

sand trades. Seems to me "Superintendent of the Golf Course" or some name of that character would be more applicable in this day and age.

Close Cooperation

A closer cooperation between the greenkeeper and green committees is very evident on this coast. There is less bossing and more desire to work with the other fellow than ever before. The greenkeeper is being given more latitude and more chance to develop and carry out his ideas. Wherever you find a well kept course you generally find a greenkeeper praising his boss, the green's chairman. It is my opinion that as long as this feeling of friendship, good fellowship and closer cooperation between the greenkeeper and green chairman increases we will have many more improved golf courses. I don't mean by this that this same friend-

ship and good fellowship is always lacking on courses that are not so well kept. This condition is sometimes due to lack of funds as well as other factors. But I do mean that it is very seldom you find a well kept course where there is continuous friction between the greenkeeper and the higher ups.

It is also noticeable that this same splendid spirit of cooperation has taken hold between the greenkeepers of the various courses. They are friendlier to one another. They visit each other's golf courses and study and discuss each other's problems. Here in southern California they have organized a greenkeepers' association. They meet at a different course each month and discuss their problems. I understand this same idea is being carried out in many other states. If properly continued the results are bound to be reflected in better golf courses, better golfers and more of them.

Snappy Selling Gives Pro Edge on Market

By HARRY SCHOPP
South Grove Golf Course, Indianapolis, Ind.

IN these days I believe for a pro to be successful he must become a merchant, that is to say he must handle clubs from the highest price to the cheapest, or in fact try to have anything else that the golfer might desire from the cheapest to the expensive in bags or other accessories.

By giving the customer any article he or she might desire the pro thereby prevents the customer going elsewhere. By this practice I have been successful in holding business. I keep two men and a boy in the shop, one of whom does nothing but the repairing. The boy does the cleaning of the clubs and the arranging of the stock and one man looks after the selling end.

I have an exhibit every spring and fall at one of the large banks in the downtown districts of our city. I believe this to be one of the best selling methods I have ever undertaken. Thousands of people passing in and out of the bank always stop to look at the attractively arranged exhibit. There is a man in charge to explain the construction of balls and the clubs and he also explains the use of each club. We

DAILY CASH REPORT

HARRY SCHOPP, Indianapolis
SOUTH GROVE GOLF COURSE
INDIANAPOLIS, INDIANA

		CASH RECEIVED	DATE	DATE
Balance from previous				
Cash Sales—New Clubs				
— Used Clubs				
— New Balls				
— Used Balls				
— Miscellaneous Merchandise				
County and Property				
— Rent				
— Taxes				
— Insurance				
		Total		
		CASH DISBURSED		
Taxes, Rent				
Dividends, a Profit				
		Total		
Balance Forward				
Current				
Cash				
— Cash				
		Balance		
		Cash Received		
		Cash Disbursed		
		Total		

How Schopp keeps sales record.



Display in a Bank Lobby that builds business for a professional.

have sold quite a number of matched sets of woods and irons to players from other courses other than South Grove. We have also sold a great number of sets to people who had never before played the game, but who have been attracted by the exhibit and are wooed into taking up the game.

I meet the department store competition by underselling, and I am able to do this by getting these clubs in large quantities. I have several sets of used ladies' clubs which we have women try especially if they are beginners. The man in charge of the sales always shows the latest in clubs and the newer accessories.

The profit from the ball and club sales is about 75 per cent greater than that of instruction. A daily report sheet is made out at the end of each day's business and with the aid of extra keys on the cash register we are able to tell at a glance the club repairing, cleaning, sales of new and used clubs, bags, balls and instruction. These report sheets are filed away and bound together at the end of each year.

Now you see it is an easy matter to go back over the reports and find just what business you did on any date the year preceding. I have these filed away for the past two or three years. My business has never fallen behind and has been on a gradual increase. I believe the rearranging of the stock at least once a week is very helpful in stirring up sales.

A mistaken but prevalent idea that keeps

down pro shop sales is the belief of many members that when they buy from the pro shop they are going to pay an excess price.

The first idea that a pro wants to get across to his market is that the merchandise in his shop is "in line" for price. Start off the propaganda by circulating the idea that the pro shops get the pick of the manufacturers' stocks as the pro's trade won't stand for anything less than the best in quality.

Ask yourself, "Does a \$12 club in a dusty, untidy and carelessly kept shop look like it's worth \$12 of any sane buyer's money?"



