the tube. Since charring would be expected to produce a mixture of carbon and strongly paramagnetic cobaltous phosphate, we attach no significance to either the sign or magnitude of the susceptibility of this preparation.

The Merck preparation appeared to be homogeneous and gave consistent results on repeated measurement. The Bohr magneton number of this material, calculated from the susceptibility after correcting for the diamagnetic contribution of the remainder of the molecule, is in fairly good agreement with that expected for an ionic compound of Co^{II}. However, the variable orbital contribution found in different cobaltous compounds somewhat diminishes the significance of the exact magnitude of the magneton number.

In spite of the agreement between different runs on this material and the fact that the susceptibility is quite consistent with that expected for an ionic Co^{II} compound, we are inclined to suspect that this result is due to uniform contamination with a small amount of strongly paramagnetic or ferromagnetic impurity. Since we are not equipped to measure the field strength dependence of the susceptibility, the last-mentioned possibility could not be investigated experimentally. The question as to whether vitamin B_{12} may exist in one form as cobaltous compound undoubtedly justifies further laboratory investigation.

We regard it as significant that the Merck 9R-5168 sample was not obviously different in color or appearance from other samples of B_{12} which were diamagnetic.

Of 3 samples of vitamin B_{12b}, one (Upjohn 233-WGJ-7) was diamagnetic, and consequently must be a hexacoordinated covalent cobaltic complex. Another sample (Upjohn 239-WGJ-7) was available in smaller amount, but one run showed it to exhibit weak paramagnetism. We believe this result probably is due to the presence of a para- or ferromagnetic impurity. The third (Lederle NP-92-184-7) had been charred in sealing the tube, and the erratic paramagnetism is without significance.

In summary, samples of vitamin B_{12} and vitamin B_{12b} have been found to exist in the form of covalent cobaltic complexes with octahedral d^2sp^3 bonding. The possibility that these substances may exist as cobalt compounds exhibiting other types of bonding requires further investigation.

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Some Adsorption Colors and their Significance for Tautomeric and Thermochromic Effects

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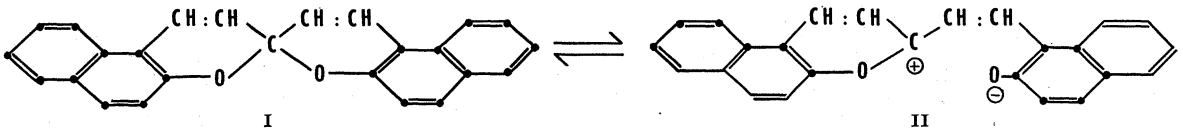
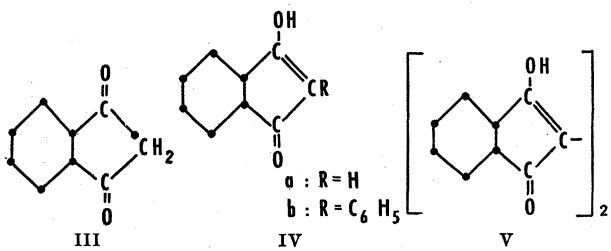
Some spiropyrans are colorless substances which form colorless solutions in cold inert solvents, whereas the hot solutions are intensely colored, e.g., violet-blue in the case of β-dinaphthaspiropyran (I); the phenomenon is reversible. The color change is usually explained by the formation of a heteropolar molecule, betaine (*1*), (compound II).



I II

The correctness of this hypothesis was recently questioned by Hukins and Le Fèvre (*2*), but the proof of the explanation outlined here may be seen from the following experiment. When a piece of activated alumina[1] is added to the cold colorless solution of (I) in xylene, the surface of the colorless alumina becomes bluish-green immediately. Using a column of activated alumina, the adsorbed material may be eluted by means of methyl alcohol. This experiment is reminiscent of the observations by Weitz and coworkers (*3*). It was found that the colorless triaryl-



III IV V

methyl halides and related substances were adsorbed with the color of the corresponding cation or a similar color, e.g., the colorless triphenylmethyl chloride gives the yellow color of the triphenylmethyl cation, and the colorless base $[(CH_3)_2N \cdot C_6H_4]_3C \cdot OH$ is adsorbed with the violet color of the corresponding cation.

