REPORT

of the

TOMATO GENETICS COOPERATIVE

Number 2 January 1952

Division of Truck Crops
University of California
Davis, California

Contents

FOREWARD

The Tomato Genetics Cooperative is a group of workers who have a common interest in tomato genetics and who are organized informally for the purpose of exchanging information and stocks. Participation is voluntary, and costs of activities are met by assessments to members.

The TGC was started in 1950, the first Report being issued in March, 1951. The date of the present second Report has been advanced to January, 1952 with the intention that it reach workers in time to permit exchange of material before the main season plantings are started.

The response to TGC memoranda and also the spontaneous comment during the past year have been very gratifying. The increase in membership from 87 listed in Report No. 1 to the present 113 also testifies to the widespread interest in tomato genetics and to the potential usefulness of the TGC. We trust that members will continue to make fullest use of the TGC Reports and, in view of the limited publicity that the group has received, that they will remember to contact other workers who might be interested in joining.

On the basis of costs of issuing Report No. 1 and the membership as of March, 1951, the assessment per member amounted to $.56. Anticipating an increased enrollment and a somewhat smaller Report in 1952, we accepted $1.00 as payment for two-year memberships. The balance of $60.94 (page 23) thus accrued will readily handle expenses of the present Report. The number of copies prepared of Report No. 1 was 150, of the present No., 200.

As more mutants and chromosome aberrations are described each year, it has become clear that some simple yet effective system of nomenclature in tomato genetics is badly needed. It has also been suggested that the TGC might issue a list of all known available stocks of genes together with sources. In order to consider these problems and to formulate a scheme of nomenclature, a committee consisting of D. W. Barton, Chairman, L. Butler, and J. A. Jenkins has been appointed. Any proposals by this committee will appear in the next Report of the TGC.

The assistance of many people in the preparation of this Report is greatly appreciated. Mildred Stearns typed the stencils, while Harriet Hopper, Dora Hunt, and Beverley Kepner helped in many other phases of the work.

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PART I
RESEARCH NOTES

Barham, W. W., and Ellis, D. E. Resistance to late blight and southern bacterial wilt.

As a result of the cooperative tomato breeding project, the Departments of Horticulture and Plant Pathology at North Carolina State College have developed a number of tomato lines possessing good field resistance to southern bacterial wilt. However, only a few of these lines have fruits approaching marketable size. In 1950, one line, 45-1-1-1-1, had several plants with fruit of marketable size (1/4 to 1/3 pound); however, these fruits contained only a few seed and were of poor quality. Crosses were made in the greenhouse between this resistant, large fruited line and other resistant lines with smaller fruit. Plants from the progenies of these crosses, along with more than 200 breeding lines selected in 1950, were tested in the greenhouse and field in the spring and summer of 1951. The more promising selections from these lines will be evaluated for quality and yield in replicated tests in 1952.

Seedlings of late blight resistant and susceptible parental lines and from crosses of resistant with resistant and resistant with susceptible lines were taken to the field in flats when late blight was very active. These seedlings had inoculum sprinkled over them; late blight developed uniformly in all thirty flats, killing all susceptible plants. From this test it is possible to conclude that inheritance of resistance to late blight is not fully recessive and that segregation in F_2 indicates a more complicated type of inheritance than a single factor. However, it was gratifying to find F_2 segregates appearing as resistant as the resistant parents. Inheritance of resistance studies will be continued, and the more promising of the advanced breeding lines will be included in the late blight free replicated test in 1952 for quality and yield evaluations.

Butler, L. Hairless (hl), a new character in the fifth linkage group.

Hairless plants (hl) are characterized by the complete absence of trichomes except for some glands filled with clear fluid. Because of this lack of hair the stamens tend to be dialytic. Hairless plants can be told from smooth (H) plants by the absence of hair on the hypocotyl. Smooth plants (HH) have a few hairs at the growing tip and many hairs on the hypocotyl and the adjacent part of the stem. Crosses between smooth and hairless give F_2 ratios of 9 smooth to 4 hairless to 3 hairy. The hairless gene is in the fifth linkage group, 19 cross-over units from green stem (a). Limited data indicates that it is between jointless and green stem. The seed of hairless was obtained from Dr. E. A. Kerr of the Horticultural Experimental Station, Vineland, where the mutation occurred.

Butler, L. Sticky peel (pe), a new character in the seventh linkage group.

Sticky peel (pe) has been fully described by P. A. Young who sent me the seed for linkage tests. The sticky peel plants are light green and very hairy. These have been found to be monogenic characters linked with sticky peel. The characters have been given the following symbols: sticky peel - pe (for peel), very hairy or villous - vi, light green foliage - lg. Preliminary linkage data indicates that all three genes are between the H and t loci of linkage group seven.

Butler, L. Jointless-leafy inflorescence.

In view of the present interest in these genes it is advisable to give a brief account of their history. Both came from Rouge Naine Native. Leafy inflorescence was discovered by J. W. MacArthur in 1926, and its linkage with green stem and fasciated was worked out. At this time we knew the penetrance of leafy was not complete, so any plant with one or more leafy inflorescences was classified as lf. In 1931 I discovered jointless in an F_2 containing leafy and was able to show that it was also linked with the other fifth chromosome genes. Only two apparently non-leafy, jointless plants were found in an F_2 of over 14,000, but these unfortunately were not saved. Later MacArthur made selections which were marked Lf j but so far none have proven to be non-leafy. Some of these misclassifications were the result of the interaction of bu and mc with jointless. Others may be because of the lack of penetrance of lf. Last summer I selected an Lf j and kept the plant in the greenhouse all summer. Every inflorescence was jointless and non-leafy. In the fall, cuttings were taken to perpetuate this plant, and on examination I was very surprised to find most of the inflorescences were leafy. Another jointless non-leafy selection would not self, but set good seed when crossed. The F_2 segregates from this should indicate whether jointless and leafy are really separate genes or merely pleiotropic effects of the same gene.

Frazier, W. A. Cracking resistance in Puck Progeny.

