zinc and sulfuric acid. This method introduces considerable quantities of $ZnSO_4$ and is somewhat uncertain.

A better method of freeing sea water of nitrate has been used by the authors in which the ability of certain pelagic plants, such as algae and diatoms, to extract nitrate from sea water, even when contained in glass bottles, has been utilized.

Samples of surface water were collected on August 1 from the bay at Friday Harbor, Washington, on an incoming tide. The plankton population at this time consisted largely of diatoms. Two-liter samples, contained in glass bottles, were placed where they would receive a maximum of diffuse light but little direct sunlight. The change in nitrate concentration was followed over a period of seventeen days, Table 1,

TABLE 1

REMOVAL OF NITRATE FROM SEA WATER BY PLANKTON*

μga PO_4–P per liter	μga NO_3–N per liter					
Days	0	4	9	12	14	17
1.65	39	39	37	15	2.3	0.0
3.00	27	22	22	15	0.6	0.5
3.50	66	72	68	33	20	1.6
4.00	70	68	73	40	29	6
4.50	32	23	13	7	6	. .
5.00	44	44	47	30	6	0.0

* μga or microgram atom is equivalent to gram atom × 10^6.

using a modification of Harvey's reduced strychnine method.[3] Two or three ml samples of water that had been filtered through a Jena G-3 fritted-glass filter were mixed with an equal volume of reagent. The color was allowed to develop for three to five hours in the dark and then the white sediment was separated from the red solution by centrifugalization. The color estimations were made with the Zeiss-Pulfrich photometer using a variable cell depth of 1–10 mm and the S-53 color filter. The instrument had been calibrated against standard solutions of potassium nitrate in nitrate-free sea water of the same chlorinity.

No special control was exercised over the presence of animals or bacteria, the type of plants involved or the abnormal conditions of environment. These probably affected the rate of photosynthesis of the diatoms more than any small differences in concentration of nutrient salts. As shown in Table 1, the phosphate concentration was varied but had no effect on the rate of nitrate removal. The addition of plankton, collected from the bay with a hand net, accelerated the nitrate removal in general, although the nitrate concentration occasionally increased at first. Probably this was due to bacterial action on the plankton killed by removal from their natural habitat.

As soon as the samples became nitrate-free, the suspended organisms were removed by filtration and mercuric chloride was added to prevent the formation of nitrate through bacterial action on the dissolved albuminoidal nitrogen. Eight ml of saturated solution per liter of sea water was an effective amount and did not interfere with the subsequent determination of nitrate. The water was stored in paraffined bottles until used.

[3] H. W. Harvey, *Rapp. et Proc-Verb.*, 53: 68–74, 1929.

REX J. ROBINSON
BENJ. M. G. ZWICKER
OCEANOGRAPHIC LABORATORIES,
SEATTLE

SMOOTHING COLORS APPLIED BY COLORED PENCILS

BRANDON GROVE, of the Vacuum Oil Company, Madrid, Spain, described in the April 4 issue of SCIENCE a seemingly "new" method of smoothing colors applied by colored pencils. This method is so old in the U. S. Forest Service that I tried to determine its origin. As I have been in the Service only twenty-two years I went to our head draftsman, here in Missoula, Joe Halm. He could not tell me because—"When I started out coloring maps, *in 1912,* the old timers showed me how to use gasoline to smooth and fix the colors"! Standard rubbing pencils called "stomps" are obtainable from any draftsman's supply store which are absorbent and permit a much better job of gasoline smoothing than can be done with a cloth, as recommended by Mr. Grove.

Mr. Halm informed me that his CCC trainee-draftsmen, at the Nine Mile Camp, have recently discovered something that was new to him, however. The boys have found that the liquid used in Pyrene fire extinguishers is just as good and much cheaper than drug store or c.p. carbon tetrachloride for *removing* colors which for some reason have to be changed or eliminated. The commercial Pyrene fluid is also better than carbon tetrachloride for cleaning tracings which have been soiled in the process of inking. The Pyrene does not thin the India ink lines as much as c.p. carbon tetrachloride. After it has evaporated colored crayons and gasoline smoothing can be used without any thinning or weakening of the colors.

H. T. GISBORNE
NORTHERN ROCKY MOUNTAIN FOREST AND
RANGE EXPERIMENT STATION

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