

19 Essex Avenue,

30 June 92.

My dear Bernard,

I trust you arrived safely & comfortably at Mexico; I felt quite concerned about you when you were leaving; and was very sorry not to have seen you off. Even yet I have not heard of your arrival.

I have got a solution to the Seal oil problem; tho' it has given me much trouble. As it may interest you I will give it in outline. I took pure Seal oil, & put it thro' Allen's method; viz: saponified with alcoholic potash, boiled down, added water, and then Ether in the separator, with all possible precautions. I separated off the ethereal solution, & on evaporating it down got a con-

considerable quantity of soap. I gave
the aqueous solution a second
washing with fresh ether, and got
a slightly increased quantity of
soap. It was all ~~done~~ quantitatively
& the soap carefully dried, amounted
to an equivalent in oil equal to
26% of the original oil at the
start. This shows that with
Allen's method, a considerable
quantity of the saponified ^{soap} ~~fatty~~
oil in a mixture may go with
the ethereal solution along with
the mineral oil - I cannot
understand why the ether takes
up the soap from the water sol-
ution when they are shaken together
in the separator, unless it is by
simple diffusion, each taking its
own share. But if so, the
process sh~~d~~ continue indefinitely
with each new washing with ether,
which does not seem to be the case.

To get at this further, I tried shaking up water & ether, each pure. The ether became ~~made~~ separated from the water as a kind of emulsion; and altho quite sharply separated, when run off & evaporated down (by steam over a water-bath) there remained $\frac{1}{10}^{\text{th}}$ of the bulk of water. It may be therefore a mechanical process.

On this basis, I tried one of the mixed oils in which the seal oil had been determined by Allan's method: oil ^{into a flask,} and then I weighed some of the ~~oil~~ saponified with alcoholic potash; and instead of drying off the spirit, decanted it into a beaker. I then gave the oil remaining in the flask three or four more washings with alcohol. (This sh^d be done cold, as it appears to dissolve some part of the mineral oil if hot; as the alcohol becomes opalescent.) It served my purpose very well however, as I wanted to

set an absolute maximum limit for the possible fatty oil in the mixture; so that I forced things a little after the first weighings at the end.) I thus got the mineral oil with a little mixed alcohol, and the soap solution, separated; & avoided adding any ether at all. I then put the flask in an oil-bath, & heated well over $212^{\circ} F.$ for a time; & also boiled down the soap solution, to get a complete check. Allowing for the potash added, it comes out very close to the total. I have not quite made up the figures yet; but I can give you all the facts & figures if you wd care to have them.

I think this will prove a very satisfactory method. The mixed oil is weighed direct into a tared flask, saponified and washed there also; so that there

is no need to get it from one vessel into another which is one of the chief bothers in such work. Then it has only to be dried from alcohol (and possibly water if there was any in the potash or the methylated spirit) and weighed again. If the alcohol dissolves anything out of the mineral oil it will be an error on the one side; & if there is anything unsaponifiable in the fatty oil it will be an error on the other. Also if there sh^d be any mineral acid that w^d form a salt with potash that was insoluble in alcohol. But these errors seem to me much less than the chances of "etherial soap" being left on the mineral side of the separation as in Allen's.

I w^d be glad to know what you think of this method. I sh^d say that Allen's is really for the purpose of separating out a small mineral adulterant from a fatty oil;

whereas I want to get a maximum
value for a small quantity of
fatty oil in mineral.

I hope you will be able
to remain for a good holiday
at Metis, & not be called
away. Please be sure to
let me know if there is any-
thing I can do for you, ~~in~~
in town. My love to
Anna & the children.

Yours affectionately,

William.

W. B. D.

June 30/92