

POOL DATA

Country Club, Grand Rapids, Michigan

Season of Pool Operation	Daily Hours	Av. Daily Use	Total Club Membership	Annual Club Dues With Tax	Annual Swimming Dues	Daily Swimming Dues	Monthly Cost of Water	Monthly Cost of Guard	Annual Operating Revenue	Annual Operating Cost	Net Profit or Loss	Did Membership Build Up After Pool Installation
June 1—Sept. 15	10 to 10		250	\$264	None	None	42	\$300 (2)	\$350	\$1600	\$1250 loss	Yes
June 12—Sept. 13	10 to 10	200	265	135	None (\$20 fam. \$10 ind.)	.50		150	2250	1250	1000 profit	Yes
May 15—Sept. 15	10-12, 1-6 8 a.m. to 10:30 p.m.	50	293	144		None	None	35	50			
May 15—Sept. 15	10:30 a.m. to 8 a.m. to 10 p.m.	250	725			.15	15				619 loss	Yes
June 1—Sept. 15	8 to 8	122	450	275	\$6	.25	50	160 (2)	4200	4490	290 loss	No
June 15—Sept. 10	7 a.m. to 10:30 p.m.	70	128	113	\$2	.25	40	50	700	350	350 profit	
June 1—Sept. 15	10 to 10		400	252	None	.25		100 (2)	1391	2853	1462 loss	No
June 1—LaborDay	10 to 10	100	600	125	None	None	25	170	1000	1000	Even	Yes
June 1—LaborDay	10 a.m. to 10:30 p.m.	150	300	132	None (\$12.50 fam. \$5 ind.)	.50	30	125 (2)	2400	2000	400 profit	Yes
July 4—Sept. 26	9 a.m. to 10 p.m.	135	350	198		\$5	.60 (\$1 on S.S.)	100	200 (2)	3500	1300	2200 profit
May 30—LaborDay	10 p.m.	100	220	158	None	None		60	150	700	1700	1000 loss
June 15—Sept. 15	9 a.m. to 10 p.m.	125	250	350	None	None		75			profit	Yes
June 1—Sept. 1	10 a.m. to 6 p.m.	50	90	69	None	None	55	60				Yes
May 25—Sept. 20	10:30 a.m. to 7 p.m.	40	370	66	\$10 fam.	.20	4	70	2600	700	1900 profit	Yes
May 30—Sept. 10	10:30 to 10:30		180	140	None	None		40	200	600	400 loss	Yes
May until Oct.			150	360	None	None	None	None	None	250		
May 30—Sept. 15	9 a.m. to 10 p.m.	75	475	113	\$5	None		120	1600	800	800 profit	Yes
May 15—Sept. 30	8 to 8	50	318				100	60				Yes
May 15—Sept. 15	11 to 11	60	900	55	\$15	.50 (75c on S.S.)	50	60	4000	1200		Yes

Turf work at Rhode Island has revolved around the production of bent grass seeds, and while there I acquired intimate contacts with this interesting agricultural industry.

There is an increasing tendency at present to order special mixtures, or to mix them on the golf course under the direction of the greenkeeper, because he knows what grasses are particularly adapted for golf and for the particular soil and climate, as well as when to plant them. This practice is saving a great deal of money for golf clubs and producing much finer turf at the same time. The cost of grass seeds often seems excessive, and it is worth while to study the production from this angle alone. However, the greatest benefit from the study of seed production is the ability to buy with confidence. Suppose one desires red fescue and purchases some. The seedsman sells what he has bought for European red fescue, and this is planted in a fairway. After some time, it develops that the seed was hard fescue and the turf inferior to what had been expected. How much time and money would have been saved if, instead of re-seeding with Chewings fescue, which is

true to name, it had been asked for in the beginning. Even today bent seeds are sometimes sold under rather misleading names, and one must be familiar with the grasses under seed production in a particular region or costly errors may result.

There are several grasses that are important for the northern golf courses. The bent grasses are almost universally used for the greens in the North. The important grasses for fairways and tees are Kentucky bluegrass, redbottom, Chewings fescue, Colonial bent and rough bluegrass, the last being particularly useful in moist shade. For the rough, we have two types of seed: sheep or hard fescue, and Canada bluegrass. On the southern golf courses, the greens are usually composed of Bermuda grass during the summer, and rye-grass planted very thickly for making putting turf in winter. Fairways in the south are Bermuda grass or carpet grass.

