the floor. In certain localities it varies from this type. Where the floor is still in process of being formed, as, for example, in areas denuded by landslips, the depth of humus is not great—rocks and boulders project here and there, and the humus layer is very thin. In other swampy or boggy areas the floor is mainly covered with dense masses of Sphagnum moss, with pools of water in depressions. Again, there may have been much breakage and falling among the adult trees, and this strews the floor with branches and logs which may take years to decay to humus.

A noticeable floor feature is the great profusion of seedling trees and shrubs. The majority of such seedlings are those of the broad-leaved trees and shrubs, but taxads, too, are constantly found, though their relative numbers and distribution vary. The chief importance of the floor lies not so much in its chemical or even its biological constitution, but in its physical condition, where porosity, retention of moisture and looseness of particles are its chief properties. The floor bears an intimate relationship to the other tiers of the forest. The tree and shrub tiers are dependent on the floor, and the floor on the upper tiers. Any disturbance of this balance of ecological relationship, such as by clear felling, fire or stock, is fatal to the continued well-being of the forest.

Lianes abound; these are the creepers, climbers or scramblers, and they form a characteristic plant type in the forest. It is difficult to find any area of rain forest in which lianes do not occur. They sometimes scramble over the forest floor, cover shrubs, logs and tree tops, or climb lofty taxads, and so gain the light, to which they expose their chief leaf masses. As a distinct group in the forest the lianes are important and interesting, and from the point of view of forest ecology they appear to be important in two directions. Firstly, certain lianes, e.g., one of the Ratas, **Metrosideros florida,** may actually strangle its host tree. Secondly, after logging operations, many scramble about the forest floor, and, forming dense matted tangles, inhibit the growth of seedlings and saplings. The chief lianes are the various Ratas **(Metrosideros** spp.), the Supplejack **(Rhipogonum scandens),** various Bush Lawyers **(Rubus** spp.), and the Pohuehue **(Muehlenbeckia australis).**

The epiphytes or "perching plants" are of many types, and include ferns, lycopods, orchids, and other seed plants. A profusion of epiphytes is one of the chief characteristics of this rain forest. They are a corollary to heavy rainfall, great humidity and a mild climate.

In the flood plains of the great rivers two distinct types of forest occur, the Kahikatea Swamp Forest and the Totara Forest. The Kahikatea **(Podocarpus dacrydioides),** is a tall taxad with buttressed trunk, which normally inhabits the lower-lying and more or less swampy areas of river valleys, and lagoon and lake edges. The Totara **(Podocarpus totara)** occurs also in river valleys, but on higher land than that occupied by Kahikatea chiefly on well-drained shingly terraces. It is the dryest type of rain forest—the floor is not always soaking wet.

Silver Pine **(Dacrydium Colensoi)** does not form pure stands of large extent, but is usually scattered sporadically throughout the moister Rimu forests of long standing. Other taxads occur in Westland, but these inhabit higher ground than the lowland forest as a whole.

The foregoing is but a brief account of a few types of the vast rain forest of Westland. No attempt has been made to touch upon forestry problems. These are many, and often perplexing. Problems relating to life history, rate of growth, regeneration, effects of logging, fire and stock, management, succession, etc., etc., are ever present, and may form topics of discussion in a future issue.

—C. E. F.

FORESTRY AS A PROFESSION.

Forestry in some of its many varied aspects has provided a livelihood for men since the very beginning of civilisation, for civilisation is dependent upon wood, and since wood is obtained from forests, this entailed forestry of some sort, since forestry has been defined as "any and all activity whose object is woodland." In primitive times, forestry consisted entirely in the harvesting of needed wood from the abundant forest wealth supplied by Nature, so that the first forester was that sturdy and independent being, the bushman, who has wrought mightily here in New Zealand to supply us with timber for our buildings, fertile clearings for our crops, and also, perhaps, to some extent, with barren acres of blackened stumps and bare clay soil—the result of an excess of misdirected energy. Aside from this last point, for which he can hardly be blamed, his work is most necessary and valuable, and he fills an important place in the life of the nation. But he is not altogether a forester, for his work is only a small part of forestry, albeit an indispensable one.

