some carbonate, and pigmenting iron oxide. The accessory minerals are estimated to occur as less than 10% of some specimens and usually as less than 80% of most of the typical ocherous Popo Agie.

Recognition of the analcime is based on x-ray powder diffraction patterns, and its optical properties —namely, isotropic character and index of refraction which ranges slightly above 1.487. Loss of weight on ignition of the bulk specimen falls between 9 and 10% by weight.

White to slightly colored oolites represent the purest analcime in the Popo Agie, but it occurs also in the ochre-colored portions. The tiny spheres are definitely oolites (*4*), and are not euhedral to subhedral crystals, as were observed by Bradley (*1*) in the Green River, or by Ross (*8*) in the occurrence from Yavapai Co., Ariz. Ordinary bedding is absent in the analcime rock, but rectangular nodules up to 18 in. on an edge, which weather to well-rounded corners, and massiveness characterize its structure.

The origin of the Popo Agie analcime is tentatively postulated as representing an alteration or reaction product of colloidal clays with strongly saline water, whereby the sodium came from the water and the aluminum and silicon from the clay. In other words, analcime is believed to represent a stable hydrous sodium aluminum silicate in a saline environment, whereas illite might be the stable hydrous potassic aluminum silicate in a less saline marine environment. This origin is similar to the one proposed by Ross (*8*). Microscopic study of the Popo Agie so far has not shown the presence of significant feldspar, mica, shards, or other tuffaceous materials, which occur in the Green River and which are cited (*1*) as the most probable source of aluminum and silicon. It is possible that volcanic dust might still have contributed to the analcime, and that all nonquartz material has been entirely altered in the Popo Agie, leaving behind only fine-grained quartz silt, but there is no positive evidence for that.

The analcime-containing Popo Agie is quite widespread. It crops out in continuous exposure along the northeast flank of the Wind River Mountains. Five localities sampled between Derby Dome (15 miles southeast of Lander) to near Dubois, an airline distance on the northwest of about 70 miles, all show well-developed analcime. The analcime-bearing section on Middle Fork (Sinks Canyon) southwest of Lander is approximately 60 ft thick. Analcime is abundantly present also in the Popo Agie across the Wind River basin in Circle Ridge and Maverick Springs domes on the south flank of the Owl Creek Mountains. It was observed to the west in the faulted Popo Agie high on Red Rocks Cliff along the Gros Ventre River about 20 miles east of Moose, Wyo. Analcime was determined in oolitic ocherous Popo Agie well cuttings[2] at a depth of 4700 ft from Unit #1 Well, South Baxter basin, sec 21, T 16 N, R 104 W, south of Rock Springs, Wyo. Airline distance between the South Baxter basin and Circle Ridge Dome is approximately 150 miles across the Wind River range.

[2] Courtesy M. M. Fidlar, Mountain Fuel Supply Co., Rock Springs, Wyo.

Presumably the analcime rocks extended continuously across this area, or at least were formed throughout at about the same geologic time. They are unique mineralogically and should constitute a good stratigraphic marker. The base of the Popo Agie has not been defined previously (*2, 6*), but the lowest occurrence of analcime may be utilized as a reference surface for the base. The sediments overlying the analcime vary from conglomerate through sandstone to gypsum. The Triassic-Jurassic rocks of Wyoming are scant in index fossils, and the stratigraphy of the section has been controversial. The analcime rocks appear to be a single, definitely, and uniquely recognizable zone which may serve as a datum on which further stratigraphic conclusions may be based. The abundance and availability of the analcime make it worthy of consideration for possible technological use.

More detailed petrographic, chemical, and stratigraphic studies that are in progress will be published later.

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The Activation by Vitamin D of the Phosphorylation of Thiamin

C.-E. Räihä and O. Forsander

Children's Clinic, University of Helsinki, Finland

It appears that vitamin D is intimately linked with the metabolism of phosphorus in the living organism. There are several findings suggesting that the symptoms of rickets depend on changes in the metabolism of phosphorus. Zetterström (*1*) has demonstrated by *in vitro* experiments that phosphorylated vitamin D activates phosphatase obtained from various organs.