Grass seeds may seem to be a very expensive commodity. However, in comparison with vegetable and flower seeds they are cheap. What we want in seed is 100% purity, and 100% germination. Kentucky bluegrass, 100% pure, for instance, has nothing else in it but Ken-

tucky bluegrass. Kentucky bluegrass, 90% pure, contains 10% of weeds, other seeds (which might be white clover), or trash, and should be proportionately lower in price than a sample of higher purity. Germination is the percentage of the seeds which will grow. What we actually buy is an approximation of the perfect sample, and this is very exactly designated by the percentages. We look at a sample of bluegrass and the label attached to the bag reads something like this: "Purity 80%—Germination 70%—Weeds 1%." Suppose the seller also has on the tag "Weight per bushel, 19 pounds." Let us assume that this seedsman has several more kinds of Kentucky bluegrass, and say that he has one that has 99% Purity and 90% Germination, with no weeds, and the weight per bushel is 28 pounds. If we are given a price of 20c for the first kind and 30c for the second lot, which would be the better buy? In order to form an estimate of a sample of seed, it is much better to rely on arithmetic than upon the brightness and cleanliness of the sample. The labelling of seeds is required in practically every state, and although it is wise policy to purchase from reliable seedsman, you can usually count on the information the tag has on it.

Prices Are Index to Quality

I have been informed that the average weight per bushel of Kentucky bluegrass seed now is approximately 21 pounds, as against the legal weight per bushel in most states of 14 pounds which was established many years ago. However, some Kentucky bluegrass has been offered for sale with a weight per bushel of 28 pounds, although this is very unusual, and the quality which you should buy is at least the 24 or 26 pound seed. The perfection in the quality of this kind of seed has been doubled in a generation, and this same improvement is true for almost all kinds of golf grass seeds. When you are

speculating as to whether the highest grade seed would or would not be the best buy, you should remember that the seedsman has no doubt priced the seed in accordance with its quality, and it is usually good policy to purchase the best he has.

Tariff Has Reduced Imports

Please refer to Chart I. It is rather evident in this chart, showing importations of turf grass seeds, that the amount of bent grass seed being imported has declined since 1930 when the tariff was raised to 40c a pound. This is also the result of the depression in the United States. Bent seed is mostly sold to the golf clubs while Chewings fescue is much used for lawns and parks, and the demand in golf is only one of the factors in the market. There are two varieties of rye grasses, the perennial, and the Italian. The perennial is less used in the United States, although on this chart it would appear that it is the more important. One cannot say why the importation is growing smaller, which would indicate that United States grown grass seed is competing strongly with the imported. There is little to say regarding the rough bluegrass seed that is coming in, except that more is imported than we usually imagine and that the importations have been practically uniform during this period. With Canada bluegrass, the amount which is coming in seems to be on the decrease and it may be that more seed is being harvested in the United States, or that less seed was being used during the depression.

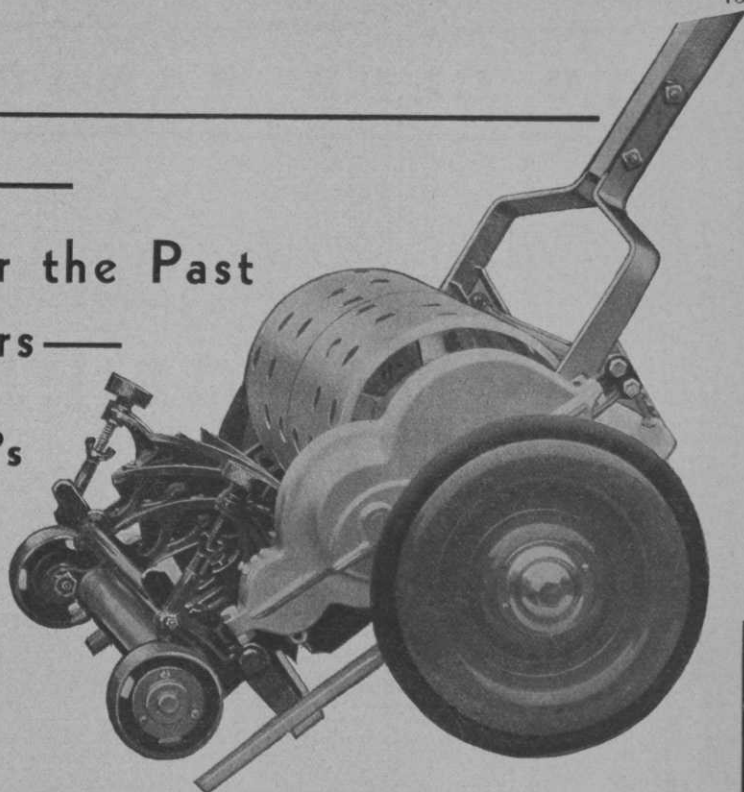
The chief regions of production of these imported grasses are New Zealand, Germany and Canada for bent. The Chewings fescue comes from New Zealand. Both the imported rye grasses, perennial and Italian, are grown almost exclusively in Ireland and New Zealand. The rough bluegrass comes from Denmark, and the

