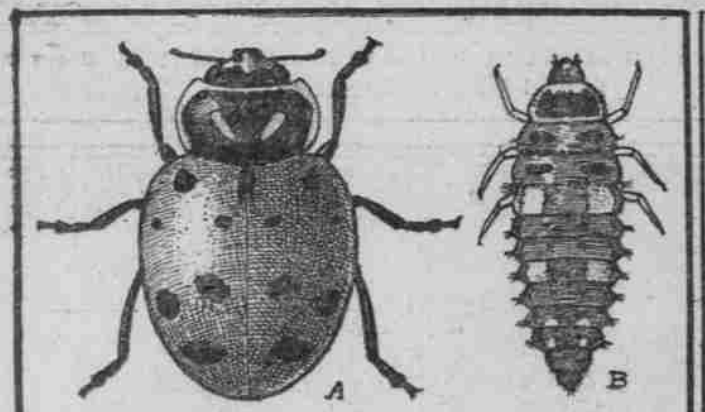
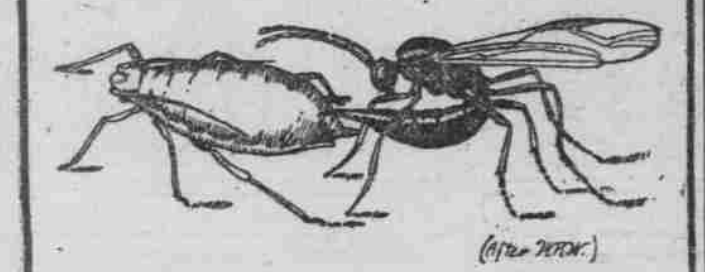


# THE LADYBUG ARMY FRATICULATE THE APHIDS?

## Scientists' Opinions Differ As To Practicability Of Present Experiment In Directing Activities Of Insect Hosts Against Plant Scourge.



The Convergent Lady Bug—A, adult; B, larva. Both forms devour aphids.



Minute parasitic wasp stinging an aphid.

Of what practical value is the attempt that is being made to direct the activities of the vast ladybug army that each season invades the grain fields of the Pacific Northwest, there to feed upon their favorite delicacy, the aphid?

This is a question that is being asked by farmers throughout Oregon and Washington and also by scientists of the agricultural colleges and elsewhere. There is no question as to the fact that the ladybug is a great natural enemy of the aphid. Left alone, they seek out and devour many millions of aphids each season. The problem is whether it is best to leave the beneficial ladybug free to find its prey where it will or to direct the flocks of beetles to the localities where they are most needed.

### Millions of Bugs Studied.

Probably the best answer to the question is that the collection and distribution of ladybugs has been seriously undertaken. News accounts of it being done already have been printed in the Oregonian. Under the direction of District Forester Cecil J. Burrill, United States Forest Service, 25,000,000 ladybugs have been placed in Winter quarters where they will remain until time for the Spring assault. Then they will be sent out on their invasion of the grain fields, their distribution being in charge of county agricultural agents. The Bureau of Entomology of the Department of Agriculture also is co-operating to the extent of supplying data for the work.

The work is not entirely new. It is being tried in California by Federal and state authorities. It has been tried, too, in different localities by individuals who sought through the intervention of the ladybug to save their crops. J. L. Dumas, of Dayton, Wash., is said to be the first man to experiment with the beetles. He gathered them to fight the aphids as long as 15 years ago.

It seems to be the general opinion that ladybugs may be used to advantage in places where the aphids has not yet become a hold and where weather conditions are favorable. Professor A. L. Lovett, entomologist at Oregon Agricultural College, asserts that the bugs could not have controlled the outbreak of aphids in the vetch fields of Western Oregon in 1918 and warns the farmer not to put too much faith in the experiment. F. W. Creel, in charge of the station of the Bureau of Entomology at Forest Grove, Ore., agrees with Professor Lovett that the use of ladybugs for aphid control is in the experimental stage and would have been of

no value in the epidemic of last year. However, he thinks that the distribution may prove of value in certain Eastern Washington counties.

**Mr. Creel Supplies Data.**

"In connection with the recent publicity given ladybug distribution, the impression has gone out that the United States Bureau of Entomology fully indorses the collecting and artificial distribution of these insects for the purpose of controlling aphid epidemics," writes Mr. Creel. "This is by no means the case, as the bureau still regards this work as being in the experimental stage. On the other hand, we have not stood in the way of authorities who wished to try it out and have co-operated with them to the extent of securing and furnishing them with information as to the distribution of these insects.

