

Kentucky FARM AND HOME *Science*

Issued quarterly by the Kentucky Agricultural Experiment Station

Volume 6

Number 2

Spring 1960



READ—

**Problems of
Older Persons**

**Studies on
Mites**

**Keeping Milk
Flavor Uniform**

Kentucky FARM AND HOME Science

Vol. 6, No. 2 Spring 1960

A report of progress published quarterly by the Kentucky Agricultural Experiment Station, University of Kentucky, Lexington

KENTUCKY AGRICULTURAL EXPERIMENT STATION
FRANK J. WELCHDirector
WILLIAM A. SEAYVice Director
W. P. GARRIGUSAssociate Director
J. ALLAN SMITHAgricultural Editor

Kentucky Farm and Home Science
JOSEPH G. DUNCANEditor
LOUISE BOSWELL Assistant Editor
ROBERT C. MAY Photographer

Material appearing in this publication may be reproduced without further permission, provided that full acknowledgment is made of the source and that no change in headings or text is made without approval by the author.

Address correspondence about articles in this publication to either the authors or the Department of Public Information and Educational Aids, Experiment Station Building, University of Kentucky, Lexington.

In This Issue

PROBLEMS OF OLDER RURAL PERSONS <i>By E. Grant Youmans</i>	Page 3
STUDIES ON MITES IN KENTUCKY <i>By J. G. Rodriguez</i>	Page 4
NEW EQUIPMENT HELPS KEEP MILK FLAVOR UNIFORM <i>By A. W. Rudnick, Jr., T. R. Freeman, and Carrol E. Graves</i>	Page 6

The Cover



No, these mites are not feeding on polished rice grains. They are feeding on housefly eggs in a UK Agricultural Experiment Station laboratory. Possibilities of biological control of houseflies by predator housefly mites that feed on the fly eggs are being investigated by J. G. Rodriguez, Associate Professor of Entomology, through a grant from the National Institutes of Health. Pictures of mites taken by him appear on the cover and on pages 4 and 5. The mites and fly eggs on the cover are magnified 14 times. The cover picture was made with the assistance of J. A. Shrader, of the Department of Feed and Fertilizer. Photographic processing was done by R. C. May.

About one-third of the men and women aged 60 and over in a low-income, rural Kentucky county interviewed for information on

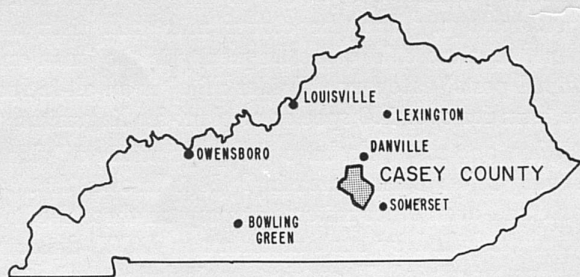
Problems of Older Persons

By E. GRANT YOUMANS

Department of Rural Sociology

Problems of old age—both social and economic—have continually plagued mankind, and because of the increasing proportion of older persons in our population attention is being focused on those problems. Very few systematic studies, however, have been made of the problems of older rural men and women.

In April 1959, a representative sample of the men and women aged 60 and over living in Casey county, Kentucky, were interviewed in their homes. The sample¹ included approximately one-third of the older



Casey county is located in south-central Kentucky and is relatively isolated from any large urban community.

persons in this predominantly rural county in a low-income farming area. The interviews were divided equally between men and women. Four-fifths of the persons lived on farms or in the open country and one-fifth in villages or towns.

The study was made by the U-K Department of Rural Sociology and the Agricultural Marketing Service, U. S. Department of Agriculture. This article reports a part of the data collected in the larger survey of the economic conditions, social activities, family relationships and values of rural older persons.²

¹ A total of 627 persons were interviewed out of a sample of about 650; 10 refused to be interviewed and 21 were physically or mentally unable to respond adequately. Persons living in institutions were not included.

² More information on a part of the survey appears in the author's "Socio-economic Problems of Older Persons in Casey County, Kentucky," Ky. Agr. Expt. Sta. Progress Report 88.