This is a part of a crowded golf course. Some of the unemployed caddies are making the most of its natural facilities. Before long the members probably will take a tip from the kids and get a swimming pool of their own by making use of the stream. The swimming pool is becoming recognized as a necessary detail of the well appointed golf club.

"Ask Me Another"

By NOAH LOTT

WHAT problems of turf development and maintenance are troubling you? Write "Noah Lott," care of GOLFDOM, about your difficulties and he will give you some expert advice through these columns. There is no charge for this service. Don't hesitate to ask, for your troubles may be the same as others are experiencing and the answer will help others as well as yourself.

Q. The plugs of grass where our greenkeeper changes the cups usually die, leaving numerous brown spots about the green. How can this be avoided?

A. Several mistakes can be made in changing the cup which might cause the turf to die. It is difficult to guess which one or ones your greenkeeper commits. It is entirely unnecessary to have the plug of grass die. There are many greenkeepers who change the cup on their greens as often as three times a week who never lose a plug and you cannot pick out the spots where the cup has been a week before.

One of the most common mistakes is caused by having the green too wet when the cup is changed. Where the cup is changed in the morning after heavy watering at night the soil is altogether too wet to be handled. Tamping the wet soil from the new hole in the old one is making a puddled soil which will not grow anything. Some greenkeepers take fresh dirt with them when they go around to perform this task and discard the dirt from the new location until it has had a chance to dry out so it will crumble. Where there is poor drainage the holes sometimes fill with water during the night and not all of it drains away before the dirt is tamped in. Such a condition is almost sure to cause trouble in a clay soil if dirt is tamped into the water.

The remedy is to have the dirt which goes into the old hole just moist enough to pack without puddling. This can be determined by squeezing a handful of it. If the

resulting ball can be rubbed into crumbles it is all right, but if it packs into a pasty mass it is not fit to use.

Q. We have some nice large oak trees on our course which appear to be dying. Several large limbs have already died and we fear they are all going bad. We do not wish to lose these trees if it can be avoided. What do you suggest?

A. You had better try the same treatment a St. Louis club used a few years ago under similar conditions. Starting back some ten or twelve feet from the trunk of the tree, dig a hole about two feet in diameter and about the same distance in depth. Dig about six or eight of these holes in a circle about the tree. Fill the holes up to about six inches from the top with fresh stable manure and cover over with a layer of soil, leaving a depression of two inches. Then have the men who do the watering make a practice of keeping these holes well watered, that is fill them with water every time they water the greens. The trees no doubt are suffering from lack of nourishment. Feed them and you will note a change for the better.



Photo Underwood & Underwood
The ingenious helmet for the mower operator saves the club damage suits and the operator headaches—or worse.

Q. Is it good to cut these greens when dew is on the grass? Should Bermuda be watered during the summer months, and also your opinion of sowing rye grass with Bermuda during September and playing the greens all the year around? Does this rye grass hurt the Bermuda, or is it a good thing for the Bermuda?—A. S. H.

A. It does not do any harm to mow greens when the dew is on the grass, provided there is not a tall growth and the cuttings are not left on the greens. Wads of wet cuttings left on the turf often smother out patches of the grass. With this precaution we see no reason why you should not cut your greens as early as you care to do so. Many greenkeepers make a practice of whipping the dew off the greens with bamboo poles just before cutting. This gets rid of the surplus moisture, breaks up worm casts and gets rid of leaves and trash which accumulate on the greens during the night.

Yes, Bermuda should be watered through the summer months if you wish it to produce a close, thick turf. Bermuda will thrive in hot weather better than will most other grasses except crab-grass, but it requires water like any other plant. As it does not grow except in the summer, if

it does not get watered it will have a hard time getting along.

A good thick Bermuda turf will withstand a lot of trampling during the winter, although there is no new growth taking place. But it is straw-colored and not pleasing in appearance.

It has been the practice for several years in the gulf states to sow some quick growing grass in September on the old Bermuda sod in order to have a green turf during the winter. Rye grass is often used for this purpose and so is redtop and sometimes bent seed. The recently introduced poa bulbosa is being tried. If it produces the right kind of a putting surface it will have the advantage over the other sorts in that it will not have to be replanted each fall. So far its sponsors are only recommending it for use with Bermuda on fairways.

None of these grasses hurts the Bermuda, as the Bermuda is dormant during the winter while they are active and they all die down in the early summer when the Bermuda starts growing.

