paths has come to know as groundless. The puma, or American panther, and its South American representative, the jaguar, are not regarded by experienced hunters and naturalists as animals to be feared, excepting under circumstances which leave no avenue of escape open to the beast. The writer has repeatedly observed this fact in connection with the puma in this country, with the jaguar in the forests of the Amazon, and with various other wild animals, in both regions, which are terrible antagonists when brought to bay by wounds or other events demanding defence of self or young. The puma plays like a cat about the lonely traveller on foot or snow-shoes in the Rocky Mountains, and the curiosity of the jaguar brings him nightly to the camps of voyagers along the Brazilian rivers. I have often in that region been disturbed in sleep by such prowlers, who would rush suddenly off upon the slightest movement of my body; and upon numerous occasions in the morning fresh tracks in the sand all around our blankets would be visible, many times without our being awakened by the movements of the animals.

Mr. Hudson's remarks regarding the fearlessness of the natives in La Plata do not, however, agree with my own observations of the average Amazonian dwellers. As an instance, one night in 1870, at the Cachociras (waterfalls) de Maroim upon the Tocantins River, some 200 miles above the city of Pará, we encamped in the forest at the edge of the river, contrary to our usual custom of selecting a sandy island. Some in hammocks, others with blankets spread upon the ground, we North-Americans all slept soundly, notwithstanding that a rock cavern with well-gnawed bones and other signs of jaguar occupancy lay within 200 feet of the camp. I did awake once and saw the glaring eyes of a huge jaguar, as I supposed, within a few feet of my hammock. Next morning the tracks were evident in this particular spot, as well as many others all around camp, which were not there when we lay down at night. But the natives! Every mother's son of them uttered that night fervent prayers for protection, and sought rest in the tree-tops, swinging their hammocks from limbs hanging far out over the water, at the same time cautioning us of the great danger to be feared from vicious attacks of the tigers. This is only one of a number of similar instances, and not a little experience with the puma and with bears of various kinds (including the cinnamon and grizzly) and other animals of reputation for unbridled ferocity, has brought me to the same conclusion regarding them. The writer called attention to the harmless nature of some supposed dangerous *feres* as early as 1873–74 in articles in the *American Naturalist* upon "The Scientific Value of the Yellowstone Park."

Venomous reptiles and insects, as the rattlesnake, "Gila Monster," tarantula, scorpion, centipede, etc., have reputations beyond their deserts for blood-thirstiness. Notwithstanding the numerous authentic cases of poisoning by them, I have yet to learn of one which cannot be fairly regarded as the *derrier resort* of the animal in a defensive attitude. Give any one of these creatures a reasonable (to their notion) chance of escape and they will avail themselves of it in preference to attack. One may come upon them suddenly, and unconsciously put them in a position from which no escape is open; but, if they are let alone or given a free field, they will always avail themselves of it. I remember the case of a rattlesnake in Texas, which we had surrounded and which was menaced by clubs upon all sides. He ran for dear life, striving his best to pass the gaps between each pair of enemies, until, baffled at every point, he suddenly turned upon the writer for an attack. As soon, however, as this manœuvre had opened a passage-way in one direction, he darted off and was again caught only with great difficulty. So, in Indian Territory, among the Wichita Mountains, where the rattlesnakes are akin to boas in size and hideousness, they are wofully sluggish. I have encountered them there among the rocks and in the tall grass, with the sickening rattle sounding long enough to get far from harm before the dangerous thrust was made. My horse has almost stepped upon them in such situations in that region, as well as in Wyoming, Texas, Arizona, and elsewhere, without further result than a scampering off of the snake. Much as the boa constrictor is dreaded in Brazil, cases are exceedingly rare of the exercise of its undoubted power over humanity.

The alligator, with all his ability to devour, is an arrant coward, and we often bathed in the tropical rivers where they were disporting themselves not far away. The natives there claim that none but drunken men are in danger from their attacks.

Hunger, endangerment of life, excessive fear of man with no means of escape, and a sudden surprise are all effective in bringing up every means of defence. The real danger from association with many of these creatures is the liability to meet them unawares, or to suddenly place them on the defensive through the unconscious movements of sleep. The more sluggish or the smaller the animal, the greater is this risk.

In Arizona the bite of a certain small species of skunk is very much dreaded, owing to the belief that hydrophobia is a probable result. There is almost no danger from this source, nor from the vile excretions of other species of polecat, if one does not directly attack them; but from their unfortunate sociability in this region, a sleeping person may suddenly throw out his hand when disturbed, without awakening. In nine cases out of ten this will drive off the intruder, who will rarely return. Occasionally, however, such an act may hit the animal, when he will bite as he flees. Very few cases of this kind have been reported. I have frequently discovered innumerable tracks of these animals about my cot of a morning when camping in sandy tracts, and sometimes have seen them moving about. A movement of the arm is always enough to send them post-haste to cover at a distance. Persons lying on blankets on the ground need more caution, as these "essence peddlers" will sometimes occupy such beds on cold nights.