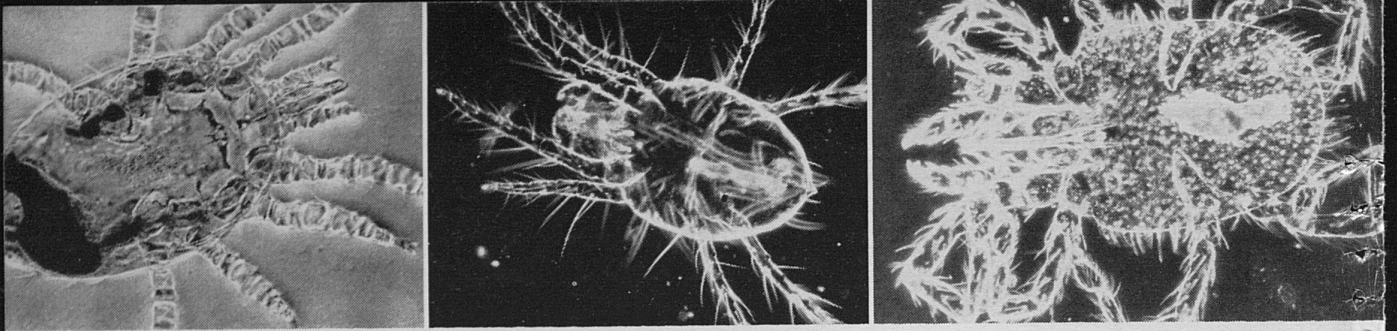
About 4/5 of the men and 2/3 of the women interviewed considered themselves retired or unable to work. For 9/10 of the women, this was retirement from housekeeping duties rather than from gainful employment. A third of the men and women aged 60 to 64 had moved from work to retirement status. The men who were fully employed estimated they worked an average of 41 hours each week. The rural business and professional men estimated they worked somewhat longer hours than did the farm operators. Among the fully employed male workers, advancing chronological age did not appear to interfere with the number of hours worked each week. The men aged 65 and over said they worked longer hours than did those aged 60 to 64. The women who considered themselves full-time workers estimated they worked an average of 37 hours each week.

The average annual income reported by the men was \$815, and that of the women, \$715. Six percent of the older men and women said they had no income and 1 out of every 4 said they had some money income but less than \$500 per year. The full-time working men reported an average annual income of \$1,221, the partly retired men \$991, the fully retired men \$655, and the men unable to work \$499. Almost 4 out of 5 respondents said they or their spouses owned their homes. The median value placed on property owned by the men was \$3,943. One out of every 5 men owned less than \$500 worth of property.

Dissatisfaction with Retirement

Substantial numbers of the rural older persons evidenced dissatisfaction with their retirement status. Over half of the retired men and slightly less than half of the retired women said they disliked "very much" being retired. Both economic and non-economic factors appeared to influence this dissatisfaction. Among the older men, low income, lack of plans for retirement, and poor health aggravated their dislike for retirement. Neither socio-economic status, amount of formal education, number of social activities, marital status, nor living alone had any appreciable influence upon the men's contentment

(Continued on Page 8)



On this page and the next are some highly magnified photographs of a few mites of economic and health importance. Most of them are pinhead in size. (left) The northern fowl mite is a parasite of domestic fowl and birds. It may attack

man and cause itching. (center) The two-spotted spider mite is one of the most important plant-feeding mites. (right) The chigger mite attacks both humans and domestic animals. Some species help to transmit scrub typhus.

Economic and health importance of these tiny insects causes rapid growth of interest in a relatively new scientific field; housefly control by predators is new project here

Studies on Mites in Kentucky

By J. G. RODRIGUEZ

Department of Entomology and Botany

Acarology, the study of mites, is a relatively new area of study. Before 1940 there were only a few scattered workers in this field; now the interest is growing so rapidly that last year a French journal entirely devoted to the subject began publication. In the United States the University of Maryland has an Institute of Acarology.