Creeping bent can be grown successfully at Winston-Salem and in our opinion it is superior to Bermuda as a putting green grass.

C. D. WAGSTAFF & CO.

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Evanston, Ill.

Compost Characteristics and Its Preparation

By C. A. TREGILLUS

"SON, don't forget your compost." The advice of the old greenkeeper to the young man about to take over a new course was sound and timely. No other planning requires so much looking ahead or can be more easily neglected. To provide liberal supplies of top dressing material for keeping the putting greens in good order is often a perplexing problem to both greenkeeper and green committee—particularly the former, since he carries the burden of anxiety from season to season and cannot lay the blame upon a former incumbent of office. The difficulty of securing the raw material, which may be scarce or of poor quality, and the inability of some executives to foresee beautiful new greens dwindling in the future for want of proper care are the chief causes of his anxiety. The day is approaching, in golf congested areas, when compost preparation may be an independent business and clubs may contract for top dressing material which will be delivered already screened and ready, with perhaps further addition to sand, for immediate application on the greens. However, until that time the responsibility rests upon the individual clubs to maintain their own supplies.

Compost Is Vital

It is generally agreed that compost in some form or other is vitally essential to the management of putting greens. The reason is obvious. One cannot harvest a daily clip of grass without replenishing the source of supply. The soil beneath the green is not an inexhaustible well of fertility; there comes a time when the drain is felt, the turf falls off, weeds and moss takes its place. Chemical fertilizers may bring about a short revival, but unless something organic—material capable of decay—is provided, the humus of the soil will become depleted and the grass will disappear. The fertility of the prairies, the richness of the valley bottoms is, for the most part, due to the large quantities of decayed and decaying plant and animal remains that have collected there for perhaps centuries. A similar richness must

be incorporated into the active root occupying stratum of the putting green to promote a healthy, vigorous growth of turf. And this is the function performed by compost which, to be of any value as an aid to plant nutrition, must possess a high humus content. The problem is not whether to use compost, but how much is necessary or desirable. Careful consideration of this point is one of the delicate determinations in the science of greenkeeping. A superabundance of rich compost will cause a luxuriant and heady turf, requiring a lot of mowing to keep the grass in check, perhaps an unnecessary expense in two ways; first, putting on the top dressing and then taking it off again in the form of clippings. It is a question to ponder over. Creeping bent is held up as an outstanding example of a turf that needs constant top dressing, in fact this has been a main cause of criticism of this grass from some quarters, yet the writer knows of several creeping bent greens that have stood for a score of years with scarcely an honest dressing during their whole existence, where moss, as evidence of poverty, is plainly visible. These greens have almost perfect putting surfaces and require but a minimum of cutting. The amount of top dressing and compost required is influenced by many factors: soil, location, type of turf, age of stand, etc.

Compost Preparation

In preparing the compost requirements of the course the greenkeeper must consider, first, what raw materials can be secure most economically, and secondly, how long must the heap stand before it will be fit to use. The older the compost the better. There are greenkeepers who, having the best stuff to work with would not consider using any until it had lain at least three years. That means that the material he is using this year was laid down in 1924 or 1925 and that this year he is gathering his supplies for 1929 or 1930. These facts must be remembered and emphasize the necessity of long programmes in connection with course upkeep; not month to

month haphazard planning, but everything mapped out some seasons ahead.

We usually consider compost as being made up of three components: topsoil, sand and manure, with no hard and fast rule laid down regarding the particular characteristics of these three or their proportion. The experienced man will compound his heap with whatever materials he can gather, being concerned more with the finished product rather than the stuff he commences with. The resulting decomposition is practically the same regardless of the original composition of the ingredients, whatever their source, so the man who knows his business will make use of those that can be most easily and cheaply obtained. There are many clubs that, either through ignorance or misinformation, are going short of compost or spending unnecessary amounts upon it by bringing in supplies from long distances when local material might serve.