"As an instance of this, our special field agent, assigned to the state of Washington this season, Mr. A. C. Burrill, has through the co-operation of the Forest Service, been able to secure much information with reference to ladybug caches in the National Forest reserves. This information has been furnished to county agents and other interested parties in the state of Washington who desired it. In no case, however, is the bureau doing any collecting, storing or distributing of these insects in the Pacific Northwest. In California such work is being done in an experimental way, I understand, in co-operation with the State Commission of Horticulture. In Oregon no work of this kind is being done at all, as far as I know, unless it is being done by private parties."

### Survey Made by Mr. Burrill.

Mr. Burrill, mentioned by Mr. Creel, is making a complete historical survey of the subject. It is probable that it later will be published in the Department of Agriculture and will be important in calling attention to the aphid pest, which causes a \$10,000,000 to \$20,000,000 loss in the Pacific Northwest each season. Two other men who have been greatly interested in the ladybug experiment are J. M. Lewis and B. W. Cooney, county agents given valuable assistance in the collection and storage of the bugs, are J. M. Lewis and B. W. Cooney, county agents at Dayton and Goldendale, Wash., respectively.

Professor Lovett, quoted before in this article, who perhaps takes the most conservative view among those engaged in the experiment, has prepared an interesting article, here published in full, for which sketches were drawn by Forest Cole, entomologist, at the Forest Grove station.

### Life-Cycle of an Aphid.

During late Autumn sexed forms occur and eggs are produced. These eggs hatch in the first warm days of Spring. The aphids hatching from these eggs mature in about 12 days and are termed "stem mothers." They are wingless and have the unusual ability of giving birth to living young without sexual intercourse. They reproduce at the rate of one to three young per day, and progeny maturing in about 10 days and in their turn giving birth to living young at a similar rate. All the forms mature in about 10 days, and the young months are these "agamic females," capable of producing living young. No true sexed forms occur until the third generation in the Spring, both winged and wingless forms occur. The winged forms frequently fly to new fields and set up colonies there.