At the Kentucky Agricultural Experiment Station in past years we have worked in the field of biology and control of the plant-feeding mites. Research in mite nutrition has been sponsored by the Rockefeller Foundation and the National Science Foundation.

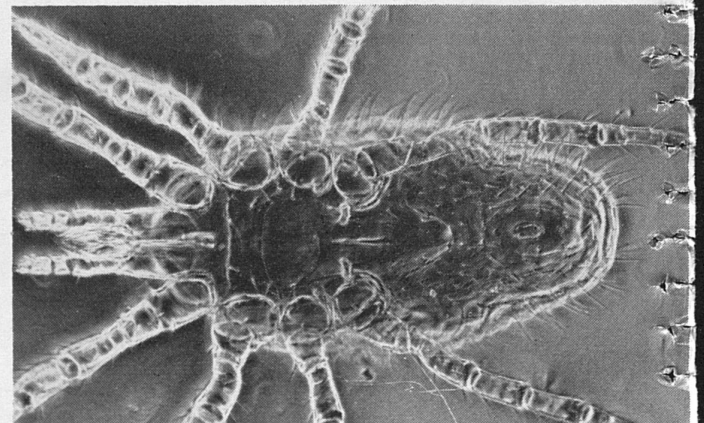
Presently, under a grant from the National Institutes of Health, we are investigating the possibilities of biological control of houseflies by using predator mites that feed on housefly eggs. Special problems in the field of acarology are being given in the Department of Entomology and Botany and a course in general acarology for graduate students is offered.

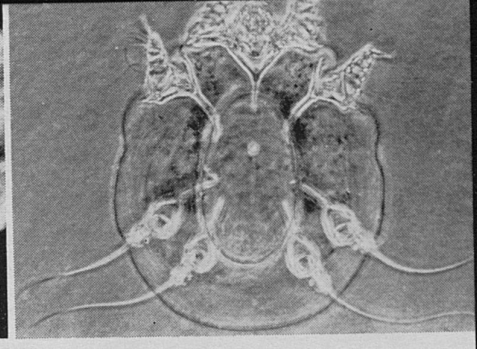
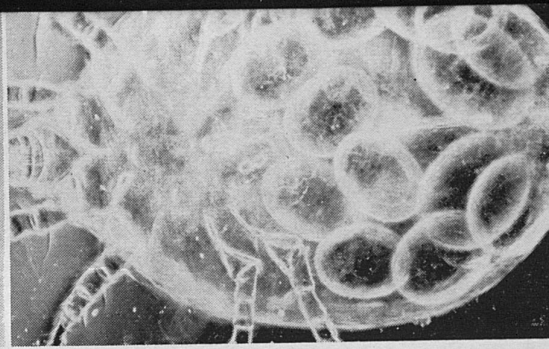
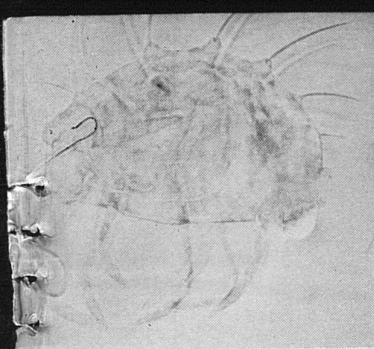
From the agricultural point of view, plant-feeding species of mites are one of the most important pests in fruit and cotton production. According to the Co-operative Economic Insect Report issued by the Plant Pest Control Division of the U.S. Department of Agriculture, in which the 10 most important pests for the

year are tabulated for each state, spider mites are named by almost every state in the "crop and forest pests" category and the clover mite and ticks are named in almost the same frequency in the "man and animal pests" category. "Spider mite" is an all-inclusive term for over 100 species of plant-feeding mites.

