man, with Miss Etta Elberg as sponsor; the other was entitled "Experiments Using Dry Ice," put on by two boys from the New Philadelphia High School, George Robb and Glenn Curtis, Miss Leila E. Helmick, sponsor. Both demonstrations were put on in a masterly manner, doing great credit to the pupils, the teachers and the schools from which they came. (3) The third notable advance, while not so spectacular, is very real and is found in the change in the form of government of the academy from the general to the council form of government, as provided in the revised constitution—somewhat after the manner of the American Association for the Advancement of Science.

As a result of a rather intensive campaign under the slogan "One Thousand Members in 1940" and under the leadership of Dr. C. W. Jarvis, the membership list of the academy was increased by 127 new members at the annual meeting, and still they come, and by three restorations so that we are well on the way toward 700, to say nothing of the Juniors.

The annual election resulted in the choice of the following as the officers for the ensuing year: *President,* Stephen R. Williams, Miami University; *Secretary,* William H. Alexander, Normandie Hotel, Columbus; *Treasurer,* Edward S. Thomas, Ohio State University.

WILLIAM H. ALEXANDER,
Secretary

THE ILLINOIS STATE ACADEMY OF SCIENCE

THE Illinois State Academy of Science met for its thirty-third annual meeting at Galesburg, Illinois, May 3 and 4. The meeting was well attended and facilities provided by Knox College and by the City of Galesburg were unusually well planned. All meetings progressed nicely on schedule, adding much to the pleasure and interest. The main features of the meeting on Friday were the general session in the morning, the special sections meeting in the afternoon, the Junior Academy exhibit and judging, banquets of the Junior and Senior Academies in the evening, followed by a joint lecture for both groups after the banquets. Awards for prize-winning exhibits in the Junior Academy were made following this lecture.

At the morning session three lectures were given: Dr. E. I. Fernald, professor of botany at Rockford College, and the retiring president of the academy, spoke on "Michael S. Bebb, Illinois Botanist and Letter-Writer." The lecture was illustrated with slides. Two other lectures, "Science and Common Life," by Anton J. Carlson, of the University of Chicago, and "Looking through Great Telescopes," by Oliver J. Lee, Dearborn Observatory, completed the morning program.

Arrangements were provided by the college for a joint luncheon, special tables and rooms being available for groups that desired this. The geologists met together and the Illinois branch of the American Association of Physics Teachers also. This latter group sponsored the physics section program and appointed a committee to organize an engineering and applied science section for the next annual meeting.

Altogether some 120 papers were presented at the section meetings in the afternoon. The chairmen elected to take charge of the respective sections for the ensuing year were:

Agriculture: Mr. C. H. Oathout, Western Illinois State Teachers College.
Anthropology: Mr. Floyd Barloga, 1423 N. Glenn Oak, Peoria.
Botany: Mr. Paul Voth, Department of Botany, University of Chicago.
Chemistry: Mr. George H. Reed, Knox College.
Geography: Dr. Arthur B. Cozzens, University of Illinois.
Geology: Mr. J. Marvin Weller, State Geological Survey.
Physics: Ph. A. Constantinides, Wright Junior College.
Psychology and Education: O. Irving Jacobsen, Shurtleff College.
Zoology: Dr. W. V. Balduf, Department of Entomology, University of Illinois.

It was voted to accept the invitation of a cooperating group headed by the Museum of Science and Industry, Chicago, to hold the next annual meeting there on May 1, 2 and 3, 1941.

The evening banquet was well attended and adjourned to enjoy an exciting demonstration lecture given by Dr. J. O. Perrine, of the American Telephone and Telegraph Company, who led the discussion with Pedro the Voder. The meeting was a joint one with the Junior Academy, and both groups are indebted to Dr. Perrine and the company he represented for the lecture. After the lecture awards were presented to the winners in the competition between the science groups of the Junior Academy and the American Association for the Advancement of Science. It was an enthusiastic occasion and demonstrated quite clearly the vitality of the academy work in the state of Illinois.

On Saturday morning the Burlington Railroad took a group of over a hundred Junior and Senior Academy members on a special train through their yards and tie-treatment plant in the vicinity of Galesburg. Three other science pilgrimages to points of interest in that part of the state were planned and carried out by the anthropologists, geologists and biologists. All trips were reported successful and well attended. The academy meeting was attended by over six hundred. It is anticipated that even a larger group will be in attendance next year when the meeting will be in Chicago.

