to speed up the rate of hemoglobin production, when the iron is administered parenterally, indicates to us that the rôle of copper in hemoglobin production must now be evaluated in terms of iron absorption.

The milk used contained an average of 0.34 mg. of copper per liter, as estimated by the Biazzo procedure described by Ansbacher, Remington and Culp.[5] Keil and Nelson[6, 7] have reported the failure of pure iron to cure nutritional anemia, when the milk contained 0.24 mg. of copper per liter. However, in a few rats receiving the same source of milk they found that intraperitoneally injected iron was curative. Our results confirm and extend theirs, although the copper content was somewhat higher in the milk used by us. Preliminary experiments performed in this laboratory indicate that the administration of injected iron solutions also cures rats made anemic on milk containing only 0.14 mg. of copper per liter.

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Variations in Serum Calcium and Phosphorus During Pregnancy.

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The serum calcium and phosphorus were followed in a series of 579 dispensary patients throughout the course of their pregnancy. 3501 determinations were made in the interval between 28 weeks before delivery and 7 weeks postpartum.

Two factors were found to influence the calcium, the development of the pregnancy and the season. As the pregnancy progressed there was a gradual decline which reached a maximum a few weeks before delivery. This decline was not so sharp, from 9.86 mg. to 9.64 mg., during the first 4 months of the year, a season of low values, as during the remaining months, 10.46 mg. to 9.90 mg., but the drop is still significant. The last few weeks preceding delivery show a slight rise in both cases, succeeded immediately after the delivery by a marked increase, to 10.20 mg. and 10.40 mg. respect-

[5] Ansbacher, S., Remington, R. E., and Culp, F. B., *J. Ind. Eng. Chem., Anal. Ed.*, 1931, **3**, 314.

[6] Keil, H. L., and Nelson, V. E., *J. Biol. Chem.*, 1931, **93**, 49.

[7] Keil, H. L., and Nelson, V. E., *J. Biol. Chem.*, 1932, **97**, 115.

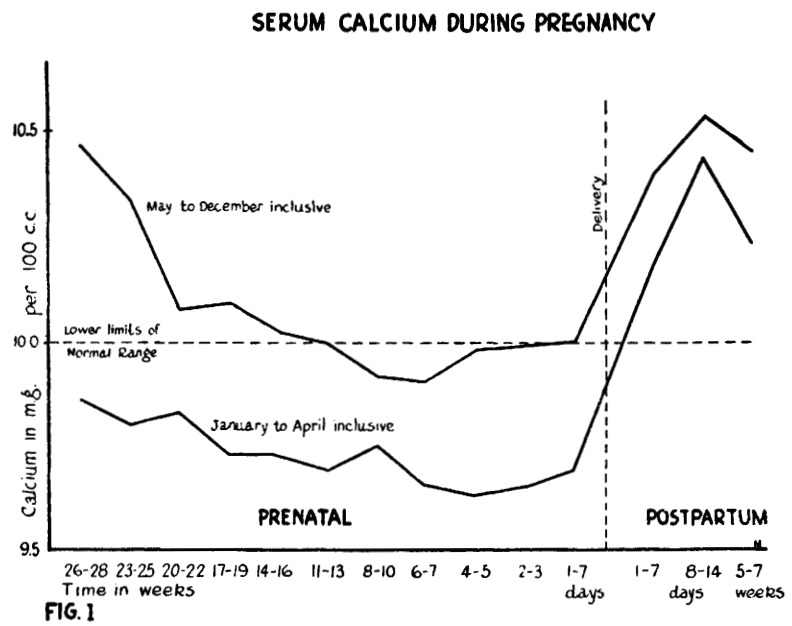

FIG. 1

ively, which was maintained to the end of the study, 5 to 7 weeks postpartum.

The seasonal effect is illustrated by the distinctly lower values found in blood drawn during the first 4 months of the year, the winter months, compared with those of the same stage of pregnancy drawn during the remaining 8 months. The 2 curves, based on averages for each season, are shown in Fig. 1. The depleted state

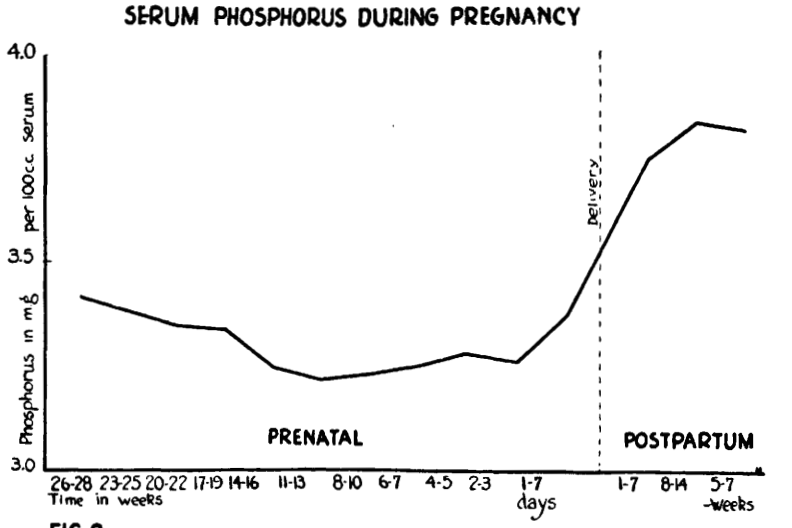

FIG. 2

found during the winter months is clearly demonstrated by the fact that the entire curve, up to the time of delivery, lies below the lower limits of the normal range, 10.0 mg. to 11.5 mg. per 100 cc. of serum, as determined by the authors.[1] The May to December averages are higher, though even these never rise above the lower third of the normal range. The differences between the curves although small at some stages, are in every case significant.

The averages of the serum phosphorus determinations are shown in Fig. 2. The gradual decline, 3.4 mg. to 3.2 mg., which reaches a maximum about 11 to 12 weeks before delivery, although clearly indicated is so slight that it can barely be considered significant. The rise to 3.85 mg. following delivery is, however, immediate and beyond question. There is no evidence of any seasonal variation.

Repeated dental examinations were made on 358 women during 3 months or more of pregnancy. Only 54 showed evidence of active decay within this time. The calcium and phosphorus were studied in 49 of these cases. Each determination on these 49 individuals, some 354 in all, was checked against the range as established by our investigation for the particular interval of the pregnancy in which it fell. Only a few were outside the normal distribution range, and of these an equal number were above and below. In no case were as many as half the determinations on any one person outside the range. There is, therefore, no connection between the teeth and the serum calcium or phosphorus.

[1] Mull, J. W., and Bill, A. H., *J. Lab. and Clin. Med.*, in press.