Why, one may ask, have the populations of plant-feeding mites been increasing? It is known that insects and even other mites that prey on these feeding mites are killed by such materials as DDT, dieldrin, lindane or sevin. These insects include predacious thrips, aphid lions, syrphid fly larvae, and certain lady beetles. On the other hand, these materials have no detrimental effect on the plant-feeding mites. In fact, DDT stimulates the European red mite, an orchard pest, into producing more eggs. DDT also has an irritating effect on the mites, and they tend to scatter, thus establishing more colonies. Mites cause bronzing of apple foliage, and often defoliation follows. The greatest losses in yield occur in the year following the injury, yields being reduced as much as 89 percent.

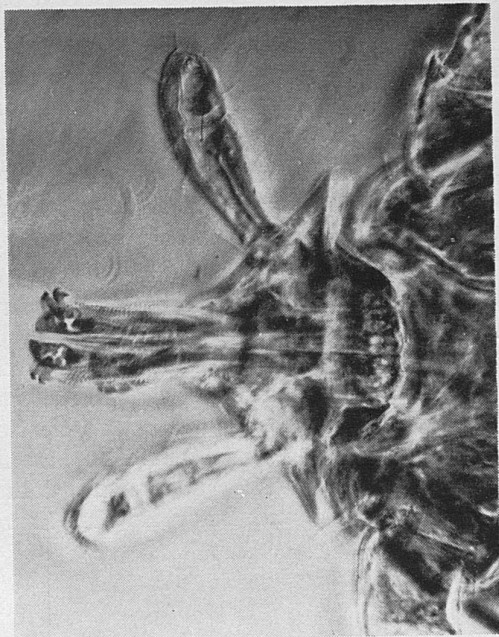
This male tropical rat mite was taken recently from an office in Lexington. Members of its species had caused office personnel to suffer from dermatitis caused by mite bites.





(left) The European red mite is an important pest of orchards. The fishhook-shaped structure on the extreme left is used in piercing the leaf and sucking the cell contents. (middle) The caloglyphid mite is virtually an egg-laying ma-

chine. It belongs to a group that attacks grain, cheese, bulbs and foodstuffs. (right) This mange mite was taken from a cat. Its group causes mange in dogs and rabbits, scaly-leg on poultry, scabies on humans.



Ticks are all parasitic in their method of living. This close-up view of a portion of one shows the piercing mouth parts, re-curved teeth and the cutting lateral teeth of movable digits.

Work at the Kentucky Station has shown that the nutrition of the host plant influences mite development and absorbed nitrogen and phosphorus have the most influence. This is shown by the rapid growth of the two-spotted spider mite and the European red mite populations when nitrogen is increased in apple foliage. As phosphorus is increased, the mite reaction may reverse. A range of absorbed phosphorus up to 0.20 percent is favorable to two-spotted spider mite development. (This range may vary with the host plant.)

We have also shown that chlorinated hydrocarbon soil insecticides added to the soil affect plant composition and mite development in diverse ways. Generally, increased populations were associated with

stimulation of growth and depressed nitrogen content. However, when extremely high levels of DDT were added to the soil, nitrogen and sugar content went up and mite population increases were directly related.

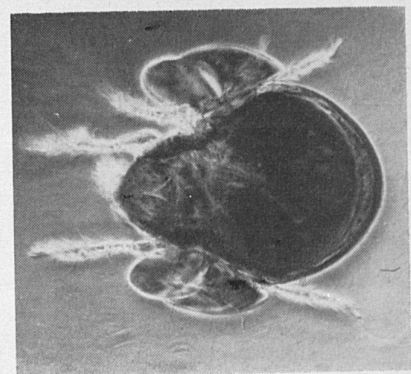
One can conclude that a moderate, balanced fertilizer program is the safest course to pursue and that the build-up of insecticides in the soil may become important in such places as in orchards where cover crops will be the first affected.

A group very distant from the ordinary plant-feeding or spider mites are the Eriophyid mites, variously known as gall mites, blister mites, rust mites and bud mites. They are the smallest animals bearing an exterior skeleton with which the agriculturist has to contend, averaging 1/200 inch in size, and cannot be seen by the unaided eye. Injury is in the form of blasted buds, russeted foliage or fruit. About 50 species are more or less of economic importance. Specific blister or rust mites damage pear, apple, grape, peach, citrus and cotton. The tomato russet mite is extremely insidious, the death of the plant often occurring before the grower realizes that a mite is responsible for the browning and crisping of the foliage.