As civilisation developed, probably the next form of forester was the game warden, who, from his knowledge of the wild things inhabiting the forest, regulated the comings and goings of people therein to the one end of providing good hunting for his employers, the great lords and nobles of the realm. In his day this gamekeeper forester was a great man indeed, looked up to by his neighbours, and respected even by the great lords his mas-

ters, for his knowledge of the wild creatures, and the laws of the chase. But this form of forester served only a privileged class, and often brought distinct hardship to the villagers and common people with his harsh administration of the hunting laws. He did no good for humanity, and as time went on the privileged class which he served gradually disappeared, and he likewise, so that now the gamekeeper side of forestry has been altogether done away with except in some of the older countries, where it is of distinctly minor importance.

As time went on forests became more and more restricted. Wood, and other forest products, became more and more in demand as industrial development of the nations proceeded, and it began to be realised that if things went on as they were doing, the end of the forests was in sight. Then there arose another type of forester, brought into being by the needs of humanity. This was the man whose vision grasped the possibilities of treating the forest as a crop, not as a mine. He saw the possibility of co-operating with Nature so as to secure more forest and take the place of those destroyed, so that posterity need never fear starvation where wood was concerned, and he set himself patiently to study the laws of nature in the forest, that he might apply those laws to his own ends for the good of humanity, holding constantly in view the fact that generation on generation was to follow after him, and that the world of nature with which he dealt was not a free gift to his generation, but a heritage held in trust, which in honour must be transmitted to his successors, better, if possible, certainly not one whit diminished from the condition in which he had received it.

This man is the forester as we know him to-day—a man who has made a long study of the forest and of the needs of men in regard to it, and who spends his life in securing, as far as his knoweldge permits, that greatest good to the greatest number in the long run from the forest, which is the aim of all constructive effort.

It has a long and honourable history, this profession of forestry—commencing naturally first in the older, more closely settled countries of Europe, particularly Germany, to which we still look for guidance in many things, spreading thence as the need for reasoned forest management became apparent to North America, India, South Africa, and finally, quite recently, to New Zealand, in which country, though many far-seeing men had for years been "crying in the wilderness," it needed the great awakening and self-searching of the Great War to arouse the nation as a whole to its responsibilities to posterity in this matter, and to crystallize this sense of responsibility into adequate forest legislation, leading to the establishment of a corps of trained foresters for the administration of the nation's forest heritage.

So that now the young man of New Zealand, in deciding upon his career, has, among other honourable and worthy callings, this profession of forestry to be chosen if he so desires—a profession founded upon the permanent basis of service to mankind, without which foundation no profession or occupation can long endure.

In considering forestry as a lifework, there is a double question that the young man will ask concerning it. "In event of my investing four years of my life in a course of study of forestry, what then, firstly, will forestry demand of me, and secondly, what does it offer in return?"

In considering first the demands which forestry makes upon one, it should be held in mind that while the followers of some professions are engaged upon individualistic lines, where each reaps just what he has sown, the forester must submerge his individuality in a public or semi-public service. He will become one of a body of men organised to carry on a programme of highy technical work carefully planned to cover a long period of time, and he must submit himself to the discipline of that body and take his part in the carrying out of that programme to the utmost of his initiative. It will be necessary that he possess a few essential requirements in order that he may take his place in the ranks of his chosen field.

First of all he must possess a genuine love of his work. To be really successful in any line of human endeavour whatever, this must be true, but most especially is this true of forestry, for while in the average large business or organisation, discipline means for the individual perfection in attack by mass formation, the Forest organisation attacks in skirmish order, scattering its men singly or in twos and threes in outposts where loneliness always, monotony sometimes, frequently little tangible achievement for so much outlay of thought and strength, apparent lack of appreciation by his superiors and his community, may all combine to attack the morale and esprit de corps of the skirmishers, and the man who has not a deep and genuine love of his work to sustain him against the attacks of these enemies will easily become a prey to self-pity, and the sooner he gets out of forestry the better, for in it he will suffer the tortures of the damned.