Skunks are extremely abundant for several weeks in autumn in this region. Last year four of them entered the university itself, and at one point in the Baboquivon Mountains as many as thirty were killed near our cabin in two or three days. They would come up to the doors at midday, and as many as seven at one time were seen on moonlight nights within shooting distance.

These pests have again made their appearance this month. There seem to be four kinds of them, varying materially in "scentability" from the inodorous little biter to the one which is the very *quintessence* of malodorousness, and in color from a light gray to a dense black with white tail. Somehow or other, one of each kind inhabited a cosy nook beneath the writer's office last fall. The little gray one was particularly fond of intruding into my bed-room until the shot-gun was called into requisition.

Tucson, Arizona, Sept. 5.

CONCERNING THE AERATION OF MILK.

BY C. S. PLUMB, DIRECTOR AGRICULTURAL EXPERIMENT STATION OF INDIANA.

MUCH advance has been made in our knowledge of dairying of late years, and especially in America has there been much attention devoted to problems affecting the industry, which has resulted in remarkable progress. Some of the American agricultural experiment stations have made themselves best known by the dairy investigations they have conducted.

Among these subjects of study has been that of the influence of aeration upon milk. Milk fresh from the cow, that was aerated and suddenly reduced in temperature at the same time, it was claimed, would remain sweet longer than milk not so treated set under similar conditions. Within a comparatively short time aerating machines have been placed on the market, that are credited with removing disagreeable odors and retarding acidity of milk.

Bulletin 27 of the Vermont Experiment Station, for January, 1892, states that the "aerator gave good satisfaction" when in use at that institution. At the Cornell University Experiment Station the aeration and cooling of milk were studied by Professor H. H. Wing, and the results published in Bulletin 39, for July, 1892. In this it is shown that the Champion aerator will cool 225 to 250 pounds of milk per hour down to about 60° F. Milk passed over the Champion was, on an average, perceptibly sour in fifty hours after setting; that aerated on the Star machine was sour in fifty-one hours; while milk aerated with the Powell machine

soured in forty-six hours, the average length of time in which milk not aerated became acid. It was also shown that skim-milk from aerated milk contained .53 per cent of fat against .31 per cent of fat in skim-milk from milk not aerated; this milk was set in Cooley cans.

During April and May of the present year the writer, assisted by Mr. H. C. Beckman, an agricultural student in Purdue University, carried on a series of tests to note the influence of aeration upon the securing of butter-fat in milk, the details of which were presented to the Society for the Promotion of Agricultural Science, at Rochester, N.Y., on Aug. 20. Fifty pounds of fresh, warm, mixed milk was divided into two lots of twenty-five pounds each. Lot one was passed over an Evans and Heuling aerator and reduced in temperature, on an average, from 88.3° to 56.5° F. This milk was then set in cold water, and skimmed in twenty-four hours. Lot two was treated like lot one, excepting that it was not aerated. Twenty-nine lots of cream were secured from each class, which resulted in a total amount of 183 pounds 5½ ounces of cream from aerated milk, and 181 pounds 10½ ounces from that not aerated. Daily tests were made with the Babcock machine, which showed an average of 24.4 per cent fat in cream from aerated, and 24.0 per cent of fat in cream from non-aerated milk. Thirty-two pounds seven ounces of butter were made from the cream from aerated milk, and six ounces less from the non-aerated.

The limited amount of experimental evidence published would indicate that aerated milk kept sweet somewhat longer than that not so treated, other things being equal. Our practical observations seemed to point this way. In order to more carefully investigate this point, a chemical investigation of the subject was carried on under the direction of Professor H. A. Huston, chemist of the Purdue University Agricultural Experiment Station. The milks were treated as noted above, one lot being aerated and the other not. Check samples from each lot were taken every twelve hours. The relative acidity of the milks was determined by means of the quantity of one-half normal caustic potash required to produce a neutral tint. On account of the well-known amphegenic action of milk with litmus paper, it was considered desirable to obtain results with more than one indicator. After repeated trials with a large number of indicators, phenol-phthalein and corralline were selected. The milk was titrated at once after sampling. After the first twelve hours 5 cubic centimeters one-half normal HCl were added to 250 cubic centimeters of the milk; 25 cubic centimeters of this milk were taken for titration. Several methods of setting the lots of milk were tried. A synopsis of these tests, over equal periods of time, shows the following interesting results: In sixteen tests the aerated milk was most acid; in eleven tests the non-aerated milk was most acid; while in seven cases the acidity was equal in both lots. These tests, which represent considerable painstaking work, do not indicate the results from aeration that were to have been expected as based on current opinion.