It has been stated that the first requirement of compost is its high content of humus-forming organic material which has reached advanced stages of fermentation. The second requirement is suitable physical texture about which more will be said later. As a nitrogenous constituent we have come to look upon barnyard manure and like substances such as mushroom soil as absolutely necessary and without which it is rather hopeless to think of successful compost. But however desirable such may be, there are many instances where it is practically impossible to obtain, and while this might be considered a handicap, it is not sufficient to cause dismay since there are a host of other things that might be used in its stead. In fact, the original idea of composting, which is a very, very old custom among gardeners and horticulturists, was to render into fertilizer, trash and low class refuse that, in its original state, is useless for the purpose. Among the many substances used as compost formers in the older countries we find the following: carcasses of dead animals, blood, fish refuse, blubber, offal, leaves, rushes, weeds, sawdust, shavings, spent bark, scourings of ditches and ponds, woolen rags, shoddy, mill dust, soapers' waste, paper waste, glue refuse, refuse from starch mills, canning factories, provision curers and sugar works, etc., in addition to the regular things that we are familiar with, as manure from barnyard and stable, peat, commercial humus and so on. All are capable of decay, but at

different rates of fermentation, those of animal origin changing much more rapidly than drier woody or horny substances.

It is customary, therefore, when using such a heterogeneous mass to mix the active with the inert material, or lacking that, with earth or ashes to retard the fermentation. The advantage of manure is that it contains large numbers of active bacteria and the processes of decay proceed quickly, while in dry herbage the work is much slower since the bacteria take time to multiply sufficiently to become effective. The germs of fermentation that bring about these changes are present in the air at all times and only require the proper conditions to start their growth and multiplication. Clear evidence of this is the spontaneous combustion of hay piled in a green or damp state. Again we often find that muck or peat taken from swampy areas has been preserved by the formation of acids and compounds brought about by other species of bacteria that work in places where the air is excluded. Such material, if used in the green state as top dressing, is likely to have a detrimental effect upon upland plants (grass in this case) with which it comes in contact. This toxic effect is not permanent and once the air has a chance to work through it the beneficial bacteria will resume their activity and rid the peat or muck of its unsatisfactory compounds. Simple proof of this condition is afforded by sowing a few seeds of redtop in a plat of the material; if the seeds germinate and grow freely there can be nothing wrong. The addition of a small quantity of lime in the heap will assist the right kind of bacteria, hastening its correction and further decomposition.

Septic Tank an Aid

A very valuable source of humus and a great aid to the fermentation of rough dry herbage is the discharge from the septic tank disposal system which is usually allowed to escape into the drainage or led off and wasted through weeping tile. Where there is sufficient fall from the club house to the compost yard, this liquid, clear and odorless when the tanks are working properly, may be turned onto the ageing compost and its valuable fertilizing element conserved.

There are many materials that can be bought for making up the organic part of the compact heap, such as mushroom soil, commercial humus, activated sludge, etc. These can be made ready for im-

mediate use by blending with soil and sand and the time that would be taken for composting thus saved. The key to the money value of these products is the availability for immediate use and the nitrogen, phosphoric acid and potash content. Therefore, the groundkeeper, planning his compost requirements for this and succeeding years, will consider this question of components from all angles. He can buy commercial products which will be ready for use almost as soon as he gets them, for which he will have to pay a price, or, on the other hand, he can get his materials in the rough state at a cheaper figure and allow them to rot down in his heap, which they will do under careful management.

Loam Element

The next requisite is good loam (top-soil). This component will absorb the ammonium salts resulting from the fermentation of the rotting substances, will moderate the fermentation and will influence the texture of the resulting top dressing material. A medium sandy loam may be considered the standard, but when this is not available we must use whatever soil we can obtain, preferring it to be sandy rather than sticky. If the green is inclined to be light and sandy, a heavier soil may be used to consolidate the putting surface, and in the opposite argument, where the greens are built on heavy clay it is imperative that we use a light sandy soil in the top dressing if such can be obtained. Sod is by all means the best on account of the fibre it contains, which will further increase the nitrogenous material in the heap. Turf that has been grazed or cut over regularly has more surface root growth than ground that has borne long grass and so is preferred. While the sod may be taken at any time of the season, we find that at the end of the spring growth is most desirable, as then there is a maximum of both root and top and both are in a green, succulent condition. The custom is spreading of skimming the top spit from the rough where the turf is heavy. This serves two purposes: supplies a good rich sod for composting and sowing the subsoil with a hardy grass as sheep's fescue or Canada Blue, a scantier, more satisfactory rough is provided. Wood ashes may be added to the soil in making the compost; they will absorb ammonia compounds from the fermentation and supply extra chemical ferti-

lizing elements and thus enrich the compost.