In the No. 1 report of the TGC, it was pointed out that the variety Puck, a dwarf with stiff, dark green leaves, showed promise for fruit set at low temperatures during the 1950 growing season in Willamette valley. Crosses were made to Stokesdale, Moscow, Oahu, and Nebraska 11, and F_2 progeny studied in the field in 1951. A surprising association was noted between dwarf habit and resistance to cracking. An arbitrary cracking index was given to all fruits on each of 279 plants (187 normal, 92 dwarf) on a scale of 0 (none) to 10 (severe cracking). The relatively large number of dwarfs was accounted for by removal of many normals soon after germination, since there were more of them than could be handled in the field plot. The association of dwarf with cracking resistance was similar for F_2 progeny of the four crosses, so that the average of all of them will be presented here:

Concentric cracking index, normals	- 5.73
Concentric cracking index, dwarfs	- 1.24
Radial cracking index, normals	- 3.06
Radial cracking index, dwarfs	- 1.61

Dwarf plants, in general, provide good leaf cover for the fruit, and in these segregates from Puck, the dwarfs tended to produce inflorescences in which fruits were tightly clustered, with the stem end (and, therefore, shoulder) of many fruits turned inward and downward into the cluster, so that the stylar end was actually more exposed to drying atmospheric influences than was the stem end. These two characters - leaf cover, and fruit position in the cluster - may be involved in the cracking resistance noted. There may, needless to say, be several other factors involved.

Griffing, B. Interaction of nutrition and heterosis in determining earliness.

A greenhouse experiment was conducted to study genotypic-environmental interactions with tomatoes. Five tomato varieties and all possible F_1's were grown under three nutrient levels. These levels consisted of three different mixtures of sand and soil. Nutrient level #1 (N_1) was made by mixing seven parts sand and one part soil; nutrient level #2 (N_2) was made by mixing six parts sand and two parts soil; and N_3 was made by mixing five parts sand and three parts soil. The soil was a rich semi-compost. The experimental design consisted of two randomized blocks with two pots per replication for each genotypic-environmental combination.

One of the interesting variables was that of flowering date (the date on which the first flower opened). The following table gives the arithmetic mean values for parents and F_1's at each level. These values are coded so that day number 1 corresponds to the day that the first flower opened in the entire experiment.

		1	2	3	4	5
1	N_1	5.00	7.50	6.50	10.75	7.75
	N_2	3.00	3.25	3.50	4.25	4.50
	N_3	3.25	1.75	2.75	4.25	3.75
2	N_1		11.75	12.75	14.75	18.25
	N_2		5.25	6.75	10.75	11.25
	N_3		2.75	3.75	6.00	5.25
3	N_1			19.00	18.75	23.50
	N_2			15.00	12.75	11.00
	N_3			15.50	7.50	9.25
4	N_1				21.50	21.00
	N_2				12.75	15.00
	N_3				9.00	11.00
5	N_1					22.75
	N_2					17.75
	N_3					14.00

S. E. = 1.85

The following table gives the mean values for the three levels, first, for all genotypes, then for the parents as one group followed by the F_1's as a second group.

	N_1	N_2	N_3
Both parents and F_1's	14.77	9.12	6.65
Parents	16.00	10.75	8.90
F_1's	14.15	8.30	5.53

The following facts are obvious:

(a) Increased nutrients (at least with the levels considered here) generally result in earlier flowering.

(b) At any one level the F_1's collectively are earlier than the parents as a group.

(c) In all cases of heterosis except one the F_1 is earlier than the earliest parent.

Thus positive nutrient stimuli result in essentially the same phenotypic shift as heterotic gene combinations. The exception is the F_1 due to crossing parents three and five. In this case on N_1 the F_1 is later than either parent, and on N_2 and N_3 a reversal occurs so that the F_1 is earlier than either parent.

In most cases in which hybrid vigor is evident, heterosis occurs only at one level. Thus heterosis appears to be caused by both a specific environment as well as a specific genotypic combination. In those instances in which the F_1 exceeds the earliest parent at the highest nutrient level but is intermediate at lower levels, the heterosis appears to be due to the fact that the F_1 is more responsive to increased nutrients than either parent.

Hardin, M. Large sepals protect fruit. It was noted here that the large sepals of the Macrocalyx (mc) tomato protect young fruit from weather hazards up to 14 days after being set. That is a good feature to have in a variety. The two Macrocalyx lines in tests made a light set of small sized fruit. A large-fruited variety crossed with Macrocalyx resulted in some sp, mc plants with good fruit size, very large sepals and profuse blooming habit. But only a small percent of blossoms set fruit, which may indicate that unfruitfulness is associated with the macrocalyx character.

Hardin, M. A new variety with minature plants. M-47, with plants 4 to 6 inches high, is unique in its minature growth habit and heavy fruit set for such a tiny plant. Plants start bearing when one inch high. Fruit small (10 to 15 grams), nipple-tipped oval, red. M-47 came from a Midget X Farthest North cross made in 1947. Midget, an extremely dwarfed tree type with yellow fruit was bred here.

H. J. Heinz Co. Evaluation of pectin in tomato fruits by relative viscosity. (This method devised by experts of the Food Research Department of the Heinz Co. is included here in case it might be useful to anyone investigating the inheritance or breeding of high pectin content).

1. Weigh two kilograms of tomato sample. The larger the sample, the more representative the sample.
2. Measure water equivalent to 20% of tomato sample. Heat to 200°F. using stainless steel beaker.
3. Slice the tomatoes with sharp knife and add slices at such a rate as to maintain the temperature of the mixture between 190°F. and 200°F. The tomato slices should be added very slowly at first because of the small amount of liquid. The addition of one slice at this point will lower the temperature about 10°F. Tomatoes should be sliced as added to prevent enzymatic destruction of the pectin. Temperature should never get below 175°F. in order that inactivation of enzymes will be immediate. Mechanical stirrer should not be used during extraction of pectin, although gentle hand stirring is desirable to equalize the temperature throughout the mixture.

It is essential that the enzymes be heat inactivated before they are released from the cells. Otherwise, the enzymes will very rapidly degrade (in seconds) and low values will be obtained. Therefore, the outlined procedure for making the pectin extraction from the tomatoes should be adhered to very closely. The tomatoes must be brought to temperature throughout be-

fore "breaking" or disintegrating. No method is now known for holding tomato samples for pectin analysis at a later date.

4. After addition of all the tomato sample, hold solution at 190-200°F. for 30 minutes to insure complete pectin extraction.

5. Cool sample to 95° F. using an ice bath, and readjust to original weight by adding water. This is to compensate for water lost by evaporation.