The amount of thiamin in food affects the blood and tissue concentration of cocarboxylase (*2*). If this vitamin is given intravenously or intramuscularly, the phosphorylation of thiamin to cocarboxylase proceeds rapidly. In 1951 we tried to determine whether vitamin D affects this synthesis. For the determination of the concentration of cocarboxylase in blood, the writers used the manometric method of Westenbrink (*3*). Alkali-washed yeast was prepared from dried yeast (obtained from Oranjeboom, Rotterdam). The analyses were made in duplicate. First a normal value for the cocarboxylase concentration in the blood of the experimental subjects was determined during 4 days.

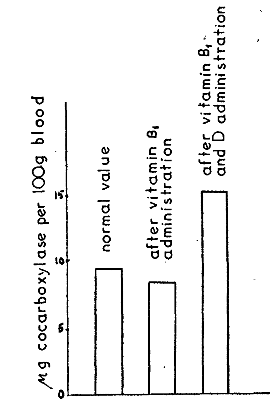

FIG. 1.

After this, the subject was given 0.05 g thiamin intramuscularly for 4 successive days, and finally 500,000 IU vitamin D and 0.05 g thiamin again for 4 successive days. The cocarboxylase concentration in the blood was determined throughout the course of the experiment. In some of the cases, vitamin D strongly activated the synthesis of cocarboxylase. Fig. 1 shows the

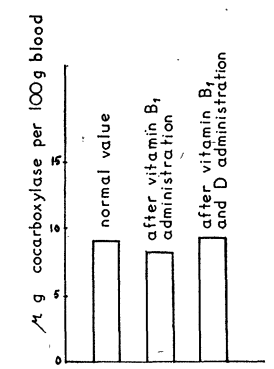

FIG. 2.

typical results of such an experiment. Younger subjects seemed less prone to this activation than older ones. In other cases, there was no activation (Fig. 2). This may have been due to the possibility of the sub-

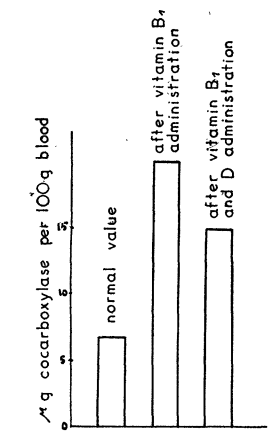

FIG. 3.

ject's having been "saturated" with vitamin D before the experiment. In rickets, no activation was observed (Fig. 3).

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Demonstration Concerning Pressure-Tension Relations in Various Organs

A. V. Wolf

Department of Physiology and Pharmacology, Albany Medical College, Albany, New York

Most textbooks of physiology used in medical schools in this country fail to make use of the formulas of Laplace relating the pressure in a hollow body, its radius of curvature, and the tension in its wall. This neglect has occasioned, for example, misleading theoretical treatments in hemodynamics. Some widely used books base a tendency of an aneurysmal sacculation "to go from bad to worse" on Bernoulli's hydrodynamic principle that along a line of flow in a tube the lateral pressure is increased in a dilated portion, where the velocity of flow is reduced. This, it is true, puts added strain on an arterial wall already weakened by disease processes. But no note is taken that the percentual increase in lateral pressure in such conditions must be quite small, as can be indicated by calculation or by demonstration in models. Actually, the *tension* in the dilated wall, which is the important consideration, tends to increase in proportion to the radius of curvature of the sacculation; and this is the dominant factor.

For a hollow sphere, Laplace's formula states $P = 2T/r$, where P is internal pressure (excess over external pressure), T is tangential tension in the wall, and r is the radius. For a cylinder the formula is $P = T/r$. Practically, the blood pressures in the aneurysm and in the portions of the vessel just proximal and distal to it may be essentially equal. If so, a sacculated segment with radius twice the proximal or distal segments would have to suffer a tension in its wall twice that of the wall of the proximal or distal vessel in order to sustain the pressure. Huge increases in tension may occur in the wall of greatly dilated vessels in which the change in blood pressure, following Bernoulli's theorem, is negligible.

Many students find it difficult to comprehend these pressure-tension relations in blood vessels. A model piezometer of glass or semirigid tubes is inadequate to suggest to an observer the state of tension in its walls. The demands on the imagination can often be obviated by an elementary demonstration in the classroom using a partially inflated tubular balloon (Fig. 1). It is easy for students to grasp the sense of Pascal's law