Chart I
IMPORTS OF TURF GRASS SEEDS IN THE UNITED STATES

	1929	1930	1931	1932	Tons		1935	1936	Tariff
					1933	1934			
Bent grass		445	106	163	26	29	6	15	40c lb.
Chewings fescue....		494	509	515	460	538	377	351	2c lb.
Ryegrasses Perennial	1,150	464	412	323	231	266	210	244	3c lb.
Italian	848	122	100	38	16	8	18	15	3c lb.
Rough bluegrass....		174	139	277	213	213	146	234	2c lb.
Canada bluegrass..		304	479	183	95	64	65	78	2c & 5c lb.

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Chart II
PRODUCTION OF TURF GRASS SEEDS IN THE UNITED STATES

	1930	1931	1932	1933	1934	1935	1936
By Tons							
Ryegrass	4,500	6,500	2,500	150	5,500	3,000	2,250
Redtop	3,750	9,000	7,875	3,750	3,000	5,000	2,700
By 1,000 Bu.							
Ky. blue (Ky.)	125	2,300	400	600	175	900	175
(West)	650	1,200	1,000	700	225	1,800	1,200

Canada bluegrass from Ontario. Other golf turf seeds that we import from Europe are sheep fescue, hair fescue and a very small amount of annual bluegrass.

Chart No. 2, showing production of grass seeds in the United States, is interesting from the point of view of the marked fluctuations from year to year. Apparently 1933 was a year that rye grass yielded very poorly. The rye produced in the United States is known in the trade as "Domestic." Much seed of Domestic rye grass is sown for winter greens in the south and it is probably the most satisfactory rye grass, from all angles, for this purpose. The redtop from a few counties in southern Illinois makes up 85% of the world crop and 95% of this seed produced in the United States. Since Kentucky bluegrass is listed in bushels, the

figures appear small, but the amount grown in the United States amounts to very nearly the same tonnage as that of redtop. You will notice that the production of Kentucky bluegrass in Kentucky and in the West varies back and forth in amount, although during recent years the western area has produced the most. The western area is the section where Iowa, Missouri, Kansas and Nebraska join. In England this grass is called "smooth-stalked meadow grass." Thus the grass has earned a new name so that now Kentucky is famous for bluegrass, and bluegrass is famous for Kentucky.

The production of bent in the United States has not been so carefully estimated and the figures would be unreliable if they were shown. It is significant that bent grown in Oregon amounted in 1930 to 125

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tons and in 1935 to 300 tons. If we look back at Chart I, it would seem that the production in Oregon almost equals what we might expect to have imported. This would indicate that no shortage of bent seed has been caused by the high tariff. The figures are not given either for Chewings fescue grown in the United States, since this is a recent industry, but production is on the increase. The other kinds of turf grass seeds grown in the United States, which are important to the greenkeeper, are Bermuda grass and carpet grass. Practically all of the seed of Bermuda grass comes from Arizona and California. Carpet grass seed is grown in Louisiana and Mississippi. These two grasses are the mainstay of the southern golf courses.

Growing Bent Grass Seeds

Bent grasses are found growing very commonly beyond the last range of mountains in western Washington and Oregon, as well as in New England. Rainfall is abundant in bent growing sections. Near the mouths of several of the rivers in this region, notably the Coquille, there are broad flats of land covered with a luxuriant growth of wild hay. A dozen years ago these areas were almost waste land, although patches of the hay were harvested by some of the isolated farmers who lived nearby, and in summer the area was pastured somewhat. No one lived upon the land because it was flooded during the winter.