6. Take a representative sample and press through a 20-mesh stainless steel screen.

7. Filter the screened material through a coarse fluted filter paper. It is not necessary to filter the entire amount of extracted material, but only sufficient to supply 10 ml. for the viscosity pipette, and perhaps sufficient more for a duplicate determination if such should seem necessary. The first few milliliters (5) of filtrate coming through the filter should be discarded. Determine relative viscosity of this serum at 95°F. (0.5°) using a No. 200 Ostwald-Fenske viscosity pipette. With a transfer pipette, measure 10 ml. of the pectin extract into the viscosity pipette suspended in a constant temperature bath at 95°F. (0.5°). The pipette should be suspended with the throat in a vertical position. In taking a reading, the liquid should be drawn up into both bulbs by sucking on a rubber tube attached to the pipette. The reading should be made in time for the lower bulb to empty. As it empties, liquid drains from the upper bulb in an amount approximately equal to that adhering to the wall of the lower bulb at the end of the flow. Three readings should be taken for each sample and readings should check with 0.2 seconds.

8. Report as relative viscosity. Calculation of relative viscosity:

$$\text{Relative viscosity} = \frac{\text{seconds for sample}}{\text{seconds for water}}$$

(Boiled distilled water at 95° F. should be used for standardizing the pipette, and the reading should be checked frequently to assure the pipette is clean. If not, clean with dichromate cleaning solution.)

In addition to the instructions for the laboratory, it should be noted that tomato fruit for this study must be handled with special care. Since the study began, we have personally selected all of the fruit, being very careful not to bruise the fruit in any way. Stems are always removed and a regular picking schedule is closely followed. Storage time, temperature, size of fruit and all other factors which could possibly affect consistency are standardized for the season.

Jenkins, J. A., and Mackinney, G. Carotenoid pigments of r, t, and the new mutant at.

In our study of the yellow-tangerine hybrid (rrTT x RRtt) we have found a ratio of 9 red : 3 yellow : 4 tangerine in the F_2. This ratio has been confirmed by segregation in F_3 and in test crosses. We have not been able to detect any difference in carotenoid content of the red-fruited genotypes (RRTT, RrTT, RRTt, RrTt). The two yellow genotypes (rrTT, rrTt) are also indistinguishable from each other in their carotenoids. The tangerine phenotype includes two types with different carotenoid content: (1) the typical tangerines (RRtt, Rrtt) which are indistinguishable from the tangerine parent, and (2) the atypical tangerine (rrtt), which is quite distinct in carotenoid content, though not very different in phenotype. The double recessive surprisingly enough has a total carotenoid content intermediate between yellow and tangerine or red (the latter two have about the same total carotenoid content). However, like the tangerine the dominant pigment in the double recessive is prolycopene. As far as carotenoid content is concerned the R and the T alleles are completely dominant at their respective loci. In the double recessive, however, the r and the t alleles interact in a complex fashion not only with respect to the total carotenoid content but with respect to the individual compounds. The double recessive is intermediate between

the yellow and tangerine in its lycopene and phytofluene content, but lower than either in beta-carotene.

We have also studied in some detail the apricot tomato, both in pure lines and in hybrids with red, yellow and tangerine. Apricot (at) is a new carotenoid mutant that was found in a Mexican strain. Phenotypically homozygous apricot (atat) is similar to yellow but with a pinkish blush in the flesh. The F_1 hybrids apricot x yellow, apricot x tangerine and apricot x red are all typical reds. Apricot appears to be monogenic recessive to red and to be inherited independently of both the r and t loci.

Reynard, G. B. Genes for uniform ripening of fruits.

In a recent paper, H. F. Butler (New linkage groups in the tomato. Jour. Hered. 42(2):100-104. 1951) suggested using the symbols uu and ug ug in place of u_1u_1 and u_2u_2 for the two basic types of uniform ripening fruit of tomato.

In describing the uniform unripe fruit color of tomatoes, G. W. Bohn and D. H. Scott (Jour. Hered. 36(6): 169-172. 1945) found no noticeable difference in fruit with uu and fruit with ugug genes. In local tests (Riverton, N. J.) the latter appear in field plantings to be more grayish green and the stem end of the fruit is distinctly shaded darker than the remainder of the fruit. It was possible to separate the F_2 of the cross uu x ugug into three phenotypes, Green base, uniform ripening and gray uniform ripening. From 390 F_2 plants, a segregation of 208:91:92 was obtained for the three classes. If the double recessive uu ugug is like uu in phenotype, the expected 9:4:3 ratio would be 220:98:73 for the above example. The F_2 was not completely classified by F_3 analysis, and some uncertainty existed in the field classification of several plants.

According to local tests, Crack-Proof, Uniform Globe and Maryland selection #23 from Brown's Special have the ugug genes. It is suggested that tomato breeders check the unripe fruit of varieties, accessions and breeding stocks for this distinction between the two types.

Reynard, G. B. Inheritance of polycotyledony (part of a Ph.D. thesis, Univ. Maryland 1943)

Seedlings with more than two cotyledons may appear in plantings of tomatoes of named varieties and of breeding stocks. These usually occur in amounts up to 2 or 3 per cent. Populations containing much higher percentages were observed from crosses between Lycopersicon pimpinellifolium and Rutgers variety. Selection within such populations produced strains in which 100% of the plants produced progenies with high percentages of polycotyledons. These progenies ranged from about 20% to 90% phenotypic polycotyledons, in no case was the 100% phenotype reached. In other words, all plants were polycotyledon producers, even though some were phenotypically normal.

Penetrance and expression of the character were variable. The expression of the condition ranged from slight separation of the two cotyledonary midveins at the tip of one cotyledon, notching of one cotyledon apex, forking of one cotyledon-from slight to complete forking-resulting in two separate "cotyledons" on one side of the hypocotyl. This series of division or "spliting" of the cotyledon was present also in both cotyledons at the same time forming a continuous series of variations from normal dicotyledon appearance to an apparent tetracotyledon. The latter was believed to be the extreme limit, after classifying over 250,000 seedlings. One seedling has since been observed with a malformed axis and apparently five partly coalesced members. This is believed to be formed from two embryos.

The basic number four-represented by the total number of main cotyledonary veins-was present in all specimens examined. In a tricotyledon, one cotyledon was normal with two midveins and on the opposite side of the hypocotyl were two "cotyledons" each with one midvein. In a tetracotyledon, each member had one midvein.

Crosses of polycotyledonous selections with a strain of L. pimpinellifolium which produced no polycotyledons resulted in an F_1 with ½% polycotyledons and F_2 suggesting continuous variation found in characters determined by large numbers of genes. High percentages of polycotyledony were often associated with late bearing habit. "Tricotyledons" from Marglobe and Rutgers varieties had a slightly later crop than the crop from apparently normal seedling plants.

