself for a future issue of SCIENCE NEWS.

Maybe the Germans are using more coal than we do; I haven't heard of them using any solar energy schemes, so what's the secret?

Peter H. Johnson
Doylestown, Penn.

(The Meinels were intrigued but have yet to find an explanation for Germany's accomplishment.—Ed.)