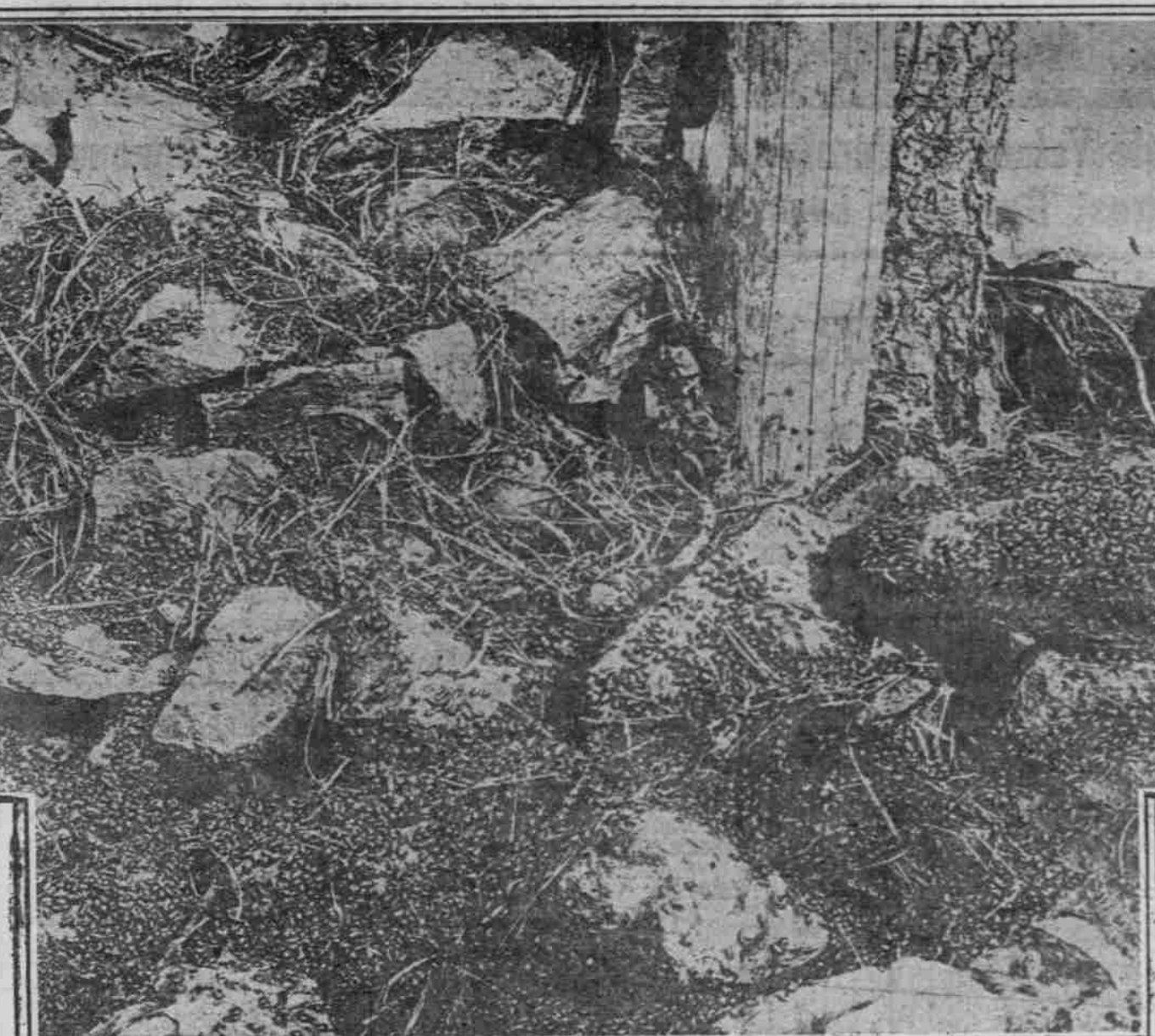
In the summer most aphids occur as an "alternation of host plant." Migratory winged forms occur and fly to some new host, often entirely unlike the Spring host plant. For example, the pruned aphids fly to the hop and constitute the destructive hop aphid. This habit affords protection from their natural enemies. Where colonies are about to be wiped out these migratory forms may set up new colonies in situations where the enemy is absent. About 12 to 18 generations occur during the season. "Fall migrants" occur late Autumn and return to the host plant the spring following in the Spring. Here true sexes are produced and eggs deposited.

Some of the distinct species of aphids in the United States. Nearly every plant is attacked by its own particular species. The vetch aphid is distinct from the cabbage aphid, etc. Within reasonable limits the problem of aphid attack then becomes an individual problem for each crop, as seldom do they transfer their attack from one adjacent crop to another.

### Beneficial Insects in Control.

To combat a group of insects so well equipped for increase and injury there has been developed a multitude of natural enemies which prey upon it. These beneficial forms include ladybugs, beetles, and their larvae; the larvae of syrphus flies; the larvae of lacewing flies and lampyrid beetles. These forms actually devour the aphids. In addition there is a variety of minute wasp-like flies which sting the aphids and so kill them. All these natural enemies reproduce sexually and from eggs. This fact proves the weak point in their chain of control.

Thus we have the two groups: the aphids adapted by habit and life-cycles



Winter Cache of Lady Beetles. Two Million Bugs Had Been Taken Out When This Picture Was Made. Photo by B.W. Cooney, Goldendale, Wash.



325 Pounds of Lady Bugs in Sacks and Boxes, Partially Filled With Excelsior For Roosts. Photo by J.M. Lewis, Dayton, Wash.

to rapid increase in countless numbers; their horde of natural enemies actively endeavoring to wipe them out.

In the normal season then, as the first warm days of Spring appear, the aphids hatch from their eggs and the seasonal cycle begins. The effects of the warmer temperatures react in a similar manner on the beneficial insects which resume activity, emerge from their Winter quarters, seek out the plant lice and prey upon them. Every Spring there are aphids present in the fields on the grain, the vetch, the clover and other crops. The activities of these natural enemies, however, serve as an effective check to their usual increase, and the average grower is not aware that aphids are present in his field.

Since aphids are present on crops every year, what conditions permit a serious outbreak such as occurred on vetch and grain in 1918? Similar aphid outbreaks, though somewhat later and therefore not so severe, occurred in 1912. One of unusual severity to grains occurred in 1902.