The behavior of tomato polycotyledons was very much like that described by DeVries (Ueber Tricotyle Rassen. Ber. d. Deutsch Bot. Gesellsch. 20:pp 45-54. 1902; and in Opera VI; pp 314-322) for many plants, not including tomatoes. MacArthur, J. W. (X-ray mutations in the tomato. Jour. Hered. 25:(No 2) pp.75-78, 1934) reported a progeny from x-rayed seed which was 25% polycotylous but the trait seemed to be unfixable. F.U.G. Agrelius (Kansas State Teachers Coll. Emporia Kan.-Botanical notes-in Kansas. Acad. Sci. Trans. 32:117-118, 1929 and F. C. Gates, Trans. 31:49-50, 1928) grew plants from tricotyledonous tomatoes and failed to obtain similar types in their progenies.

In a strain of tomatoes high in these abnormal types, it is not possible to select a strain which is all tricotyledons or all tetracotyledons since these are only two of innumerable points in a series of expressions of the character. You will obtain many gradations from each of these types as well as from apparently normal seedlings appearing in the same strain.

Rick, C. M. Linkage of ms_{10} with d_1 in linkage group I.

No attempts have been made at Davis to locate the loci of the male-sterile genes. Thus it seems quite amazing that in an attempt to combine ms_{10} with other genes a linkage would be inadvertantly revealed. The ms_{10} gene was not selected for any likelihood of its being linked, but for the fact that it has one of the most extreme male-sterile phenotypes and well exserted stigmas that facilitate cross-pollination.

Crosses were made between ms_{10} and two stocks, one being MacArthur's standard d_1-a_1-c-l-r-y and the other being Wo-d. With the purpose in mind of combining ms_{10} with as many of the other genes as possible in the F_2, fairly large progenies were grown and dominant phenotypes for the genes expressed in seedling stage (Wo-d_1-a_1-c-l) were rogued out in the flat. In the F_2 of the first cross random recombination of ms_{10} with a_1, c, and l was indicated, but of 55 dwarf plants moved to the field, only two were ms_{10}. In the F_2 of the second cross, only one of 47 Wo-d_1 plants was also ms_{10}. The deviation in each case is significant. The smallness of the numbers and the absence of the dominant phenotypes permit only a very crude estimate of c.o. distance, but in the first cross a value of 9.5% between d_1 and ms_1 is indicated, and in the second the estimate is 12%. Considering how similar these values are, it seems likely thatthe linkage in the second case is only with d_1 and that ms_{10} is located on the opposite side of d_1 from Wo. The material has been sent to Dr. L. Butler for further study and a more accurate test of linkage relations.

Rick, C. M. Modifications of scions in grafts of wilty-dwarf (wd)

Wilty dwarf is a new mutant determined by a recessive gene (wd) as yet unlocated. Segregations in progenies to date total 341 normal and 125 wilty dwarf, agreement with the expected 3:1 being good. The mutant phenotype differs from nor-

mal in a syndrome of features enumerated as follows: dwarf, erect habit (fewer and shorter internodes), smaller leaves, thinner stems, greyish leaf color, and tendency of leaves to droop under field conditions.

Grafts of all combinations of wd and + were made both in 1950 and 1951. After being planted in the field, each grafted plant was pruned to a single stem per stock or scion and trained to a stake. Whereas scions of all other combinations of mutants and normal made here have retained their phenotype with no perceptible modification, scions of wd/+, and +/wd were markedly affected by the stock. The characters most affected are stem girth (measured as diameter) and leaf size (measured as length). Mean measurements for scions are given as follows:

	Graft combination			
	wd/wd	wd/+	+/wd	+/+
Stem diameter	0.43	0.60	0.58	0.85 cm.
Leaf length	12.4	15.1	16.0	19.3 cm.

Scion stems of wd/+ were thus actually thicker than scion stems of +/wd, although the difference in means is very slight. The differences between treatments as a group and either wd or + controls is highly significant since the distributions of values for these groups did not even overlap. In respect of most other character differences between wd and +, the scions remained essentially autonomous. The data also suggest a possible effect of scion on stock, but of a reverse nature and much less marked than that of stock on scion.

In the reciprocal double graft combinations wd/+/wd and +/wd/+ the top scion in all cases showed characters of the donor without modification whereas the sandwiched scion was modified in the same fashion as the scions in the mixed grafts already mentioned. It is therefore evident that the effect of stock upon scion, whatever it might be, is generated not by stems or leaves but by the root system of the stock.

Progeny from selfed flowers of the grafts made in 1950 were grown in 1951 under comparable field conditions. Means for the progeny are:

	Parentage			
	wd control	Scion, wd/+	Scion, +/wd	+ control
Stem diameter	0.411	0.404	0.629	0.625 cm.
Leaf length	13.02	13.44	19.45	19.33 cm.

Stem diameters of + of any parentage are greatly below those of the control grafts themselves because the plants of the progenies were allowed to grow without restriction, whereas the grafted plants were pruned to two stems. Only in the case of leaf length of scion, wd/+ parentage is there any shift of the mean in the direction of the stock, but even in this case, none of the treatment distributions extend beyond those of controls in the direction of larger leaves. Furthermore, within each graft combination progeny means are not correlated with parent scion means. In spite of marked immediate effects on scions, therefore, the experiment did not detect any transmission of such effects to the progeny.

Rick, C. M. and Sawant, A. C.
The j-lf situation.

A number of observations were made in the field in 1951 of the anomalous j-lf situation reported in 1951 (TGC Report 1:13). In the first place, another backcross progeny was grown from seed kindly furnished by R. W. Richardson. This seed was received so late that the only way of being certain to observe progeny in the field in 1951 was to sow directly in the field. Emergence was very good, but darkling ground beetles reduced the stand markedly before control measures were applied. A total of 233 flowering plants was obtained and classified as J-Lf:125, j-lf:108, no seedlings of either crossover type j-Lf or J-lf being found.

Additional lines were furnished by other workers in a very gratifying response to the listing of j-Lf as a stock desired in the 1951 Report. One of these lines sent by P. A. Young is homozygous for what certainly appears to be the J-lf phenotype. Although this is the reciprocal of the j-Lf crossover that we want, it is very interesting, and if test crosses to j-lf bear out that it is actually J-lf, we can be sure at least that we are dealing with two separate genes between which crossing over can take place.

In all other lines we could not be certain of crossing-over. Many of them appeared at first to be true j-Lf phenotypes, but these all proved to be homozygous for sp, and at least one inflorescence in all plants was of lf type. Although the situation is not clear it appears possible that sp with its drastic effects on limiting shoot development might also suppress lf from full expression. The progeny of test crosses with j-lf-Sp stock should clarify this point. At any rate, from a practical viewpoint, these lines certainly seem to have incorporated j and to be free of the objectionable unfruitfulness and vegetative proliferation usually found in j stocks.