In golf course practice sand is considered an essential of the compost heap, its use being that of improving the physical texture of the top dressing material, which in an open, crumbly condition will rub into the turf more easily and also leaves the surface loose and porous. It must also be remembered that successive top dressings season after season will build up the surface of the green and that our compost inevitably forms a new soil in which the grass roots will grow, so we must consider the compost as a soil former, and as such must be suitable both as a root bed and a playing surface.

The effect of sand in the compost heap is to hasten the fermentation of the mass by making the structure more open. Nitrogenous materials of animal origin decompose much more rapidly than herbaceous matter, therefore the addition of sand to a heap of fish or animal refuse would not be wise, as the loss of nitrogen due to the rapid decomposition would seriously depreciate the value of the compost. On the other hand, where there is a quantity of dry, fibrous matter, as old hay, sawdust, shoddy, etc.—slow stuff to rot down—the addition of sand may help. Such a heap should not become too tightly compressed. It is the practice among many who have to buy sand not to put it in the compost heap, but to mix it in just before topdressing the putting greens, in order to conserve it as much as possible. Ungraded sand, containing everything from silt to small pebbles, is false economy if a uniform grade of coarse grains can be secured, even at a higher price. A fine sand will pack on the green surface as badly as clay and under constant watering will become quite "boardy."

Building the Stack

In building the stack the various materials to be used are built up in alternate layers, varying from eight to twelve inches of each. The first layer should be sod, then manure or whatever other organic substance is being used, more soil and so on until a suitable height is reached. When the soil is a good, well-rooted turf there will be less need for manure or pure organic matter than where the loam is barren of fibre. The first essential of compost is humus and humus-forming substances, and this fact governs the making of the pile. The finished heap should be

(Continued on page 45.)

T a l k i n g I t O v e r

Joint Meetings of Greenkeepers and Chairmen Go Good

One evening recently we attended a joint meeting of green chairmen and greenkeepers located in one of the metropolitan districts. The attendance was surprisingly large, for the meeting was held at a club that is far distant from some of the other clubs in the section. All that was needed to make the meeting a perfect success was more green chairmen, and they will come to the next session after word of value of this meeting gets around.

This idea of joint meetings is something that should be encouraged throughout the country. It need not be confined to the metropolitan territories for the automobile these days brings any men from a dozen small towns having golf clubs quickly to a central meeting place.

There were three things that made this particular meeting a success. The first was a definite program of timely interest with papers prepared in advance by authoritative speakers. The second was a chairman who guided the discussions so they would have a specific relation to the subject under discussion, have some practical benefit, and would not degenerate into pointless arguments or wordy speeches. The third factor responsible for the successful meeting was that the greenkeepers were not allowed to get the impression that they were meeting with their employers on a basis that called for any reluctance to make a correction of a green chairman when he was wrong, or to refrain from telling the greenkeeper's whole story for any reason.

It was a great meeting for inspiring co-operation between green chairmen and their greenkeepers, and a session that is certain to have a marked beneficial effect on greenkeeping in the district.

There should be more of such meetings. Why not call one for your locality?

Why Not a "Check-Up" of Progress?

Immediately upon his election each golf club president resolves on a program of progress at his club and dedicates himself to the job of seeing that each detail of this campaign is carried through to a successful conclusion.

Along comes bad weather, lack of co-operation, lower income, increased expenses and a score of other factors to make the heart weary and the head heavy. The best laid plans sink quietly to rest. The natural tendency is to think that since he is struggling valiantly in a thankless and profitless job, the best thing that an enlightened and disillusioned president can do is to get by in the smoothest and easiest manner possible and abandon his high hopes.

But it is now when the real battler just begins to fight. The first thing

Between Ourselves

is to check up on how much has been done to bring about the improvements the administration desired. The points of shortcoming, brought forcibly to the attention of the responsible committees, probably will get more attention in a few weeks than the president's fondest dreams contemplated. An element of competition in achievement may be introduced to committee activities as a result of this appraisal of the work done to date and keep all committees "pepped up" through the dog days of August.

Pros Learn to Be Business Men Quickly

Around seven years ago golf first attained the "craze" status in the United States. Previous to that time it was enjoying a lively growth, but nothing like that it has experienced since 1920.

In view of this phenomenal development of the market it seems to us that harsh criticism of professionals generally as business men is without foundation. They have done far better in getting their bearings quickly than many other men in new work. They have improved as business men at a quicker rate than most to whom selling is an old game. Look about you at other comparatively new businesses and you will find a condition of distress prices, selling oversights and extravagances, and frantic efforts to break even.