Officers for the coming year are:

President: V. O. Graham, 4028 Grace Street, Chicago.
First Vice-president: T. H. Frison, State Natural History Survey, Urbana.
Second Vice-president: C. R. Moulton, Museum of Science and Industry, Chicago.
Secretary: R. F. Paton, University of Illinois.
Treasurer: John Voss, Manual Training High School, Peoria.
Librarian: Thorne Deuel, State Museum, Springfield.
Editor: Grace Needham Oliver, State Geological Survey, Urbana.
Junior Academy Representative: Miss Audry Hill, Chester High School, Chester.

Winners of the American Association for the Advancement of Science academy grants in aid for research for 1940–41 were:

Dr. F. O. Green, Department of Chemistry, Greenville College.
Dr. C. L. Furrow, Department of Zoology, Knox College.
Dr. F. R. Cagle, Southern Illinois State Normal University.

R. F. PATON,
Secretary

SPECIAL ARTICLES

DIMINISHING RESPONSE OF THE SKIN TO FREQUENTLY REPEATED REINFECTION WITH INVASIVE BACTERIA

IN experiments concerned with the mode of action of sulfanilamide we wished to make observations on the difference in the response to the drug by a primary infection as compared to the response found once an infection had been established. In devising the experiments we felt that injecting four or five small doses of the bacteria in different parts of the skin, at intervals of a few hours, would give more information than injecting a single large dose. As a preliminary step leading to this study, rabbits were injected intradermally, following this procedure but without sulfanilamide being administered. The main purpose of this preliminary note is to describe a phenomenon which was encountered constantly in the course of these studies. Details of the experiments will be published in the *Yale Journal of Biology and Medicine.*

Two groups of bacteria were studied, (*a*) two strains of *Streptococcus hemolyticus* and two strains of *Staphylococcus aureus,* which were invasive bacteria and produced large amounts of spreading factor, and (*b*) two strains of *E. coli* and one of *S. anolium,* which were not invasive and did not produce spreading factor. Broth cultures of exactly the same age were employed for the injections in each rabbit. In general, the amount of bacterial culture administered in each injection was that which when injected for the first time into rabbits would induce lesions measuring from 10 to 20 sq cm after 24 hours. For instance, when streptococcus was employed 0.1 cc of 18-hour broth culture was usually injected; when *E. coli* was employed 0.5 cc of culture were injected.

It was found that when the invasive bacteria were injected in four or five identical doses within a period of from one to twenty-four hours, using a different part of the skin for each injection, the resulting lesions, measured twenty-four hours after injection, showed marked differences both in severity and in the area through which the infection had spread; the second lesion being smaller and less severe than the first; the third smaller than the second, and the fourth and fifth, when present, smaller and much less severe than all the lesions resulting from earlier injections. These results were not affected by the site injected. The phenomenon may distinctly manifest inself as early as one hour after the first injection. Frequently the area of the lesion resulting from the last injection was as much as fifteen times smaller than that resulting from the first; indeed, oftentimes such lesion was no more than a pimple.

This phenomenon of the diminishing skin response was completely absent in infections caused by *E. coli* and *S. anolium.* However, when larger doses of these non-invasive bacteria were given so as to induce a more severe first lesion, a slight decrease in the response to the following injections was sometimes observed; and if the same amounts of bacteria were injected together with spreading factor either from streptococcus or from testicle extracts so that very large first lesions were induced, then the phenomenon was clearly present.

Antibodies were not found in the serum by the usual serological tests, and blood counts made at different intervals showed no unusual or marked variations.

These findings led us to make identical experiments with heat-killed bacteria and with bacterial filtrates. The results were as follows:

The phenomenon was practically never present when the bacteria, either invasive or non-invasive, were killed by heat. In testing the filtrates India ink was used as an indicator of the area through which each inoculum spread. Filtrates of non-invasive organisms failed to spread at all, and the area of spread of all inocula was the same. Streptococcus filtrates, endowed with a pronounced spreading power, seemed to elicit the phenomenon in some instances, and not in a very marked degree.

In identical experiments in which dilution of rattlesnake venom, a secretion containing much spreading