Correspondence on this problem has revealed a difference in the concept of the lf phenotype. In both the extreme conditions of the summer field and winter greenhouse and also in the intermediate environments at Davis all stocks received as lf develop a vegetative shoot in each inflorescence. This expression is so constant that we have never found an exception, and all seedlings here can be classified reliably according to their first cluster. The appearance of one or two leaf segments in the inflorescence is sporadic in nearly all of our tomato lines and does not appear to be regulated by lf, but more likely by polygenes with considerable environmental influence. It would not be surprising if lf were expressed differently in different environments, for examples of such differences have already been encountered as in p, which we cannot distinguish from P under our field conditions. At any rate we have always classified as lf those plants whose inflorescences are indeterminate, i.e., those whose axes continue to develop as a shoot.

Samson, R. W. and M. L. Tomes
Indiana tests for late blight resistance.

Barham and Ellis (TGC Research Notes 1951) listed 28 P. I. lines which were shown to possess some resistance to late blight in trials at Transou, N. C. Nineteen of these 28 P. I. lines were tested for resistance to late blight at Wanatah, Indiana, in 1951 on an isolated muck soil plot. The plot was inoculated with two isolates--one from a diseased Indiana tomato, and one from a diseased North Dakota potato. Under these conditions, Rutgers was completely destroyed. None of the P.I. lines escaped infection. P. I. 123538 possessed the highest degree of resistance and P.I. 124132 was slightly less resistant. Of the remaining 17, several were very susceptible, although most possessed some resistance as compared with Rutgers. Relative resistance ratings were taken August 30, 1951. Included in the trial were derivatives of P.I. 91913, 92865, 110946, 117898, 118790, 123538, 124132, 126408, 126907, 126914, 126925, (110597,

126951, 126952, 128236, 128277, 128445, 128990, and 129065. One additional line, P. I. 119214, not listed by Barham and Ellis, was found to possess some resistance.

Soost, R. K. Dosage effects of Wo in trisomics, triploids and tetraploids. Several tetraploid plants containing two doses of the Wo gene have been obtained by treatment of heterozygous Wo seedlings with colchicine. These tetraploids exhibit the sterility usually encountered in tetraploids. Appropriate crosses have been made with these tetraploids in an attempt to obtain tetraploids with additional doses of Wo and also triploids with the Wo gene. Phenotypically the mature foliage of the tetraploid Wo plants is less "wooly" than diploid Wo plants.

Soost, R. K. and Lesley, J. W. Inheritance in L. esculentum x L. peruvianum var. dentatum. Five F_1 plants of L. peruvianum var. dentatum with an L. esculentum stock heterozygous for d_1, r, y, c, f, a_1, j, lf were obtained. Two of these F_1s had jointless pedicels and leafy inflorescences. Each of the five F_1s were crossed to a homozygous c, f, a_1, j, lf tester. Families 51.58 and 51.62 from the two phenotypically j, lf F_1s were phenotypically j, lf. The appearance of these two characters in two of the F_1s and the failure of their backcross generations to segregate indicates that the dentatum parent was at least heterozygous for these these two genes. The dentatum parent has been lost but photographs and records show that it was phenotypically j, lf.

Backcross Segregations

Fam.	c	+	j	+	d_1	+	l	+
51.58	0	95	95	0	--	--	--	--
51.59	79	62	42	54	--	--	--	--
51.60	84	81	53	44	--	--	--	--
51.61	0	71	36	36	--	--	--	--
51.62	53	51	85	0	--	--	--	--
51.63	52	34	--	--	34	36	39	32
51.143	6	7	0	13	2	10	0	13
51.156	22	15	34	0	6	28	0	34
51.157	0	18	18	0	0	18	0	18

Segregations of c and j from the other three backcross families, 51.59, 51.60 and 51.61 as well as 51.58 and 51.62, are shown in the above table. Since lf and j remained linked only the segregation for j is shown. Expression of c was quite variable but no difficulty was encountered in recognizing c plants.

51.143 originated from the same F_1 as 51.60 crossed with a d_1, c, l, r, y, tester. Scoring of c and d_1 in this family was not difficult but a deficiency of d_1 plants occurred. 51.156 is an additional backcross family of the F_1 used in 51.62 with a c, a_1, lf, j, f tester. 51.157 originated from the same F_1 crossed with a wt, lf, j, br tester. These families give additional evidence that dentatum contained the j, lf alleles. The occurrence of dwarf plants in 51.156 is unexplained.

One F_1 was also produced using a stock homozygous for d_1, c, l and heterozygous for a_1, r, y. This F_1 was backcrossed to a d_1, c, l, a_1, r, y tester producing family 51.63. X^2 analyses of families 51.58 through 51.63 indicate that there is no significant difference at the 5% level from an expected 1:1

ratio for the d_1, l, c, j and lf genes.

Characters determined by a_1, r, and y genes give reason to suspect a more complex genetic system. Although the testers used in producing the F_1 plants were heterozygous for a_1, r, and y the behavior of these characters in the backcross progenies indicates that at least some of the F_1 plants received the recessive alleles a_1, r, and y and that dentatum lacks the R and r genes and possibly y also but contains alleles not present in L. esculentum which strongly modify the wild type alleles R, Y and A_1.

Tomes, M. L. Flower color modification associated with the gene t.

In crosses involving the variety Jubilee (tt) it was noted that the Jubilee parent and the segregates producing fruit flesh carotenoids typical of the Jubilee or Tangerine varieties, produced flowers in which the corolla and anther color was slightly modified. Other tomatoes (T) produce bright yellow carollas and anthers (regardless of R- er rr). Jubilee segregates produce flowers with a slight orange tint. The character is somewhat difficult to distinguish, but in one progeny of over 200 plants, each Jubilee-fleshed segregate was classified accurately on the basis of flower color prior to fruit ripening. Either tt modifies the flower pigments as well as the fruit flesh pigments, or a very closely linked gene is responsible for flower color modification. This characteristic has been useful in selecting from populations segregating various carotenoid complexes those plants carrying tt. For example, rrtt plants were selected from a segregating population on this basis. The rrtt genotype was subsequently proven by test crosses.

Young, P. A. New characters: green jelly, white flesh, cold resistance, rooty stems, pink and gold fruits and curled sepals.