While on a trip through the Pacific Northwest in 1924, Roland McKee of the Department of Agriculture happened to visit the Coquille area. The grass interested McKee, and upon examination he found it to be creeping bent. Upon McKee's return to Washington, this information was transmitted to Lyman Carrier, who had his desk in the same room. Carrier deserves much credit for the pioneer work in bent seed growing in Oregon and in Rhode Island. However, here was bent seed going to waste by the ton, when it was in great demand at high prices, and it took a more or less casual visitor, who was not particularly interested in the growing of turf, to find out what the grass was.

The colonial bents grow on better drained soils although pure or nearly pure stands of Astoria colonial bent may not be separated from the creeping bent by more than a few feet difference in elevation. This wild hay is what is harvested for seed and has furnished so much that

planted fields are somewhat the exception. There are three types of colonial bent growing in the Pacific Northwest: the Astoria, the ordinary *Agrostis tenuis*, and the rather distinct one called Highland. Astoria and ordinary are very similar when in turf, but the highland colonial is much more creeping in habit and has a color of foliage resembling redtop.

At any rate, they are all harvested about the same time and in the same way, but they are sold under different names. The ordinary *Agrostis tenuis* is called Rhode Island bent instead of Western colonial, which would be more appropriate. Harvesting consists of cutting with mowing machines after the seed is well ripened. The seed is ripe when the grass is still green, so that curing requires the same time as other hay. It is threshed with grain separators directly from the field or from stacks or mows later. The trouble begins because the fine pieces of hay fall through the sieves with the seed and only a poor separation is secured. This seed approximates the litter commonly found at the bottom of a haymow.

How Bent Is Cleaned

In cleaning, it is necessary to remove a large part of the coarser impurities first, in order that the seed will fall from the hopper in an even stream into the cleaner proper. The grade of material after scalping is what used to be sold a generation ago over the counter.

In the final cleaning, the remaining hay and the larger weed seeds are sieved out and the seed and chaff falls to a finer screen below, which usually is 36 mesh to the inch each way. The bent seeds fall through this screen, but the weed seeds, with the exception of a few kinds, are too large and roll off. Below the 36 x 36 mesh screen is a very fine (60 x 60) mesh screen, permitting only the finest weed seeds and the dust to pass through. In some cleaners chaff is removed almost continuously during the passage of the seed through and over the screens, while in other types the chaff is removed either before or after the screening. The expensive cleaners remove most of the chaff before the screening and take the rest last.

The process of certifying Oregon and Washington grown bent seeds is simple. After due application is sent in, an inspector goes over the fields estimating the redtop, mixture and weeds. If the inspection is favorable, the seed is analyzed under a glass after it is cleaned and ready

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for the market. Very high requirements are in force in Oregon and the certified seed is almost perfect.

The naturalization of redtop in the United States is interesting in that it attained importance sooner here than in its native land. Its agricultural value was well recognized in New Jersey in 1804, the seed having been brought there from New England. It grows under a wider range of conditions than other cultivated grasses in the United States. Since about 1875 nearly all of the commercial seed, 85% of the world's supply, 95% of the United States' supply, has been raised in a dozen counties in southern Illinois, where it is particularly well adapted. A limited amount is separated from timothy seed produced in Iowa and Missouri. In southern Illinois the growing of redtop is due to a combination of circumstances, chiefly the poor drainage condition which could not be remedied successfully with tile. In plowing such soil, the earth may slip along ahead of the plow and it is inconvenient to prepare a seed bed for much corn or wheat each year. For this reason redtop which persists for a number of years is highly desirable.

It is seeded at the rate of four pounds of re-cleaned seed to the acre, preferably in the fall after the corn, and is usually left in pasture or meadow for six or seven years. It is cut with mowing machines and with binders. During 1922-33 the redtop produced averaged 54 pounds to the acre. It is sold to local dealers, who maintain the re-cleaning plants, on a basis of 90% purity. Sorrel and yarrow are the more costly seeds to remove. Price of seed to grower averaged 13c per pound during the period from 1923 to 1932. Average wholesale price is approximately 17c and more than pays for the crop. The average retail price is approximately 21c. It costs the farmer \$5.00 per acre to grow the crop and the seed about pays for itself and the farmer has the straw to feed.