Seasonal irregularities and temperature conditions are responsible for the serious aphid outbreaks. In the normal season when warm weather advances gradually, the aphids and their natural enemies develop at the same time and are equally favored by conditions. In the season of 1918, April, particularly 18, 19, 20, was unusually warm, the temperature reaching 80 degrees on the 19th. The last half of the month was warm and dry. May was cold, cloudy

and disagreeable, with frequent showers. The warm days of April stimulated insect activity and the aphids commenced reproduction. The disagreeable weather of May was decidedly adverse to the beneficial insects. Reproducing from eggs as they do they need medium warm temperatures to develop. Plant lice, reproducing living young, are but little affected by temperature. They have been found reproducing under the snow and even at temperatures below zero. The inevitable result was that soon the plant lice were present in ever increasing numbers with no effective check from their enemies, and quickly assumed the proportions of a real menace to crops.

A careful study of previous years of aphid outbreaks shows this condition always present. Whenever a season occurs in which we have a few warm, pleasant days in early Spring followed by an extended period of cool, rainy weather, aphids will be prevalent and generally injurious. There is a common saying that hot weather kills aphids. The fact is that hot weather provides favorable conditions for the rapid development of the natural enemies and where present in numbers and with favorable weather they can quickly cope with the aphid situation.

### Economic Status of Insects.

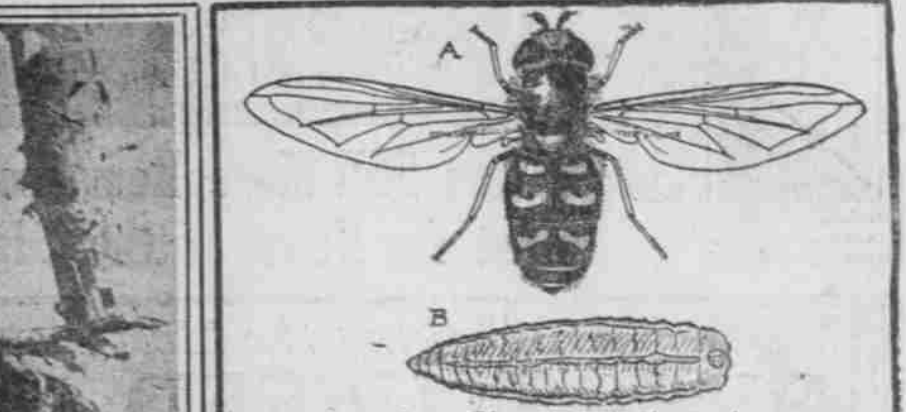
Ladybird beetles and their larvae constitute one of the most efficient factors in the control of the aphid. In the serious "Greenbug" outbreak in the South in 1907, however, it was the

parasitic flies which were finally responsible for the control of that serious pest. In 1912 in Oregon it was the larva of a syrphus fly which finally checked the vetch aphid. Ladybug beetles constituted the major defense in the conflict against the aphids in 1918, but their effects were so retarded as to fail to save the vetch or to prevent serious injury to the grain.

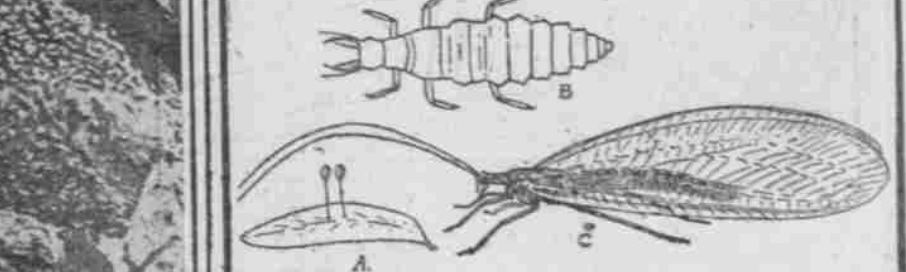
Ladybugs have developed a habit or are possessed of a "tropism" which causes them, as Fall approaches, to hunt the lower altitudes and seek hibernation in sheltered areas in the hills. Buttes rising abruptly from the surrounding fields usually are found with these caches of ladybugs, as are also the higher points in the foothills.

Advantage has been taken of this habit in California to locate the ladybugs in the caches. Later they are collected and held in cold storage, and finally sent out in small lots to growers suffering from aphid attack. They are collected by tons, and kept in excellently equipped insectory and cold storage plants. Yet the mortality in handling them is from 20 to 40 per cent. The work in California has attracted much attention, but is so far only an experiment. Even with excellent facilities for handling the beetles and with the work under the immediate direction of expert entomologists the practice is reported of questionable value.

