as a corn field does to a pig that feeds and roams therein. This exact equality in male and female conjugation, is taught by the microscope, and from our many experiments of first-cross hybrids; while other tests showing unequal potential, in three-quarter hybrids brings the simile of a horse pulling at the whiffletree with a horse of three times his power, and breeds various scrubs with only an occasional good one.

Perhaps every man in this audience, who breeds swine, has formulated the empirical law that the first cross is good, and the second cross is bad. But have all of you thought to apply this essential law to the breeding of pure pedigreed races? The mating of a pure Scotch with a Bates Shorthorn is as true a hybridization and obeys the laws of hybridization as surely as the cross of Shorthorn with Angus.

When the American Breeders' Association has brought together profound biologists and great breeders; when the artisan and the architect are brought into union, is it a dream to say that we may yet build vital forms as the sculptor molds the plastic clay?

The Angelus Ladies' Quartette then favored the convention with two vocal selections.

PRESIDENT THOMPSON: We have had a very pleasant experience here in our excursions into the world of animal life. We shall now for a little while take a journey among the flowers under the guidance of Prof. J. B. Norton, who comes from the National Capitol, and who will now address you.

HEREDITY IN CARNATION SEEDLINGS.

By J. B. NORTON, *U. S. Department of Agriculture, Washington, D. C.*

In 1904, at the request of Dr. H. J. Webber, the writer began taking notes on an extensive series of seedlings of the American carnation grown by Mr. E. M. Byrnes of Department of Agriculture. These were the result of crosses between several standard clonal varieties, but in all cases showed no uniformity of type in regard to doubling, singles appearing in every series. The percentage of singles appeared to be rather constant for the different lots, the general average for the whole lot being about 23 per cent of singles to 77 per cent of doubles. The doubles varied in the amount of doubling but could be roughly divided into two groups, standards and "bursters" or full doubles, the latter making up about one-fourth of all the seedlings. These percentages agreed so closely with the second generation results of a Mendelian hybrid that the writer at the 1904 meeting of the Society for the Promotion of Horticultural Science, at Philadelphia, ventured the opinion that the standard greenhouse carnation of this country was the unfixed hybrid of a cross between a single and a full double and

that 100 per cent of standard doubles could be raised from a cross between a single and a full double carnation.

Several crosses of this kind were made in the winter of 1905-6 and so far the 250 seedlings that have bloomed, with one exception, are standard doubles. In all cases the crosses were made on single seedlings using pollen from the full doubles. No protection from outside pollen was used and the presence of flies and bees in the house would easily account for the one single seedling.

This method of crossing is not recommended as superior to the old method, but is advanced as a suggestion to aid carnation breeders in their work. Single and very double seedlings heretofore have been thrown away no matter how desirable their other characters might be. By pollinating a good single with the pollen of a "burster" that has some new desirable quality, a complete series of standard double seedlings can be obtained, thus giving twice the ordinary possibilities of success in fixing the new character since very little over 50 per cent of standard double forms are obtained when two standards are crossed. The seedlings produced by this method that have bloomed thus far give quite as much promise as any produced in the Department houses from standard varieties or from standard double seedlings.

While this work does not prove that the carnation is following Mendel's law in regard to doubling, it offers evidence that any one familiar with Mendelian hybrids would accept as satisfactory proof. Another practical application of this method would be in the production of double-flowered garden pinks. At present many of the varieties on the market produce about 20 per cent or more of singles. If these single plants were pollinated with the pollen of full doubles, a high grade of commercial seed would be produced that could be guaranteed to produce 100 per cent of double flowers. It is possible that this method of seed production can be applied to other double flowers outside of the genus *Dianthus*.

No discussion was had, owing to the lateness of the hour. President Thompson announced the various program features of the morrow, and gave visiting members full directions as to how to reach the meeting place.

PROFESSOR HAYS: I would like to ask if there are any resolutions to be handed in at this time, or any other business that the members and friends would like to present to the Council or to the Association?

While we have a moment I want to say something about the program of to-morrow evening. Some of you heard me speak this morning of the various committees. I mentioned the committee on breeding wild animals. Some of our wild animals, for example, the buffalo, some of the antelopes and elks, mountain sheep, etc., are becoming extinct. There is a movement at this time going on to preserve these, in which movement the Government is taking part.

There is also a movement rising with a good deal of power to use these hardy animals for cold climates like the high mountains in our northern regions. The idea is to use these hardy wild animals there to produce meat in a sort of wild way. The leader in this kind of work is Colonel C. J. Jones, of Arizona—"Buffalo Jones." He is going to give us on this platform to-morrow night as good a show as the ordinary theater. He is going to talk some hard common sense and practical Americanism about these great interests that are both of scientific and practical value, and will especially appeal to the people who like wild game. He will have a moving picture machine, and is going to show you male buffaloes fighting, whole herds of buffaloes, great droves of antelope going over the hills, and himself fighting with a mountain lion in a tree. He is probably America's greatest intermountain hunter and plainsman. He is coming to this Association at a great sacrifice, as he has been making from \$100 to \$500 a night with this lecture, which he is going to give to this Association and this city free.

I hope the newspapers will fill this building; and I rather suggest, Mr. President, that this Association provide tickets for our members and guests, with reserved seats, so that the people from outside will not crowd out your visitors.

Then the convention adjourned.

WEDNESDAY FORENOON, JANUARY 16—SESSION OF THE ANIMAL SECTION.

The Section of Animal Breeding met in the University Chapel with Hon. A. P. Grout presiding.

Chairman GROUT. The first topic this morning is an address on "Teaching Animal Selection," certainly a very interesting topic to us all, by Prof. C. S. Plumb.

TEACHING ANIMAL SELECTION.

By Prof. C. S. PLUMB, *Columbus, O.*

MR. CHAIRMAN, LADIES AND GENTLEMEN: The subject of "animal selection," more commonly termed in this country "live stock judging," is one of the more recent features of agricultural education. So far as I am aware Professor Craig of the University of Wisconsin was the pioneer in systematic work along this line. It should also