Harvesting Bluegrass

Kentucky blue developed in the United States from early Colonial introductions from Europe and now it grows in every state. The principal early seed producing centers are Bourbon, Fayette and Clark counties of Kentucky. More seed is harvested now from northwest Missouri and the adjacent states of Kansas, Nebraska and Iowa. The pastures from which seed is to be gathered are grazed little in the spring. The seed is gathered by means

of the comb, revolving comb or beater types of strippers. The stripped seed is piled in low windrows and turned three or four times daily during early part of drying, which lasts from two to four weeks. Cleaning is a combination of threshing and cleaning and requires costly machinery. The average yield seems to be about 150 pounds to the acre. The seed is sold rough cleaned and the low price may be due to the by-product nature of the crop.

Rough bluegrass is also an introduced species that has received little attention and appears to be increasing in importance. It is adapted to the moist and cooler portions of the Kentucky bluegrass region. Commercial seed is harvested mainly in Denmark from cultivated rows, and yields as high as 400 pounds an acre are reported.

Canada Blue Is from Ontario

At the present time Canada bluegrass is harvested largely in Ontario and New York. In Ontario, the soils contain enough viable seeds which come up in wheat stubble to form all pasturage and it is such areas that are often harvested for hay or seed. The grass is cut when the heads appear golden, and handled much like hay. The seed is threshed in a grain separator. Some seed is secured during wheat threshing, also. The average yield of seed an acre is about 200 pounds. The seed is much cheaper and usually more viable than Kentucky bluegrass and has been used as an adulterant with the latter.

Before 1900, when Chewings fescue came upon the market, the seed termed "European red fescue" was only source and probably most desirable fescue seed. This seed today seems to be sheep or hard, instead of red fescue and little reliance can be placed upon the name "European red fescue."

There is an interesting story regarding the introduction and spread of what is known as Chewings red fescue (*Festuca rubra var commutata*). According to an authentic account, the original seed was supplied about the year 1883 by an English firm of seed merchants. It was sown about 11 miles from Invercargill, and two years later the pasture was cut for seed. The crop was taken by a Mr. Tarlton and sown at Mossburn. This Mossburn property was later purchased by a Mr. Chewings who harvested the fescue field and presumably marketed the seed as "Chewings fescue." The production of Chewings fescue is now confined primarily to

this section (Wainea Plains) and it is estimated that approximately 9,000 acres are harvested annually, the average yield being 180 to 200 pounds.

In New Zealand the seed is sown with ryegrass and clover which is pastured for two years, by which time the fescue is in possession. The seed is taken from the third, fifth, and seventh crops, alternated with sheep grazing. It is harvested with a binder and because of the likelihood of high winds is cut sometimes before ripening is completed. This practice may account for the rapid loss of viability during some seasons. Figures from the Division of Seed Investigation of the Department of Agriculture on the percentage of the imported Chewings fescue seed above 80 percent germination are as follows: 1932, 7 percent; 1933, 89 percent; 1934, 27 percent; 1935, 78 percent, and the 1936 crop is believed to be like 1935, although the figures are not yet available.

The cause for the loss of germinability during the voyage from New Zealand has been found to be due to the warm temperature and high moisture conditions. Experiments have shown that seed which is dried and packed to prevent the intake of moisture arrives in good condition and that cool storage is also the means of holding the seed in good condition, although there is no reason to expect the seed to remain viable should high temperatures occur here. It is well to know that the germination has been markedly improved and that drying plants are now operating in New Zealand. Apparently the seed arrives in good condition, regardless, in some seasons.

In Oregon this seed has been grown for several years. It has shown very high germination and purity. Growers in Oregon usually harvest with binders.

Seed

Imports

True creeping seed is imported from Europe and appears to be true to name, although a decidedly coarse type of red fescue.

It appears that most of the sheep fescue seed imported belongs to the coarser form which is called "hard fescue," *Festuca ovina var durinacula*. This is harvested in northern Germany and no information regarding its culture has been observed.

Hair fescue (fine-leaved fescue) seed is usually chaffy and of low germination and comes from the continent of Europe. Apparently it is fairly true to name.