Commercial varieties of tomatoes were crossed with unusual varieties and other species to gain resistance to diseases. Although valuable resistance to diseases was secured, the new kinds of tomatoes also showed defects or peculiarities. It is important for tomato breeders and the cooperating geneticists to identify all of the different tomato characters that are found. The following characters add to those that were described earlier (Young & MacArthur, Texas A.E.S. Bul. 698, 1947).

Green jelly: The green jelly character in red ripe tomatoes was observed in several breeding stocks and was most prominent in Selection G1393. Its parent was received from W. S. Porte of the U. S. Department of Agriculture as No. 48-B-380. It came from his cross of Stokesdale X (Rutgers X Pan America) as female parent X (Michigan State Forcing X L. peruvianum)X San Marzano as male parent from Dr. V. M. Watts of the University of Arkansas. G1393 selection had very large prolific vines with bright red fruits 2 to 2½ inches in diameter. The tops of some of the large green fruits were marked with purple-black smudges, which character probably was inherited from the L. peruvianum ancester. Black smudge is a new character for large fruited tomatoes. Some of the plants showed purple epidermis on the upper parts of the stems. The red fruits had bright green jelly around the seeds. Preliminary crosses did not indicate clearly the nature of the inheritance of the green-jelly character.

White tissues in flesh: Some of the fruits of G1393 showed large masses of white tissues in the rind and placentae of the red ripe fruits. This character was prominent in STEP 53 and similar kinds of tomatoes. Abundant white tissues in red flesh would be undesirable in tomatoes for commercial canning. The inheritance of the white-tissue character is undetermined.

Cold resistance: Five peak-type of cold frames 8x60 ft. were set with

nearly 21,000 plants of 18 varieties and 259 dissimilar selections of tomatoes. These cold frames were covered with 3 cloth sheets apiece and a thick layer of pine needles during the freezing wind at 27° to 30°F. on March 12 to 14, 1951. The covering did not exclude all of the wind from the plants in the cold frames. When the sheets were removed after the freeze, it was found that more than 90 per cent of the plants had been killed or badly damaged by the cold in all of the varieties and selections except G1393. None of its 120 plants showed any symptom of injury by the cold. This freedom from injury apparently was due to cold resistance in G1393.

Rooty stems: It is natural for tomato stems in, or touching, wet soil to produce white roots. However, G1393 has this ability in extreme form. In rainy weather, many of its stems that did not touch the ground produced many purple roots 1/4 to 1/2 inch long on the stems, and also on 2 flower trusses.

Pink gold fruits: Another selection (G1391) from Porte's No. 48-B-380 developed a new kind of tomato fruit. A few plants had fruits with yellow peel, orange rind, and orange and pink flesh. The fruits were 2 to 3 inches in diameter. Seeds from these fruits produced mostly red-fruited plants, but some plants had the typical pink gold fruits. Inheritance of fruit color is peculiar in crosses with Lycopersicon peruvianum (Lesley & Lesley, Jour. Hered. 38:245-251, 1947).

Wide curled sepals: Wide fleshy curled sepals describe a new character in tomato selection G1194. It came from H.E.S. #3446 from W. A. Frazier and R. K. Dennett of the University of Hawaii in 1948. It has very complex ancestry that includes Lycopersicon esculentum, L. hirsutum, and L. pimpinellifolium (Frazier, A, TGC Rept. 1:5, 1951). The flowers of G1194 had ordinary sepals but they became wide, fleshy and curled when the fruits were about 1 inch in diameter, and became more prominent and characteristic when the fruits matured about 2 inches in diameter. Some of the red fruits had hard yellow tops. G1194 was crossed with Pritchard and Rutgers tomatoes that have ordinary sepals on the fruits. The descendents of three of these crosses were studied in the F_1, F_2, and F_3 generations. The results secured are inconclusive but indicate that the character, wide, fleshy, curled sepals, is recessive.

deZerpa, Dora M. A case of incompatibility in tomato hybridization.

Early in 1950 the Faculty of Agronomic Science in Caracas initiated a program of hybridization between the two species L. hirsutum and L. esculentum. As a result of these crosses, fruits were harvested from one of the commercial tomato varieties, Panamerica. All crosses made on L. hirsutum gave negative results. (see following table)

Results of crosses between L. esculentum and L. hirsutum

Type of cross	Flowers yielding fruit	Flowers not yielding fruit	Total flowers pollinated
L. esculentum x L. esculentum	Many	0	Many
L. hirsutum x L. hirsutum	Many	0	Many
$\bar{F}_1$ x $\bar{F}_1$	Many	0	Many
L. esculentum x L. hirsutum	10	4	14
L. esculentum x $\bar{F}_1$	19	0	19
$\bar{F}_1$ x L. hirsutum	22	5	27
F_1 x L. esculentum	0	45	45
L. hirsutum x L. esculentum	0	45	45
L. hirsutum x $\bar{F}_1$	0	20	20

The seeds obtained from this cross were sown in the last months of 1950 and in the following year plants of the F_1 were crossed reciprocally with both parents. As a result of these crosses, the following results were observed: L. hirsutum did not set fruits when it received pollen from either L. esculentum v. Panamerica or the F_1 (L. hirsutum / L. esculentum v. Panamerica); The F_1 did not produce seeds when it received pollen from Panamerica but did produce seeds when pollinated with L. hirsutum. Panamerica produced seeds when it received pollen from L. hirsutum as well as from the F_1. (The results are indicated in the above table.)

The species involved and their F_1 have styles of distinct morphology. The style of L. esculentum is thick and short (ave. 8 mm.) and accepts its own pollen, pollen from L. hirsutum and from the F_1; L. hirsutum has a style that is thin and long (ave. 13.5 mm.) and does not accept pollen from either L. esculentum of the F_1 -- both with styles shorter than those of L. hirsutum -- but does accept its own pollen. The F_1, furthermore, with a thin style of intermediate length (ave. 11 mm.), can be fertilized with pollen of L. hirsutum, which has a longer style, but does not yield seed after receiving pollen from L. esculentum, which has a shorter style. A relation seems to exist, therefore, between the length and possibly also diameter of the style and the type of incompatibility. (This article is also appearing in Revista de Agronomia, Maracay, Venezuela).

PART IIA

DIRECTORY OF NEW MEMBERS

Andeweg, J. M., Institute of Horticultural Plant Breeding, Herenstraat 25, Wageningen, Netherlands.
Projects: 1. Research for good F_1 combinations (heterosis), if possible combined with disease resistance, use of male sterility etc.
2. Breeding of very early ripening varieties for glasshouse and outdoor cultivation.
3. Breeding of disease resistant tomato varieties (the most important tomato diseases in Holland are Cladosporium fulvum Che, Verticillium, Nematodes).