"We may safely state that no con-



The Syrphus Fly—A, adult; B, larva. The larva of this fly feeds on aphids.



The Lace Wing Fly—A, eggs; B, larva. Both larva and adult eat aphids.



This Handle is Full of Lady Bugs Just Collected For Storing. Photo by B.W. Cooney.

per cent of all present. Therefore, on this field there were approximately 250 pounds of plant lice. One gram of aphids were counted, amounting to 513. There would be then approximately 25,000,000 aphids on the field. On the 12-acre tract. Placed on this basis, 25,000,000 ladybugs would, if devouring their maximum of 200 aphids daily, be successful in controlling the plant lice on 77 acres. When we consider the hundreds of acres of vetch and the thousands of acres of grain infested with aphids last season, the task before the beneficial forms and numbers of them required becomes apparent.

Summarized, it may be stated that in a normal season the beneficial forms unassisted may be expected to cope successfully with the aphid situation on a 12-acre field of vetch. It is a reasonable supposition that an aphid outbreak such as that of 1918 will not occur again for a period of years.

Ladybug beetles are but one of several of the active agencies in producing the final result.

In the abnormal season, in spite of the presence of these natural enemies, climatic barriers prevent their successful employment.

In the artificial handling of ladybugs there is a very high mortality. The beetles occur naturally on the buttes adjacent to the cultivated areas from which they distribute themselves to the surrounding fields. Finally, it may be stated that the artificial collection and distribution of ladybugs is still in an experimental stage and for Oregon conditions, of doubtful value.

Growers may rest assured that the Utopia for all aphid troubles has not yet arrived and may still safely and sanely pursue such cultural practices and precautionary measures as are of tried value and are economically sound.

### J. L. Dumas and Jon Edwin of Dayton, Wash., Gathering Lady Bugs.

In an experiment carried on last year, 210 pounds of aphids were collected from a 12-acre field of vetch. It was estimated that this constituted 60

### BY A. L. LOVETT, Entomologist, O. A. C.

Insects comprise three-fourths of all animal life. Aphid "stem mothers" give birth to fatherless young. Nearly every plant has its own aphid parasite. Ladybugs but one of many natural enemies of aphids. Aphids always present on farm crops, outbreaks bad in 1915, '12, '02. Hatching of beneficial insects, but not birth of aphids retarded by cold weather. Not hot weather, but enemies active in hot weather, kill aphids. Ladybugs seek hills in winter and fly to cultivated fields in spring. Artificial storage and distribution of ladybugs tried in California. Practice could not have succeeded in Oregon in 1918. 25,000,000 ladybugs necessary to control aphids on 77 acres of vetch. Growers advised to depend upon practices of tried value.

THE continual war between the injurious and the beneficial insects, with the everchanging balance of power, affords a most interesting chapter in nature's great story book of "facts that are stranger than fiction." To delve into these interesting fields is a more fascinating pursuit than seeking them in our favorite fairy tale of youth.

This may be called the age of insects. These creatures of insignificant size and frequently with little or no bodily protection, constitute in numbers more than three-fourths of all animal life. By their very manner of growth, reproduction and habits for self-protection they are peculiarly fitted to cope with present-day conditions. Far from approaching extinction, they evince a tendency toward continual increase both in numbers and in species.

Among those forms of insect life particularly fitted for multiplication and increase are the aphids or plant lice. So far as any physical or body protection is concerned, they are entirely lacking. They are small and fragile, the integument of the body affording no protection from the attack of their natural enemies. To offset this fundamental weakness, however, they are provided with wonderful powers of reproduction, carried forward in a rather unusual manner, and have developed habits of life which afford a

### Motor Transport Workers Complete Difficult Tasks.

Ambulance Section Cited for Bravery Under Terrific Shell Fire.

CITATION for bravery under unusual circumstances, and the odd tasks to which motor-transport workers have been assigned since the armistice was signed, are narrated in a letter written by Sergeant Howard Shearer to his relatives in Portland.

Sergeant Shearer wrote from Sedan and gave the designation of his unit in true French terminology, as "Echelon American, Parc E, Convois Automobiles, Par B. C. M. Paris."