In benzene, 1,3-diketohydrindene (III) gives a colorless solution. When a piece of activated alumina is added to a cold solution of (III) in benzene a violet color results at once. It seems that the violet color is due to the enol form (IVa). Compound IVb is dark red (*4*), and V is violet (*5*).

[1] Obtained from Peter Spence and Sons, Ltd., London.

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Hydatid Disease (*Echinococcosis*) in Alaska and the Importance of Rodent Intermediate Hosts

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Hydatid disease, caused by the larval form of a tapeworm, *Echinococcus granulosus* (Batsch, 1786), is of circumpolar distribution, but has not previously been considered to be of much public health significance in North America. It is the purpose of this paper to present observations on this disease in Alaska, with special reference to its transmission to man.

Magath (*1*) reviewed all known North American cases and concluded that most of these had been contracted abroad. Infections in dogs have likewise been considered rare; in his review of the literature, Riley (*2*) could find but one North American record and concluded that wild carnivora and herbivora serve to maintain this parasite in the United States and Canada. Subsequent work has borne out this conclusion. The occurrence of *E. granulosus* in wild animals in North America has been reviewed by McT. Cowan (*4*).

The data derived from intensive parasitological investigations of the mammalian fauna of Alaska, carried on by us over the past two years, indicate that *E. granulosus* is well established in the Territory, in both dogs and wild canids. In arctic Alaska, particularly, where dogs are commonly very closely associated with man, there is unusual opportunity for human exposure to this parasite. The finding of infected dogs in several arctic Eskimo villages (Barrow, Kotzebue, Wainwright, Unalakleet, Anaktuvuk Pass) indicates that potentially, if not actually, a serious human health problem is involved. In addition, we have recorded this parasite from both red and arctic foxes in northern Alaska, and from the wolf over the greater part of the Territory. Moose and caribou apparently serve as the essential intermediate hosts on the mainland, since the examination of several hundred mammals of other species has failed to disclose the larval infection. The practice of the natives of feeding dogs the discarded parts from moose and caribou enhances the possibilities for canine infection.

Although the status of hydatid disease in Alaska is in general poorly known, preliminary studies on St. Lawrence Island have disclosed, through skin tests with nonspecific *Echinococcus* antigen, a high incidence of human reactors. In the villages of Gambell and Savoonga, positive reactions of 20% (126 persons tested) and 28% (106 persons tested), respectively, were obtained. As is usual under native conditions, dogs here are found in close association with man, but not to any greater degree than in arctic Alaska in general.

FIG. 1. Specimen of *Microtus oeconomus* showing location and appearance of larval cysts of *E. granulosus*.

Autopsy of 26 St. Lawrence Island dogs failed to disclose any animals infected with *E. granulosus*. Five of 7 arctic foxes (*Alopex lagopus*), likewise examined, were found to be infected, however. The mammalian fauna of the island is poor as far as land species are concerned. Red foxes (*Vulpes* sp.) are rare, but occur in small numbers. Various rodents are present: tundra vole (*Microtus*), red-backed vole (*Clethrionomys*), lemming (*Dicrostonyx*), ground squirrel (*Citellus*). A shrew (*Sorex*) occurs on St. Lawrence Island, and the reindeer has been introduced. Of these, only the reindeer is an obvious intermediate host for *E. granulosus*. For some years, however, this animal has not been killed for food, since an effort is being made to increase its numbers. In view of this situation, some other explanation for fox infections was necessary.

Schiller, during the summer of 1950, discovered infections of larval *E. granulosus* in the tundra vole, *Microtus oeconomus inuitus* Merriam, and all available evidence indicates that this rodent is the only impor-