the western languages, as an independent paper. These last two marks of consideration would be even more useful, if, in the first case, the captions of the illustrations and of the tables of measurements were made bilingual and, in the second case, if the actual relation to the longer Russian text were explicitly stated in the concentrated paper.

The view-point of those who publish in Russian only, or with a tantalizingly brief and often noncommittal abstract, seems fair enough in strict equity alone. Russian scientists must be able to read English, French and German, in order to utilize the foreign literature: why, then, should not the foreign worker learn Russian, in addition to the other two languages, beside his own? One might, perhaps, legitimately doubt, on the basis of the objective evidence, what percentage of the younger Russian workers are actually masters of all three of the languages in question. However, since the abandonment of Latin as the scientific *lingua franca,* an overwhelming proportion of all scientific work has been published in either English, French or German. There are already clear indications that, if publication in Russian becomes much more prevalent, it will be regarded as sufficient precedent for an epidemic of scientific publication in other Slavic languages, in the Scandinavian languages and even in Chinese and Japanese. It is difficult to exaggerate the chaos that would follow. Instead of the language barrier being simplified, with the spread of scientific progress, it would be made correspondingly more impassable. Present publication of original results in Italian or Spanish presents a slightly different situation. If French or French and Latin are known, a paper in one of these languages may be guessed at; and a respectable minority of western scientists is familiar with one language or the other, so that important new material and ideas become generally available, sooner or later. It is at the choice of the authors if much merely competent work in these languages is slighted.

Our Russian colleagues may well feel that, if we continue to be ignorant of their work, the loss is ours, and that we shall, eventually, be forced to learn Russian in self-defense. The academic requirement of the two other languages than one's own of English, French and German, is so thoroughly and widely established that it is very unlikely to be altered in the near future. And there is an obvious, reciprocal loss to Russian scientists if the west remains regretfully ignorant of most of their fine work. Although this appeal for mercy applies particularly to the literature of vertebrate paleontology, a similar situation evidently exists in other fields.

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A PERSONAL REPORT ON THE NATIONAL FORESTS

IN July and early August of this year I visited five of the ten National Forest Regions in the United States. Most of the inspecting was done by auto, but a little on horseback and some on foot. The outstanding impression in my mind was the universally fine esprit de corps. Everywhere the men think first, last and all the time about the public interest as contrasted with the regional or private interest. Again and again I asked how it happened that so many men had become filled with the necessary courage and intelligence to act for the long-time, general interest instead of the short-time local and political interest. The explanation goes back to Gifford Pinchot and Theodore Roosevelt.

Gifford Pinchot, in his missionary zeal, built an organization which stands as one of the greatest monuments to any living man. No matter how much disagreement there may be over Pinchot as a Progressive Republican political figure, there can be no disagreement over the marvelous contribution he made to the people of the United States in building the Forest Service firm and strong. Ever since Pinchot left the service in 1909, forester after forester has been firm to the faith of the first chief.

No one has ever brought to my attention the slightest suggestion that any lumber company has profited unfairly as a result of Forest Service laxity or favoritism. Steadily the 170,000,000 acres of national forest properties have been improved. Millions of trees have been set out. Logging has been allowed only on such areas, and under such conditions, as would assure an adequate and continuous timber crop. In recent years logging has not been allowed in areas of outstanding recreational or scenic values.

The whole idea has been to devote the land and all its resources to its highest public use; to fit national forest lands for such uses as their character, that of their resources and the needs of the public will permit. To do this, multiple-use is necessary. That means selective logging, which will maintain the present lumber industry and prevent ghost towns, and developing camp grounds or renting land at $15 to $25 a year for summer homes, perhaps where attractive trout streams are handy to good roads. Again it means

issuing permits to stockmen to graze the land and, as for example in the Kaibab Forest of northern Arizona, paying especial attention to maintaining wildlife. In this particular forest you may see, almost any evening on the shadowed edges of a single meadow, more than 100 deer.