"I am with our advance echelon," he writes, "which is 50 to 60 miles from our main echelon. We are doing a great deal of work, as we have attached to our parc about 26 ambulance sections, which are doing all sorts of work. Some are taking refugees back to their homes, while others are carrying the sick to the different hospitals."

"One night while we were in Epernay, which is about 25 miles from Rheims, I was ordered by our Captain to take a kitchen trailer to one of the advance ambulance sections which was operating on the front. When I got there they were so busy that the Captain ordered me to drive one of the

### 18th Engineers Prepare to Leave for America.

Lieutenant Shaver, on Special Duty, Completes History of Camouflage.

THE 18th Engineers, with which many Portland boys went overseas, was being mobilized near Bordeaux, France, during the middle of December, with intent to leave for America, according to a letter recently received from Lieutenant John Willard Shaver, formerly a member of The Oregonian staff.

Sailing with the 18th Engineers as a private, the newspaper man-campaigner won his commission by hard work and application, and is now attached to the office of the chief engineer, at Tours, France.

"I am now associated with the technical information section of the office of the chief engineer," wrote Lieutenant Shaver, "where I have been engaged on the compilation of technical articles on various engineering projects in the A. E. F."

"Just now I am preparing a history of 'Searchlights,' as a special service of the Engineer Department, and have completed the history of 'Camouflage.' The office is charged with the compilation of historical, biographical and technical data on all Engineer personnel, organization and services in the A. E. F."

"Troops have been moving out of here and through here pretty regular-

### Figure "13" Follows Organist in Army Life.

Ernest Nordstrum Enlists June 13, Discharged January 13, Pay Received is \$13.76.

ERNEST NORDSTRUM, who before enlisting was the organist at the Columbia Theater, has returned, and he sums up his Army experience under the heading "13."

He enlisted on June 13, arrived at Camp Lewis on August 13, was assigned to the headquarters company of the 76th Regiment (I and 8-13), of the 13th Division; was discharged from Depot Brigade 166 (I and 6-7 and 6-13), on January 13, and received his pay, \$13.76. "The 13 follows me to the very end," said Nordstrum, "even the 7 and 6 cents make another 13."

### Mexican Trade to Resume.

MEXICO CITY.—Representatives of several large British steamship lines have announced the resumption of the near future of ocean traffic between British and Mexican ports.

### ARMY CHAPLAIN IS CALLED

Captain Willard Elkins Named Pastor of Dallas Church.

DALLAS, Or., Jan. 18.—(Special.)—Captain Willard A. Elkins, formerly of Menemuth, now a chaplain in the Coast Artillery, has been called as pastor of the Dallas Christian Church. Captain Elkins succeeds Lieutenant Howard McConnell, who left here last October to become a chaplain in the National Army at Camp Lewis.

Chaplain Elkins will assume his duties here some time within the next few weeks.

### Norwegian Bank Proposed.

MEXICO CITY.—Representatives of Norwegian capitalists are arranging for the establishment in this city of a Norwegian bank, which will have branches in various parts of the republic, particularly in the states of Tamaulipas and Jalisco.

### GET RID OF FAT

Free Trial Treatment on Request. Ask also for my "pay-when-satisfied" offer. My treatment has often reduced at the rate of a pound a day. No dieting, no exercise, no fasting, no surgery, no pain, no danger. I have reduced a pound a day and lost 100 lbs.

Mrs. Anna Schmidt writes—I weighed 175 pounds before I started your treatment and I now weigh 125 pounds. You may print this if you wish.

These are just examples of what our treatment can accomplish. Let us send you more proof at my expense.

DR. R. NEWMAN, Licensed Physician, 286 Fifth Avenue, New York, Desk S-176.

### WHY SOCIETY WOMEN WASH THEIR OWN HAIR

They do, not because it is a fad, but because they wish to obtain the greatest possible hair beauty and be sure they are not using anything harmful. They have found that in washing the hair it is never wise to use a make-shift, but is always advisable to use a preparation made for shampooing only. Many of our friends see they get the best results from a simple home-made canthrox mixture. You can use this at a cost of about 2 cents a shampoo by getting some canthrox from your drug-gist and dissolving a teaspoonful in a cup of hot water. This makes enough shampoo liquid to apply to all the hair instead of just the top of the head, as with most preparations. Dandruff, excess oil and dirt are dissolved and entirely disappear in the rinsing water. Your hair will be so fluffy that it will look much heavier than it is. Its luster and softness will also delight you.—Adv.