Second, comes honesty of purpose—the idea of playing the game for the game's sake—the holding steadfastly in view of the aim and purpose of the work, and the working steadily toward the goal. It involves, on the one hand, the development of carefulness, thoroughness, and accuracy, and on the other hand the ability to say "no" both to one's self and to others—the will to submit one's self to an edu-

cation and mental discipline that will fit one for higher tasks, and the firm determination not to be swayed from one's line of duty by any outside influence.

Third, perhaps, will come mentality. This implies first of all a certain amount of native intelligence, which, when quickened by education, makes for achievement. But more important is mental alertness, making for adaptability and self-reliance—the ability to grasp essential principles and apply them to secure the desired results. One cannot constantly wait for one's cue in forestry. Too much of the work is done single-handed. A man must make his own cues, plan his own campaign of work so as to secure the results desired as efficiently and economically as possible. His superior will tell him what is wanted, but usually he will be left to worry out the way it is to be done by himself.

Fourthly might be put physical fitness. A certain amount of physical development is, of course, absolutely necessary, yet it is by no means everything. Mere brawn can never supplant courage when one is face to face with actualities in the bush. Many athletes have failed to "make the grade" in forestry, through lack of that peculiar mental attitude which we call "grit"—stamina, endurance, energy, if you like, all combined. A man possessed of this quality of "grit" need not be physically perfect. It is one thing to make a spurt—to get in to camp at night to avoid spending the night in the bush, but is a totally different thing to be face to face, day after day, with a task which taxes your physical strength and moral courage beyond their limits, and yet hang on and get the work done, and this attribute is the one which really counts in forestry.

The fifth essential is unselfishness. The man who is constantly seeking his own ends, who does not stop to consider the rights of his fellows at the camp-fire or the council table, or who shirks his share of camp duties and routine work, is digging for himself a pit from which all the flax in New Zealand will not pull him out.

And sixth, but by no means least, is the possession of a sense of humour, which is, after all, only a sense of the fitness of things. His work must be to the forester the most serious work in the world, but he must beware of taking himself too seriously, for the man who does that is, of all things in the bush, the most obnoxious. No man is indispensable. The forester, no matter what his position, from highest to lowest, is only a part of a machine—a cog, if you will—and as long as he functions in harmony with every other part of the machine—working smoothly toward the desired end, he is all right—but he must never imagine himself to be the machine, for that mistake is fatal.

These things, we have stated, are the essential attributes demanded of a man by the profession of forestry. No doubt they are practically identical with the characteristics that would be deemed essential for any other great service, for they are in a way the essentials of successful achievement in any branch of the great game of successful living in which we are all engaged.

But the apprenticeship in forestry is different from that of any other profession. It will mean, for the young man just entering it, month after month perhaps in the bush, carrying on day after day with the sandflies boring industriously into the back of his neck, or wet through time and time again—cold, hungry and miserable, making camp in a pouring rain, fording flooded rivers by night, perhaps. These are only a few of the trials that are daily endured in the work of forestry. It may entail the doing of every tiresome statistical job about the office, the being shot hither and thither about the country on what may seem to be petty detail jobs, the doing of many things of which the young forester may not see the use nor their relation to the big programme of events; and through it all, the forester must carry on towards the goal, shouldering unhesitatingly his share of the burden.

This is, of course, no worse than the beginning stages in any career. The budding lawyer spends at first month after month of sheer uninteresting drudgery; the banker must first learn every detail of the intricate business machinery that makes up the modern bank, and so on. But in no profession, as in forestry, is there so much need of developing one's self. There are innate attributes which must be developed or suppressed, and acquired traits, some of which must be picked up and some shunned as a plague. It is easy to be cheerful and philosophical when all runs smoothly; but when grub is low, the camp is cut off by a swollen creek, the fire is out, and everything soaking wet, it takes real character to listen to the men about you "biting" and yet not snarl in return. Yet that is the most invaluable part of leadership. It is the times of stress that test a man, and the one who has patiently schooled himself under such trying conditions as one must face in forestry work is the one who will succeed in his chosen career.