The professionals, most of whom have been denied education in even the first principles of merchandising, and many of whom are not naturally of a merchandising temperament, are going at their big job of making themselves business men in a way that entitles them to the cordial co-operation of their clubs and their sources of supply. These professionals are succeeding in intensively cultivating their markets, in getting the right displays of merchandise and in establishing and following the correct selling procedure, in an amazingly brief period as business history goes.

This season, so the salesmen of golf goods say, is marked by a general quickening of progress in professional selling practice. Shops are more attractive. The professional and his assistants are keen in developing buying action, and most significant of all pro credit rating has taken a wonderful turn for the better.

Competent observers have been kind enough to credit GOLFDOM with spurring this professional achievement of a sound business position. We thank them, for we are not modest enough to deny any such statement that is due to have a favorable effect on advertising. But in passing along the congratulations for bringing the pros into their own we pay tribute to the Professional Golfers Association bodies. By their firm and persistent work in emphasizing good credit as unflinching identification of a good pro, they have focused attention of their members on good business methods in a sharp and successful fashion.

Cost and Design Factors in Fairway Watering

By J. A. ROSEMAN

THIS information on fairway watering systems has been gathered after having checked the watering systems at Chicago Golf, Bob-O-Link and Olympia Fields, in addition to personally installing the system at Illinois Golf.

It appears to the writer that the drainage system which has been established by the Sanitary District, the general drainage systems of the city of Chicago and suburban towns, together with the many drainage outlets established by the present day subdividers and the draining work done by the Forest Preserve has been the means of draining a great deal of land adjacent to golf courses in the Chicago district. In addition, the golf clubs themselves have been so anxious to have their courses so thoroughly drained that they can play golf within a few hours after a very hard rain and have placed so many miles of tile in their property to guarantee early spring golf that all of the courses are bound to suffer from summer heat and lack of rain, such as we have experienced in the past two months. It does seem, then, that these Chicago golf clubs must resort to fairway sprinkling if we are to have fairly soft fairway and green turf all summer long.

Water Demands

Two of the principal points in connection with fairway sprinkling, then, I find to be: First, adequate water supply with adequate pressure; second, cost of initial installation of water mains and equipment. To adequately water fairways the minimum water supply should be 250 gallons per minute, and it is not possible to get too much, since 65 gallons per minute is required on the usual system where we water only tees and greens. A uniform pressure of not less than 60 to 65 pounds is required and 75 pounds is better than 60 pounds if you are to sprinkle the fairways at the minimum expense.

At Illinois Golf we built a 75,000-gallon tank, elevated 120 feet, which gives us about 65 pounds pressure. We then dug a lake on the course which would beautify the landscape, add to the attractiveness of

the course, serve as a hazard and hold in the neighborhood of 2,000,000 gallons of water. Drain tiles from traps, bunkers and greens were fed into this lake and a water line from the tank also ran to the lake to be used only in case of emergency should the water in the lake fail to maintain a desired level. Our original plan called for the sinking of a second deep well with which to supply the lake or from which to pump to this 75,000-gallon tank and in turn sprinkle over the fairways. The system, however, was designed to pump from the lake to the tank or from the lake direct to the fairway sprinkling system, or from the tank to the lake, depending upon the conditions to be met. The water when pumped from the lake would be delivered by a centrifugal pump capable of throwing 275 gallons per minute and producing a pressure of 75 pounds.

As I said before, the first items on this subject are source of supply, possible quantity available and method of producing the water. I have found that deep wells in our vicinity must be sunk somewhere between 1,200 and 1,400 feet to get more than 125 gallons per minute and the cost of these wells will average \$8.00 per foot.

Costs on Illinois Basis

The well will cost approximately \$10,000 and the pump with a 25-horse power motor will cost somewhere between \$4,500 and \$5,000, and a 75,000-gallon tank 125 to 130 feet high will cost somewhere around \$5,000. A lake or a swimming tank capable of holding 75,000 gallons will cost about 20 per cent more than the elevated tank, but the centrifugal pump used to deliver from the lake to the watering system will cost materially less than the deep well pump. The deep well pump costs about \$4,500 and the centrifugal pump will come somewhere around \$1,000, but if you install an automatic pump with a pressure tank the cost of the pump equipment operating from the lake or river would run in the neighborhood of \$4,000.

I always prefer the elevated tank because of the constant and uniform flow of water at a given pressure, and if I had a