caused by compaction was discernible in those cores. The chloride content of the sediments appears to be traceable only to the sea water occluded in them (*15*).

The nitrogen analysis data for Red Clay sediments are quite scanty for these most widely distributed ocean sediments. A Red Clay analysis for nitrogen reported by Andree (*16*) is 0.05% nitrogen for a dried core. The Blue Muds contain a considerable amount of organic material; however, no analyses for nitrogen seem to be available.

If one uses the value of 0.06% as the average composition of nitrogen for compacted sediments for all depths, the total quantity of nitrogen present on the ocean floor would amount to about 1.0×10^{14} metric ton-atoms accumulated from Cambrian times.

Perhaps such an assumption regarding the uniformity of nitrogen in sea sediments is not too bad for those sediments formed during the time that the atmosphere contained oxygen. It is almost certainly too low a value for sediments formed under a reducing atmosphere containing ammonia and methane, as postulated by Poole (*17*). The formation of insoluble organic compounds containing a considerable percentage of nitrogen could form in such gas mixtures (*18*) in the presence of light or by electrical discharges. Then the total nitrogen exclusive of possible sediments formed under reducing atmosphere would amount to about 3.8×10^{14} metric ton-atoms, which compares fairly well with the amount of halide in the ocean. It would appear that the available nitrogen on the earth's surface and the halide dissolved in the oceans could come from the same source of material (ammonium chloride). The accretion mechanism for the formation of the ocean also seems adequate to explain transport of both nitrogen and chloride to the earth's surface.

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The Effect of Exogenous Oxytocin in Blocking the Normal Relationship Between Endogenous Oxytocic Substance and the Milk Ejection Phenomenon

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Normally, in the lactating cow, a combination of favorable stimuli to the teats of the mammary gland and to the auditory and visual sense organs brings about a release of an oxytocic substance from the posterior pituitary gland (*1*). This material is discharged into the blood stream and carried to the udder system where it causes the myoepithelium of the alveoli of the mammary gland to contract and discharge their milk (*2, 3*). Thus, the milk is ejected into the gland sinus from which it can readily be removed by the milking act.

Recently an experimental procedure was carried out in which the response to the usual let-down stimulus became essentially nonfunctional. A cow was milked hourly with the aid of 20 iu oxytocin administered intravenously at each milking for a period of 156 hr (*4*). Following the experimental period the cow was milked in the usual manner at 12-hr intervals. This is a report of the recovery period.

Common usage has dictated that the milk ejected following a normal milking under the influence of exogenous stimuli be termed "residual." It would be more precise to designate the milk left within the udder which was not removed under the influence of exogenous oxytocin or that which was left following a stimulus liberating supramaximal amounts of endogenous oxytocic principal as "residual" and to reserve the term "complementary milk" for the milk removed under the influence of an exogenous stimulation which is in excess of that normally obtained. This terminology would agree well with physiological terminology used for other organ systems. Henceforth, we shall reserve the term "complementary milk" for that milk obtained in excess of that normally expected and which is removed by means of an exogenous stimulation whether it be collected following a normal milking or included within a normal milking in cases in which the stimulus was applied prior to milking.

Previous to the hourly experimental milking this cow was producing approximately 40 lb of 4.0% milk daily. When the cow was again milked in a normal manner 12 hr following the hourly milking routine only about half of the expected milk was obtained. A butterfat determination disclosed that this milk was low in fat (1.3%). The udder remained distended and hard to the touch. Despite the fact that very little milk had been obtained (3.8 lb), she lost milk from all four teats in the interim between this first and the next