These are a few of the things, then, that forestry will demand of those who enter its ranks. There comes now the second part of the question: "What does forestry offer in return?" In every profession one may find applied the well-known catch phrase, "Hard work, little pay, and no thanks," and there will not be found wanting some foresters, too, who will say this of their own profession, perhaps with some element of truth. Hard work always is to the fore. Forestry is no garden

party. The person who goes into forestry work thinking to idle away his time in a dilettante way, is due to receive a rude shock. Forestry is work, and really hard work, both physical and mental, and scant ceremony awaits the man who will not play up to his share in the forest organisation." As regards pay, the same conditions hold as in other professions—there are comparatively few "good jobs" or "plums" judged from the purely mercenary standard. Even the most responsible jobs on earth, such as the executive heads of vast organisations like the United States Forest Service, are underpaid when compared with positions of like responsibility in purely commercial life. But everything depends on the man himself. The young forester must be prepared to be "tried out" in subordinate jobs, and his future emolument depends entirely on how he "makes good." In forestry, more than in any other profession, there is no royal road to material success. The forester must not expect to amass a fortune in his profession; good living there may be, but no easily gained wealth. The "no thanks" part of the phrase is often true. The forest officer is constantly afflicted and irritated by the non-comprehension of and apathy toward his task, his motive, his work, and his joys and sorrows, by those around him. His finest achievement may be received with maddening complacency by the public whom he benefits, and even the people closest to him can at best admire only—they can only approximate the spirit which animates his work.

It would seem from this that forestry has little to offer her disciples—yet in spite of all that has been said there remain two distinct rewards which are bestowed upon all who truly and whole-heartedly put their lives into the work, and, though the cynic may sneer, and the man himself may not readily admit it, yet these two rewards are great enough to the soul of man to make the whole thing well worth while, so that men are content to put their lives into forestry work in all corners of the earth, enduring hardship, suffering, loneliness, exile from one's fellows, and thinking themselves well rewarded thereby.

The first of these rewards is the pleasure of work well done, the pride of accomplishment, which comes to a man when he sees the fruits of his labours taking tangible form—the forest of his charge developing as the forest of his dreams, the barren areas stocked with green, a forest industry established, providing homes for families where before was empty space, and so on, ad infinitum.

The second reward is the personal pleasure—the supreme happiness of valued association, a pleasure known to all men who have together faced hardship, danger, difficulty or stress, and have come through it strengthened and refined, and with a priceless bond between them. It is the deep friendship which was engendered on the slopes of Gallipoli, and the plains of Flanders only a few years ago, the most priceless good arising from that welter of agony. This happiness is the reward of those who enter an organisation of men banded together for the purpose of achieving a common purpose in the face of obstacles. It is the greatest reward which life has to offer, and it remains with every man who has received it until death. Even though he may leave the forestry work for other lines of effort, it will always be his most cherished remembrance.

And in conclusion, the prospective forester may be asked this question: Would he desire that his profession asked less of him than his utmost capacity of grit, both mental and physical; submission to the discipline that countless fine men before him had found necessary, apprenticeship no more burdensome than any business asks—the self-reliance of the really competent man—and open, fair and congenial competition with men who have shown their breed. Can he ask a greater reward than the personal surety of work well done—a work of value to the community—a work that will mould him as a man, and the fine associations that will go with him from the day of entry until the day when he cocks his heels up on the fireside and says to some old crony, "That was the Golden Age—there were giants then."

If he cannot sincerely answer "Yes" to these questions, then forestry has no place for him, and he will waste his time to even consider it, but if he can, and is willing to enter upon his chosen profession with singleness of heart, then the field of opportunity lies wide before him.

AN IDENTIFICATION SCHEME FOR COMMON WOODS OF NEW ZEALAND.

Introductory Note.—The key given below was compiled during the year 1925 by students of the School of Forestry, working under the guidance of Mr. Hutchinson. It is intended for general practical wood identification by rangers and timber users, and for this reason has been based upon macroscopic structure only—that is, the key is intended for use, not by the scientist with a microscope and laboratory at his disposal, but by the practical man whose only aids are a sharp pocket knife and a small pocket lens or reading glass. The wood structure was taken as the base of the key, due to the inadequacy, so well known to all timber users, of attempting to describe with certainty on paper any wood by means of superficial characteristics such as weight, hardness, colour, etc., in such terms that a person unfamiliar with the wood may recognise it from the printed description. Superficial charac-