If cows are properly fed and milked, the writer does not believe that normal milk will be disagreeable if set in clean vessels in sweet surroundings, yet there are those who lay great stress upon the animal odor in milk, and the necessity of removing it. It is claimed that the aerator will accomplish this. In the *Wisconsin Farmer* of Sept. 3, a short article is published on aerating milk, credited to "a Vermont authority." Says the writer, "by aerating milk, odors can be completely driven out that have been absorbed by the milk after being drawn from the cow. Odors that were derived by the milk through the system of the cow are not so easily taken out. They will be somewhat lessened, but can never be wholly removed. Milk should be aerated as soon as possible after it is drawn, and it should, at the same time, be cooled. Aerating alone is an advantage, but its good effects on the keeping of milk are much increased by bringing the milk down to 55° or lower. Milk should keep at least twelve hours longer for the aerating. By using a cooler and aerator faithfully it is possible to dispense with ice in selling milk under the ordinary conditions as they occur in the smaller cities; but where the milk is to be brought by train, and is 24 to 36 hours old before it is put on the milk cart, it would be necessary to use ice even with aerated milk. . . . The man who is raising his cream by shallow setting or cold deep setting has no use for a milk aerator or a milk cooler. Either would be a positive detriment, occasioning the loss of a large amount of butter in the skim-milk."

This subject is one of considerable interest and importance. A person has no business to have milk so contaminated by odors *after being drawn*, as to require the use of aeration to make it palatable. As bearing on the other points in the article quoted, I believe there is but little experimental evidence at hand, though this in a measure substantiates it. Our experiment stations have an opportunity to do some interesting work in this direction.

Purdue University Agricultural Experiment Station, Lafayette, Indiana.

REPORT OF THE SUMMER SCHOOL OF THE BROOKLYN INSTITUTE FOR THE SEASON JUST CLOSED.

BY HERBERT W. CONN, DIRECTOR.

THE Biological Laboratory of the Brooklyn Institute of Arts and Sciences has just closed its third season of biological work. The session has been the most successful one in its history, and as a preliminary report of the summer's work it will be fitting to give a brief account of the history of the Laboratory, together with its purposes and aims, in order that those interested in the matter may gain a better knowledge of the school.

The Biological Laboratory at Cold Spring Harbor was organized in 1890. It owed its inception to the Brooklyn Institute, and has been established as a branch of that institution of popular education. The foundation of the school was made possible through the generosity of Mr. John D. Jones and the New York Fish Commission. Mr. Jones at the outset contributed a considerable sum of money towards purchasing the equipment of the Laboratory, and the New York Fish Commission offered to the school the use of its buildings and appurtenances located at Cold Spring Harbor, L I. Other friends, among whom may be mentioned Mr. Eugene G. Blackford, Professor Franklin W. Hooper, Dr. Oliver L. Jones, Mr. Louis C. Tiffany, Mrs. H. G. DeForrest, and Miss Julia B. DeForrest, have contributed generously toward the equipment and support of the school. By means of these contributions and from students' fees the Laboratory has been thus far supported. Up to the present time the hatchery of the New York Fish Commission has served as a laboratory building, but the school has reached the limit of the accommodations thus offered, and is hoping to erect a special laboratory building during the coming year, which will be especially adapted to biological work. The Laboratory has been supplied with a launch, collecting apparatus, aquaria, and other appliances necessary for the pursuit of biological work. A library of biological literature has been furnished, and microscopes, etc., have been loaned by the Brooklyn Institute and Wesleyan University. During the present year a beautiful lecture-room has been fitted up for the school by the Wauwepec Society, a society organized by Mr. John D. Jones for local improvement at Cold Spring Harbor. The New York Fish Commission has given the use of its boats, aquaria, pumps, and other apparatus, which has been of great value to the school. Thus equipped, the school has been enabled to enjoy three successful seasons, and to demonstrate the need of further support and better equipment. The Wauwepec Society is contemplating the erection of a laboratory building for its use, and its further growth is only a matter of time.

During its three years of existence, over sixty persons have made use of the advantages offered by the Laboratory, either in study or in investigation. Those attending the Laboratory have included college professors, public-school teachers, physicians, and students of various grades of schools.

The Laboratory was, for the first year, under the direction of Bashford Dean, Ph.D., of Columbia College. During the last two years it has been directed by Professor Herbert W. Conn, Ph.D., of Wesleyan University, who has been assisted by Professor Charles W. Hargitt, Ph.D., of Syracuse University, and Professor H. L. Osborn, of Hamline University. In addition to these, there have been at the school leading biologists from various institutions, including Columbia College, Rutgers College, Trinity College,