Canadian and English workers, particularly, have studied the association of predacious mites found in orchards and the plant-feeding species. Unfortunately,

(Continued on Page 7)

This winged mite is a galumnoid, representative of some 40 species that are intermediate hosts for sheep tapeworm. The mites swallow the tapeworm eggs and grazing animals swallow the mites.



New Equipment Helps Keep Milk Flavor Uniform

By A. W. RUDNICK, JR., T. R. FREEMAN, and CARROL E. GRAVES

Department of Dairy Science

Milk's biggest selling point is its flavor. To keep this flavor uniform throughout the year and to help eliminate many seasonal off-flavors, the U. K. Dairy Science Department has been testing a relatively new piece of equipment.¹

This equipment consists of two large stainless-steel cylindrical tanks each about 5 feet high. They have been inserted in the line through which milk flows following its pasteurization by the high-temperature short-time method. In the first tank, about 2 feet in diameter, the milk is atomized, heated by mixing with steam, and subjected to a moderate vacuum (12-15 inches of mercury). The milk flows into the second and larger tank, about 30 inches in diameter, where the vacuum level is increased (about 22 inches

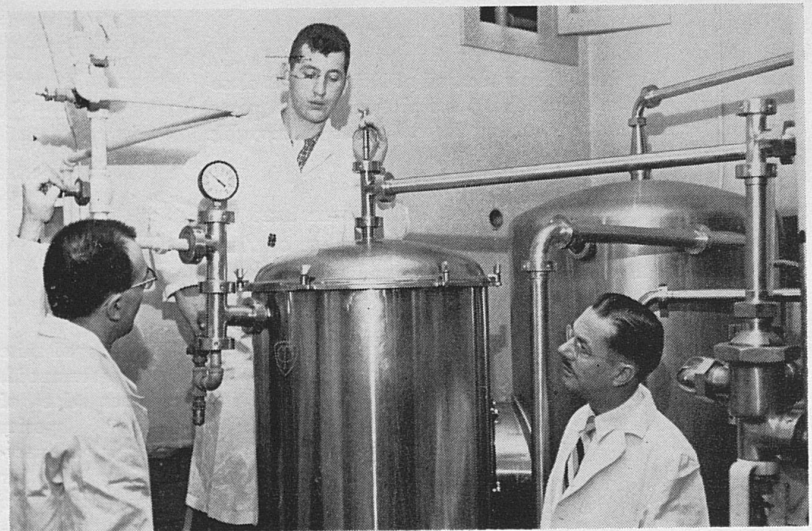
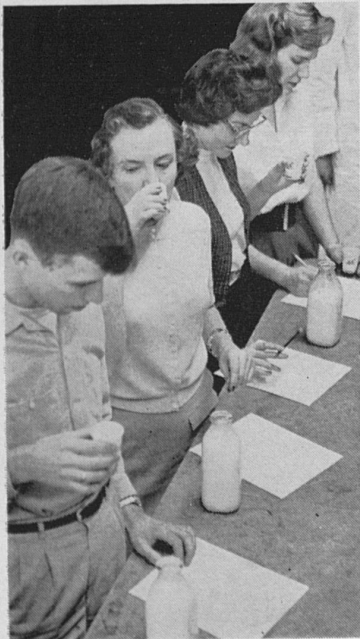
¹ The American Dairy Association contributed financial support to this project.

Apparatus makes off-flavors less noticeable; however, grading of raw milk is still necessary

of mercury). Here the milk boils at a temperature of about 155-158° F. Off-flavors and excess moisture from condensed steam are removed and discharged through the vacuum pump and carried into the drain. Then the milk is cooled and ready for bottling.

To learn if this equipment actually does improve milk flavor, the authors subjected milk from cows fed silage, grass, garlic and/or other feeds to a variety of operating conditions in this new apparatus. Also, milk was deliberately overheated during pasteurization to learn if the equipment would also remove this cooked or scorched flavor.