Andrew, William T., Department of Agriculture, Southern Illinois University, Carbondale, Illinois.

Beadle, G. W., Division of Biology, California Institute Technology, Pasadena, Calif.

Buetow, Clarence, 14552 Otsego Street, Sherman Oaks, California.
Projects: Experiments with colchicine and cross-pollination.

California, University of, Division of Genetics, Berkeley 4, California.

Cook, Solomon, Horticulture and Forestry Department, South Dakota State College, Brookings, South Dakota.

Couto, Flavio A. A., Escola Superior de Agricultura-Universidade, Rural - Viçosa-Minas Gerais - Brasil.
Projects: a) Determination of the rate of natural cross-pollination of tomato in Viçosa - Minas Gerais - Brasil.
b) Breeding tomatoes for disease resistance (With the cooperation of the Plant Pathology Department).

Crane, M. B., John Innes Horticultural Institute, Bayfordbury, Hertford, Herts.
Projects: 1. Heterosis; 2. Breeding for determinate habit, small vine and early maturity; 3. (with P. Day) Breeding of glasshouse tomatoes for resistance to Cladosporium fulvum.

Denkewitz, Paul, 167 E. Island Ave., Minneapolis, 1, Minn.

Fogle, Harold W., Irrigation Experiment Station, Prosser, Washington

Garber, E. D., Naval Biological Laboratory, Naval Supply Center, Oakland 4, Calif.

Honma, Shigemi, Graduate Student, Division of Horticulture, University of Minnesota, University Farm, St. Paul 1, Minn.

Horowitz, S., Catedra de Genetica, Fac. de Ing. Agronomica, Maracay, Venezuela.

Hutton, E. M., Division of Plant Industry, P. O. Box 109, City, Canberra, Australia.
Project: Resistance to spotted wilt and eelworm.

Jacoby, Daniel, 383 Andrews Road, East Williston, L. I., New York
Projects: To develop new strains.

John, C. C., Crop Research Dept., H. J. Heinz Company, Bowling Green, Ohio
Projects (with C. Sova): (1) Breeding for high pectin content; (2) Breeding for resistance to anthracnose.

Joubert, T. G., Pretoria Hort. Res. Station, P. O. Box 994, Pretoria, Union of South Africa.

Kristensen, Reinh., Horticultural Plant Breeding Station, Toftoe, Taastrup, Denmark.
Projects: Breeding for first line earliness, suitable vegetative growth (with or without pruning) and quality of fruit.

Martinez, Enrique J., Estacion Experimental Oliveros, OLIVEROS F.C.G.B., Republica Argentina.

Mishanec, William, Ward 108A, Veterans Hospital, Batavia, New York.

Moore, John F., The State College of Washington, Western Washington Experiment Station, Puyallup, Washington.
Projects: Studies of combining ability.

National Institute of Genetics, Yata 1111 Sizuoka-Ken, Misima, Japan.

Peto, H. B., Peto, Hollar Seed Company, 2166 Paolmar Ave., Ventura, California.

Relyea, K. E., Farmer Seed & Nursery Co., Faribault, Minnesota.

Reynard, G. B., Campbell Soup Company, Riverton, New Jersey.

Rios, Mario G., Gomez Farias No. 49-6, Mexico, D. F.
Projects: Breeding for resistance to diseases, particularly Phytophthora infestans.

Sawant, Anand C., Division Genetics, University of California, Berkeley 4, Calif. (Graduate student)

Walkof, Chas., Experimental Station, Morden, Manitoba, Canada.
Projects: Breeding for extreme earliness by: (1) Crossing followed by selection in the segregating progeny with emphasis on the search for desirable mutations; (2) Backcrossing early, poor-fruited determinate types to indeterminates of desirable fruit; (3) Use of F_1 hubrid combinations of determinate varieties.

Yarnell, S. H., U. S.Regional Vegetable Breeding Laboratory, Box 177, St. Andrews Branch P. O., Charleston, S. C.

Young, Harold W., Horticulture Department, Ohio State University, Columbus, Ohio (Graduate Student)
Projects: Inheritance of fruit cracking resistance in the tomato.

Zerpa, de, Dora M., Catedra de Genetica, Facultad de Ingenieria Agronomica, Universidad Central de Venezuela, El Limon, Maracay, Venezuela.
Projects: Breeding for resistance to mosaic and Phytophthora.

PART IIB

CHANGES OF ADDRESS

Barton, D. W., Division of Vegetable Crops, Agricultural Experiment Station, Geneva, New York.

Richardson, Jr., R. W., The Rockefeller Foundation, Londres 45, Mexico 6, D. F., Mexico.

PART III

LIST OF AVAILABLE OR DESIRED STOCKS
(In addition to those listed in 1951)

STOCKS AVAILABLE

Source	No. of Stock	Description
Barham, W. S.	1. Several breeding lines resistant to late blight Phytophthora infestans (Mont.) D By 2. Several breeding lines resistant to southern bacterial wilt Pseudemonas solanacearum EFS.	
Kristensen, R.	Danish Export	Early outdoor tomato with very smooth fruits of medium size.
	Bonner Best (Not Bonny Best)	Very early and high-yielding tomato.
Ounsworth, L.F.	6-1201 6-1205-1	Lines from different crosses similar in the following respects: They are a bush type with whitish green immature fruit. They have outyielded the Bounty variety, particularly early in the season. The fruit is a little smaller than Bounty, is more attractive, very uniform and has shown very little cracking in the field.

Reynard, G. B.

45 $\underline{jj}\ \underline{u_1u_1}$ late
69 $\underline{a_da_d}$
119 $\underline{a_da_d}\ \ \underline{u_1u_1}$ - resistant to collar rot phase of Alternaria solani.
54 $\underline{u_2u_2}\ \ \underline{u_gu_g}$ and resistant (not immune) to radial cracks.
57 $\underline{u_1u_1}\ \ \underline{u_2u_2}\ \ (\underline{u_gu_g})$
9 $\underline{se}\ \underline{se}$ - Tolerant of Septoria lycopersici

G numbers - derived from linkage tests of J. W. MacArthur
One or more of the following gene pairs in each line -

G1	$\underline{a_1a_1}$
2	$\underline{a_2a_2}$
3	$\underline{d_1d_1}$
4	$\underline{d_2d_2}$
5	$\underline{br}\ \underline{br}$
6	$\underline{rr}$
7	$\underline{yy}$
8	$\underline{cc}$
9	$\underline{jj}$
10	$\underline{ll}$
11	$\underline{HH}$
12	$\underline{wt}\ \underline{wt}$

Rick, C. M.