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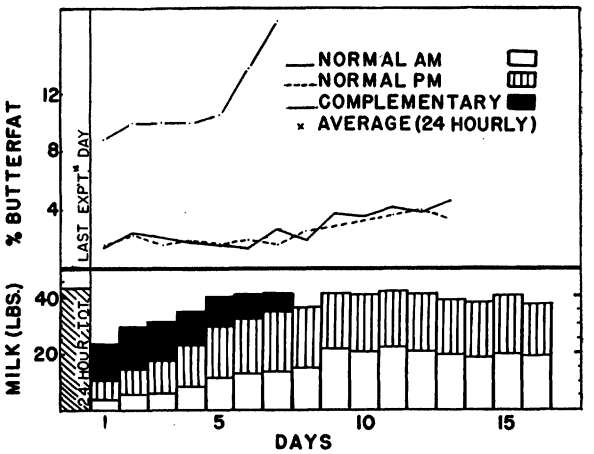

FIG. 1. Daily milk production in the recovery period following 156 hours of hourly milking. Twenty international units of oxytocin had been administered at each hourly milking. The total milk and average butterfat percentage of only the last 24 hr is indicated previous to the recovery period. Complementary milk was removed using decreasing amounts of oxytocin for a period of seven days in the recovery period at which time there was evidence of complete recovery of the ability to eject milk efficiently.

regular milking. At this second milking the condition was little improved. At this time she produced 6.5 lb of milk with a butterfat percentage of 1.6. The complementary milk was removed with the aid of an intravenous injection of 20 iu of oxytocin. There were 13.0 lb of this milk with a butterfat percentage of 8.9. The same procedure was followed in each of the next seven days. Oxytocin was given once daily in decreasing amounts according to the following schedule: 20, 20, 10, 6, 6, 3, 3 iu.

The complete recovery period data is presented in Fig. 1. The daily milk is partitioned into normally obtained A.M. and P.M. milks and P.M. complementary milk. The butterfat (%) of each of these fractions is also indicated.

In the days following the first day it is seen that the portion of milk which is complementary was decreasing in amount and increasing in butterfat content. The normally obtained amount of milk increased regularly throughout this week. At the seventh day, the complementary milk was considered normal (*5, 6*) and it was decided that she could go it alone. Subsequent production of milk and fat was essentially in the range of what might be expected. During a 10-day period following the third day after the last oxytocin injection she produced at a daily rate of 33.0 lb with a butterfat test of 3.9%.

This is believed to be the first reported instance in which treatment using exogenous oxytocin had brought about a refractoriness to the usual let-down stimuli in a normally responsive animal. It is logical to postulate that this blockage occurred at one of two sites. Either the posterior pituitary gland output of oxytocic substance was suppressed by the large amount of exogenous oxytocin that had been administered or the alveolar myoepithelial elements of the mammary gland had lost their sensitivity to physiological amounts of endogenously released oxytocic substance. The large amount of oxytocin administered over the previous 6½ days (3120 iu) appeared to disturb physiological relationships between the posterior pituitary gland and the contractile elements surrounding the alveoli of the mammary gland, but there is no evidence to favor which end of this axis had been blocked.

Although it is considered remote, there was the possibility that the hourly injection schedule may have prompted a conditioned reflex release of amounts of epinephrin sufficient to block the normal response to endogenously released oxytocic substance but not sufficient to block the effect of the administered hormone. One would then have to assume that the same conditions which had developed the conditioned release of epinephrin would not be maintained after changing the frequency of stimulation even after the reflex had become strongly established. It is possible that milk let-down blocking epinephrin may have been released as the result of a painful stimulus due to the high intramammary pressure occasioned by the change in milking frequency. The return to normal in the cow then being an adjustment to the reestablishment of this increased volume in the udder.

This paper records the observation that the milk ejection mechanism of a cow which was normally responsive was severely deranged. The most plausible explanation of this phenomenon is advanced.

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Paper Chromatography of Chlorophylls[1]

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In the hope of avoiding decomposition of chlorophylls reported to occur when they are subjected to paper chromatography, we impregnated the paper with sucrose and found that the degree of decomposition was brought virtually to zero. At the same time about the same degree and order of resolution into separate components was obtained as with the sucrose column and thus a mixture of chlorophylls

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