The treated milks were tasted by both professional flavor judges and persons representing the average consumer. This latter group consisted of 10 men and 5 women who had shown they could detect the flavors being studied. Samples of milk were treated in the equipment and then presented to these flavor panels. These professional judges and consumer tasters then decided if milk flavor had been improved



(above) The authors examining connections and atomizing valves of the first tank of the vacuum milk-treating equipment. (left) A portion of the consumer flavor panel tasting and scoring the vacuum-treated milk samples. Each bottle contains milk that has been subjected to a particular treatment.

and to what degree. Throughout most of these studies both groups agreed on the improvement or deterioration of flavor.

It was quickly learned that the amount of vacuum in the second chamber controlled the amount of concentration or dilution of the milk. When properly operated the equipment made no change in milk composition. It was also learned that safeguards were possible to insure proper operation. There was no noticeable effect on any of the other physical qualities such as fat dispersion. Therefore, it was concluded that the equipment could be used without loss to the dairy plant operator (due to concentration) or to the consumer (due to dilution).

To obtain onion or garlic flavor, cows of the U. K. dairy herd were fed garlic powder with their grain concentrate. When this milk was subjected to increasing vacuum levels in the smaller tank, more and more of the garlic flavor was removed. Increasing amounts of steam did little to improve further the flavor after a level of 50 pounds of steam per hour per 4,000 pounds of milk was reached. Actually, higher steam injection rates caused some decline in milk flavor. When garlic flavor was very strong not all of it was removed, but when only a mild flavor was present in the raw milk, virtually all of this foreign flavor was removed.

Silage and other feed flavors were also reduced by vacuum treatment. A vacuum level of 10 inches of mercury in the first, or smaller, tank proved to be most efficient. Addition of steam did not improve removal of these flavors appreciably.

When the milk was heated to 175° F for 19 seconds in the pasteurizer, it had a very unpleasant cooked or scorched flavor. Vacuum treatment removed this flavor to a marked degree but addition of steam seemed to intensify the flavor.

There was speculation at the beginning of these experiments that if off-flavors were removed, those delicate flavors associated with fine milk quality also might be removed. At the conclusion of the experiments it was noted that this was not the case. Criticisms of the treated milk as being "flat" or "tasteless" were very few when the equipment was operated properly.

From these results it can be concluded that the processor now has the means of providing the consumer with a uniform-flavored milk the year around. It does not mean, however, that grading the raw milk for flavor can be eliminated. The equipment merely reduces off-flavors; if the flavor concentration is too

high the undesirable flavor will still be present in the bottled milk. Producers must continue to follow good management practices to keep off-flavors at as low a level as possible.

Studies on Mites in Kentucky

(Continued from Page 5)

the ratio of predator mite to pest has to be relatively high to be fairly effective in control. Generally, in this country the value of the mites as predators has been largely nullified probably because of the large amount of organic insecticides used in spray programs.

The most important greenhouse species is the two-spotted spider mite, which is capable of going from egg to adult in 7 days at 75° F. This rapid turnover of generations makes it possible for even a few mites resistant to an acaricide to develop subsequently a resistant population in the greenhouse. In the orchard it now appears that the useful life of a new acaricide may be as short as 2 years.

World War II and the Korean War focused much attention on medically important species of mites and ticks. From the standpoint of disease transmission, chiggers are probably the most important group of mites. About 143 species were known over the world in 1940; today over 1,000 are known. There are about 450 known species of ticks; these are surpassed only by mosquitoes in the transmission of diseases to man. Chiggers may feed intermittently on mammals, birds or reptiles. Some chiggers are the vectors of scrub typhus, important in wartime conditions. The major problem with chiggers in non-military living is the problem of dermatitis or trombidiosis, which is the reaction of the person attacked to the salivary secretion of the chigger and is partly allergic. Secondary infections often develop after the person scratches the afflicted areas.