2-84 Cleistogamous (Cl_1) (described in TGC Rpt. No. 1)
2-137 Pistillate (pi) (" " " " " ")
16-9 Apetalous (ap) (" " " " " ")
2-110 Wilty dwarf (wd) (described on page 8,9)
2-95 Tetraploid San Marzano

F_1 Solanum lycopersicoides L. esculentum x S. lycopersicoides — Cuttings will be available in August 1952

Yeager, A. F.

The New Hampshire Experiment Station has seeds of some large fruited, high vitamin C strains of tomatoes, minimum ascorbic acid content 45 milligrams which we would be glad to send anyone who wishes some of it for breeding purposes. We also have two tomatoes descended from a Mexican tomato collection which are highly resistant to the ordinary field strains of late blight found here in New Hampshire. In fact, they are pretty near immune. The size has been built up from current size to just below market size. We can supply seed of either the wild small strain or of our selection for those who might wish it for breeding purposes.

STOCKS DESIRED

Reynard, G. B.

u_2u_2 (u_gu_g)
jj with spsp and early
Any types with dark green unripe fruit

Rick, C. M.

Any line that is jointless but not leafy (j-Lf)

(See note on page 10)

PART IV

BIBLIOGRAPHY OF PAPERS ON TOMATO GENETICS AND BREEDING PUBLISHED IN 1950.

Aizenshtat, Ya. S., 1950. (Modification of dominance under the influence of a shortened light day.) C. R. (Doklady) Acad. Sci. URSS 70:97-100.

Barton, D. W., 1950. Pachytene morphology of the tomato chromosome complement. Amer. Jour. Bot. 37:639-643.

Bianchi, A., 1950. Some results of attempts to produce polyploid tomatoes by decapitation. Genetica Agraria (Rome) 2:258-275.

Carncross, J. W., 1950. American Tomato Yearbook. C. S. MacFarland Pub. 36 pp.

Casseres, E. H., and Linares, P. J., 1950. Seleccion de variedades de tomatoes para los tropicos humedos. Turrialba 1 (1): 7-11.

Dimond, A. E., 1950. Effect of continuous gamma radiation on tomato plants and Fusarium wilt. Phytopath. 40:7 (Abstract).

Felfoldy, L., 1950. Preliminary experiments in tomato graftings. Agrartudomany 2:89-95.

Fogle, H. W., and Currence, T. M., 1950. The inheritance of fruit weight and earliness in a tomato cross. Genetics 35:363-380.

Gluscenko, I. E., 1950. The hybridization of plants by grafting. Uspehi Sovremennoi Biologii 30:15-48.

Griffing, B., 1950. Use of variance components with constant parent regression technique in estimating quantitative gene action. Genetics 35:113 (Abstract).

Lamm, R., 1950. Self-incompatibility in Lycopersicon peruvianum Mill. Hereditas 36:509-511.

Larson, R. E., 1950. A comparison of combining abilities of a monorecessive male-sterile Earliana metant and a normal Earliana tomato. Proc. Amer. Soc. Hort. Sci. 56:358-362.

Lesley, Margaret M., 1950. A cytological basis for sterility in tomato hybrids. Jour. Hered. 41:26-28.

Lincoln, R. E., Kohler, G. W., Silver, W., and Porter, J. W., 1950. Breeding for increased ascorbic acid content in tomatoes. Bot. Gaz. 111:343-353.

Lincoln, R. E., and Porter, J. W., 1950. Inheritance of Beta-carotene content in tomatoes. Genetics 35:206-211.

Moore, J. F., and Currence, T. M., 1950. Combining ability in tomatoes. Minn. Agr. Expt. Sta. Tech. Bul. 188:1-22.

Nilsson, E., 1950. Some experiments with tetraploid tomatoes. Hereditas 36:181-204.

_____, 1950. Are tetraploid tomatoes going to be worth cultivating? Arst. Svensk. Jordb. Forsk. 1950:99-108.

Paddock, E. F., 1950. A tentative assignment of the Fusarium-imminity locus to linkage group 5 in tomato. Genetics 35:683-684 (Abstract).

Powers, L., 1950. Gene analysis of weight per locule in tomato hybrids. Bot. Gaz. 112:163-174.

_____, Locke, L. F., and Garrett, J. C., 1950. Partitioning method of genetic analysis applied to quantitative characters of tomato crosses. U. S. D. A. Tech. Bul. 998:1-56.

Rick, C. M., 1950. Male-sterile tomatoes. Calif. Agric. 4 (4): 7,12.

____, 1950. Pollination relations of Lycopersicon esculentum in native and foreign regions. Evolution 4:110-122.

Soost, R. K., 1950. Cytology and genetics of five asynaptic mutants in Lycopersicon esculentum Mill. Genetics 35:694- (Abstract).

Papers published in 1949 but omitted in TGC Report No. 1

Joubert, T. G., LaG., 1949. Hybrid vigor in tomatoes. Farming South Africa 24:355, 370.

PART V

FINANCIAL STATEMENT
(to December 31, 1951)

Receipts		Total
Dues	$109.76	$109.76
Expenditures		
TGC Report No. 1, 1951		
Mimeograph stencils	3.83	
Mimeographing	29.15	
Staples	.66	
Covers	3.82	
Envelopes	1.95	
Postage	7.91	
Post card notices	1.50	$ 48.82
Balance		$ 60.94

MEMBERSHIP STATUS

Assessments paid for 1951	9
Assessments paid for 1951 and 1952	103
Assessments paid for 1951-1953	1
Total members	113

CORRECTIONS OF ERRORS IN TGC REPORT NO.1

Page 1, first line of third paragraph, for "Records" read "Reports"

Page 1, third line, third paragraph, insert "?"after "cited."

Page 3, last line of fourth paragraph, insert "with" between "homologous" and "those."

Page 10, first line of second paragraph, for "With" read "While."

Page 10, seventh line of second paragraph, for "Grünsberg" read "Grüneberg."

Page 10, ninth line of second paragraph, for "Adorn" read "Hadorn."

Page 10, title of second article, for "L. esculentum" read "L. esculentum."

Page 11, ninth line from bottom, for "(2.72)" read "(2-72)."

Page 13, first line under table, for "designats" read "designates."

Page 14, first line of seventh paragraph, for "X" read "VIII."

Page 14, fifth line from bottom, for "X" read "VIII."

Page 16, second line from top, insert "for" after "upon."