"Domestic" ryegrass is harvested in in-

creasing amounts in Oregon. From a practical point of view the "Domestic" ryegrass may be considered Italian and used for the same purpose in turf growing, particularly for winter greens or lawns in the south where any perennial plants usually are killed during the summer. The Willamette Valley of northwestern Oregon produces practically all of this seed. It is harvested with binders, and the stationary thresher used; or, if the crop is headed and windrowed, or allowed to mature in the field, it is threshed with combines. Shattering of the ripened seed tends to prevent the combining of this crop and may, when less mature, result in lowered quality. Average yields are approximately 650 pounds per acre, although 1,300-pound yields are not uncommon.

Bermuda Grown On Gulf Coast

Bermuda grass is named after the Atlantic Islands of the same name. It is now widely disseminated throughout the semi-arid and subtropical regions where winters are not sufficiently severe to kill its roots. Seed produced in humid climates seems to be infertile. All commercial seed comes from the arid regions, such as southwestern United States or Australia. It is very hardy after once becoming established, living for months without moisture, and it is on record that it lived for over two years when submerged by the Saltan Sea (Imperial Valley, California), making renewed growth when the water evaporated. The principal source of seed comes as a by-product from threshing alfalfa seed; that is, alfalfa fields badly infested with Bermuda are allowed to produce seed, and when the alfalfa is cut the Bermuda is harvested and threshed at the same time. By the proper adjustment of screens in the separator the two kinds of seeds are segregated. Occasionally pasture fields growing on alkaline soil are allowed to produce a seed crop. When this occurs the crop is harvested with haymaking machinery and threshed with ordinary threshing machinery.

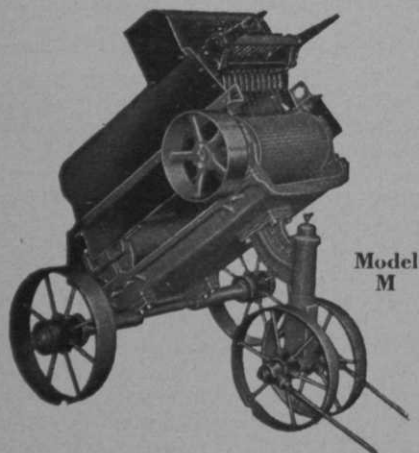
According to the best information I have been able to obtain the best carpet grass seed-producing sections are eastern Louisiana, western Mississippi, and such portions of the Gulf Coast states as have a loam of soil of moderate fertility.

The harvesting of carpet grass seed for commercial use is a very simple process but requires special equipment. The sods are grazed by cattle in spring and until near midsummer. The cattle are then removed, the fields clipped as short as possible with

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a mowing machine, and then clippings carefully raked off. A crop of seed soon develops. When the seeds have reached maturity in sufficient quantity and the weather is favorable, the crop is cut with an ordinary mowing machine fitted with a special attachment for gathering the cut material into small bunches. Ordinarily the attachment consists of a series of small iron rods, projecting about 18 inches to the rear of the mower bar, free at the back end, comparable to the tines of a many tined pitchfork or to a set of grate bars. A baffle-board at the back is so arranged that it can be lifted with a foot lever. The man driving the mowing machine lets the cut grass accumulate on these grate bars until there is enough to make a small pile, and then raises the baffle-board with his foot lever, and the resistance of the stubble against the cut grass holds it while the mowing machine moves out leaving the cut material lying on the sod. The baffle-board is then allowed to fall back to place so as to gather the next bunch. The driver never stops for dumping. When the seed has dried sufficiently, the hay is either stacked for a convenient threshing time, or else threshed directly and the drying of the seed subsequently completed with care. A second crop of seed is harvested in the late fall. Sometimes three crops may be harvested in a year.

As new shoots are coming out continuously, the seed harvest always includes some immature seed; but most of this immature seed can be eliminated in the re-cleaning. Most of the seed is re-cleaned after it comes from the thresher.

JOHN VAN KLEEK, prominent golf architect and authority, of the New York City Park dept., has compiled figures on the play of season-permit players that will be of considerable interest to other many course officials and to the golf business in general.

He found that 51% of the permit players played less than 20 rounds a year and that 17% played 44% of total rounds played during the year; the 17% averaging 59 rounds apiece.

Sawtelle Addition.—Robert Monroe Sawtelle arrived in the Charles Sawtelle family, March 3. Master Robert Monroe weighed in at 8½ pounds. His daddy is well-known in the eastern sector of the maintenance equipment field as one of the Arthur D. Peterson, Inc., staff.