Busch *et al.* believe that they have witnessed a memory or threshold type of action, but they confess to being eager to publish their first results of switching in a liquid alloy before embarking on what must necessarily be a highly speculative assay on the theory.

METAL VAPOURS

New Way of Synthesis

from our Inorganic Chemistry Correspondent

SINCE Skell and Westcott (*J. Amer. Chem. Soc.*, **85**, 1023; 1963) first described the production and reactions of carbon atoms in the gas phase, the use of high temperatures and low pressures to produce unstable gaseous atoms and molecules, which can be rapidly reacted with stable molecules to produce new compounds has been of increasing importance.

Recently P. L. Timms (*Chemical Communications*, 1033, 1969; *J. Chem. Soc.*, A, 2526; 1970) has extended this technique to the production of vapours of transition metal atoms at very low pressures ($\sim 10^{-5}$ Torr) and has shown that these vapours can be reacted with gaseous compounds such as trifluorophosphine, PF_3. The reactions proceed cleanly and give good yields in gram quantities of several unusual compounds which are either unknown or difficult to prepare by other methods.

For example, when chromium vapour is reacted with PF_3 the compound $Cr(PF_3)_6$ is produced in 60 per cent yield on the metal. If benzene vapour is used instead of PF_3, chromium dibenzene, $(C_6H_6)_2Cr$, is produced.

When iron vapour and trifluorophosphine are used, two volatile products are isolated; the first is the already known compound $Fe(PF_3)_5$, and the second has the molecular formula $Fe_2P_8F_{22}$, and seems to have the structure $(PF_3)_3Fe(PF_2)_2Fe(PF_3)_3$. With cyclopentadiene iron vapour gives ferrocene, $(C_5H_5)_2Fe$. With benzene, however, iron vapour forms a compound which explodes on warming to $-50°$ C; this may be $(C_6H_6)_2Fe$.

Cobalt, nickel and palladium vapours give with trifluorophosphine respectively $[Co(PF_3)_4]_x$, $Ni(PF_3)_4$ and $Pd(PF_3)_4$. The palladium compound is fairly unstable and decomposes back to metallic palladium and trifluorophosphine. Oddly enough no compounds are formed with manganese or copper vapours.

Timms has also shown that the transition metal vapours can be reacted with mixtures of volatile compounds to give compounds containing mixed ligands. Thus when vapour is reacted with a mixture of phosphine, PH_3, and trifluorophosphine, PF_3, both $Ni(PF_3)_4$ and $Ni(PF_3)_3PH_3$ are formed.

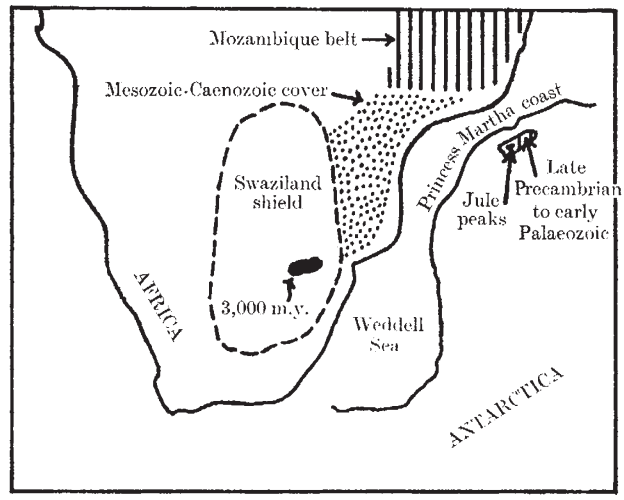
It is very likely that transition metal vapour reactions will prove useful in the synthesis of a wide range of new transition metal compounds of low oxidation state, and may in many cases provide an easier synthetic route to already known compounds.

CONTINENTAL DRIFT

Dating the Fit

from our Geomagnetism Correspondent

THE matching of discrete geochronological zones across the boundaries of continents thought to be adjacent before the onset of continental drift does not, in itself, prove that drift has occurred, but it is strong supporting evidence. The correlations across the boundary between South America and Africa are particularly impressive because they are based on many dated rocks. Other pre-drift configurations have not been so well documented geochronologically, however; and the fit of Antarctica with southern Africa has hardly been examined at all in this way. But Halpern (*Science*, **169**, 9771; 1970) has obtained a rubidium–strontium age of 3,060 ± 80 million years from a single sample of biotite granite from Jule Peaks, Antarctica. This is comparable with the age of the granites of the Swaziland shield (see map). He suggests that this supports the continental reconstruction of Dietz and Sproll (*Science*, **167**, 1612; 1970) in which the Princess Martha coast of Antarctica fits against the coast of southern Africa—as long as the Swaziland shield extends north-eastwards below the observed Mesozoic–Caenozoic cover.



One swallow does not, of course, make a summer; but to support his claim, Halpern has also collected information on the stratigraphy of the relevant coasts and finds some general correlations. Thus the early Palaeozoic to late Precambrian granitic rocks of the Mozambique belt (about 440 to 800 million years) correspond in age to sedimentary and crystalline rocks in Antarctica. Precambrian sedimentary rocks in the age range 1,400 to 1,800 million years are also found in both regions, as are late Palaeozoic to Jurassic volcanics. To these must be added the new Precambrian correlation, although many more ages are required to make it really convincing. Incidentally, Halpern's biotite granite is the oldest Antarctic rock reported so far.

RAMAN SPECTROSCOPY

Impact of the Laser

from our Inorganic Chemistry Correspondent

LASERS have wrought a transformation in Raman spectroscopy through their use as sources of illumination. The recent rapid growth of interest was evident at the international conference on Raman spectroscopy, held in Oxford from September 13 to 17. Whereas a few years ago it was difficult and sometimes impossible to