Several blood-sucking mites, including ticks, act as vectors of bacterial and virus diseases of their hosts and may spread those infections to humans and domestic animals. Some of these are species that live on plants or plant debris and may be eaten by grazing animals and many of these serve as intermediate hosts and vectors of worm parasites.

Anaplasmosis of cattle is spread by *Dermacentor andersonii*, *Dermacentor variabilis* and other ticks. Tularemia, transmitted to man by contact with infected animals, is spread from animal to animal by

(Continued on Page 8)

Problems of Older Rural Persons

(Continued from Page 3)

with retirement. Among the women, dissatisfaction with retirement appeared to vary with a wider range of factors. As was the case with the men, the chief factors influencing their dislike for retirement were low income and poor health. In addition, their dissatisfaction appeared to be aggravated by having low socio-economic status, having little formal education, being single or widowed, and living with others.

The older rural persons in the study were asked: "Do you have to go without some things because you don't have enough money?" Despite the low money incomes reported, less than half of the persons said "yes." The three things they said they lacked, in descending order of frequency, were (1) necessities of life, such as proper food and clothing, (2) certain "luxuries" commonly used in the United States, and (3) health services.

With advancing chronological age a seeming contradiction appeared: there was a decline in money income and at the same time a decline in feelings of economic deprivation. The men and women aged 60 to 64 had higher incomes than those 65 and over, but the persons aged 60 to 64 felt more economic deprivation than did the persons aged 65 and over.

Several hypotheses may be suggested to account for this paradox. The younger men and women are more actively engaged in work activity, probably have greater economic responsibilities, have higher aspirations and expectations for economic betterment, have more unmet wants and needs, and consequently feel more acutely deprived economically. In contrast, the men and women aged 65 and over are less involved in work activity, tend to have fixed incomes principally from retirement and pension systems, have lower aspirations and expectations for economic betterment, have fewer unmet wants and needs, and consequently feel less deprivation than the younger persons in the study. With advancing chronological age, the older men and women in this study appear to have made an "adjustment" to their constricted economic situation.

Feelings of economic deprivation varied with a number of factors, in addition to chronological age. Married men and the men in poor health felt more economic deprivation than did the unmarried (widowers, divorced, or separated) men and those in good health. Among the women, marital status appeared to have no bearing on their feelings of economic deprivation. Poor health and a lower level of formal education appeared to aggravate the older women's feelings of economic deprivation.

Studies on Mites in Kentucky

(Continued from Page 7)

ticks. Rickettsial diseases are also transmitted by mites; for example, Rocky Mountain spotted fever, a very dangerous disease, is transmitted to man by a tick. Other ticks are responsible for maintaining a natural reservoir of the disease in rodents. Ticks may also produce tick paralysis; a case of this was recently recorded in Kentucky on sheep. It may occur in other domestic animals, as well as in children.

Rickettsial pox is carried from animal to animal and to man by the house mouse mite, a blood sucker, and at least one big outbreak of rickettsial pox has occurred in the United States. The tropical rat mite is misnamed since it exists in the temperate zone; it has been shown experimentally to be able to transmit endemic typhus and tularemia. Lymphocytic choriomeningitis (LCM) is a virus disease carried by mites found on rats. Mites found on bats and birds are suspected of being carriers of the viruses of Eastern and Western equine encephalomyelitis and St. Louis encephalitis.

The mites of rodents may cause in man various skin reactions. This is also the case with a group of mites known as the itch and grain mites. The latter may be found in straw and have at times been a problem in the bedding of thoroughbreds. Poultry mites are also found on wild birds, the latter being one means of carrying infestations from one poultry establishment to another; hence it is important that birds should not be allowed to nest around chicken houses.

Kentucky Agricultural Experiment Station
University of Kentucky
Lexington, Ky.

Frank J. Welch
Director

FREE—Annual Report or Bulletin
or Report of Progress

Permit No. 1109
Ky. W-5-60-3,000

POSTMASTER: Please return free if
unclaimed. See Postal Laws and Reg-
ulations.

PENALTY FOR PRIVATE USE TO AVOID
PAYMENT OF POSTAGE, \$300