The problem which aroused my interest most—because it is least solved—is the grazing problem. It is inseparably linked with forest land. Indeed, within the continental United States, about 334,000,000 acres —more than 50 per cent. of all commercial and non-commercial forest lands—are grazed by domestic live stock. And these forested grazing lands are vital to farmers and their live stock in the Central, New England, Middle Atlantic and Lake States as well as in the South and the West.

Nearly 6,170,000 sheep and 1,484,000 cattle grazed in the national forests in 1934. In 1920, 7,324,700 sheep and 2,120,000 cattle were allowed. There was some overgrazing, although not one third so bad as on other lands. From 1918 to 1933 the number of cattle and horses on national forests in eleven western states was reduced 38 per cent., and the number of sheep 28 per cent. In many areas the numbers should be still further reduced. All reductions—on and off the national forests—in those same states and years were only 16 per cent. and 7 per cent., respectively.

One who has not traveled in the West can not realize the terrible damage done by overgrazing. On the hills just east of the Salt Lake Valley in Utah, I call to mind how overgrazing of private land made it possible for heavy storms to start a mud flow, carrying to the valley below boulders weighing over 100 tons. In this flow, fertile valley soil, houses and even human beings were covered up. In other cases overgrazing has resulted in the rapid silting up of reservoirs.

When traveling through the forests I have found it as interesting to study the varieties of grasses and sustained yield of grass as varieties of pine and fir and sustained yield of timber. In much of the northern mountain area the good grasses have been replaced in considerable measure by awned brome grass (*Bromus tectorum*), niggerhead (which is a kind of brown-eyed Susan), sage and porcupine grass. Sage has some real value as sheep feed, but it is not nearly equal to the original grasses. Experimental plots indicate that moderate grazing is probably a good thing, but that excessive grazing is one of the great sins against nature.

Stockmen of the mountains are just beginning to realize the difference between the good and poor grasses. Generally they call the good grasses bunch grass. Bunch grass may mean any of several wheat grasses, the better brome grasses or fescues. Under moderate grazing these good species may replace themselves, but if the grazing is heavy they may disappear entirely. In such cases no one knows how practical it is to bring them back. In a country where it takes five acres to support a sheep or one hundred acres to support a cow there is some doubt as to how much money can be justifiably spent in reseeding unless protection of a valuable watershed is involved.

I never fully realized what a splendid job of controlled grazing the Forest Service has put in practice until I saw the terribly abused range land between Bozeman and Dillon, Montana. The forest land was apparently in position to carry safely three times as much stock as this land, although originally they were of similar character. Under the Taylor Grazing Act the Interior Department hopes to control grazing in somewhat the same way as the Forest Service has.

Grasses are just beginning to come into their own. Hitherto they have not had the same romantic appeal as trees. Actually, however, on a considerable part of the national forest land they are even more important than the trees, partly because of their grazing value but even more because they can prevent erosion, rapid runoff and silting up of reservoirs. The American people everywhere have sinned terribly against their grasses. The time has come to get "grass-minded," even as Gifford Pinchot and Theodore Roosevelt thirty years ago made the American people tree-conscious.

With all their allegiance to the long-time public interest, the Forest Service men have been amazingly tactful in dealing with the local communities. They have engaged in a long, slow program of education and as a result the local people have confidence in the Forest Service men.

False sentimentalists have occasionally objected. For example, when elk or deer multiply and overgraze, the Forest Service people are just as much concerned as when there are too many cattle or sheep on the range. I call to mind an area in the Olympic peninsula where the elk have so cleaned up the browse that they are reduced to eating hemlock bark and other strange substances, the result of which is necrotic stomatitis. Though protected from man and wild animals, the elk and deer often die from diseases incident to starvation as they overgraze the range. In all this, there is a common-sense answer which recognizes that elk and deer eat grass and browse, and there must be a balance between food and population. If there is an excess of wildlife it may be merciful to have a controlled kill of the surplus, or else again allow reduction by nature's process, through the cougar and the wolf.

The financial income of forest rangers and forest supervisors is low. Their public service to lumbermen, stockmen, game lovers and seekers of recreation in the

wild is high. I covet for these men the psychic income of intelligent, public appreciation to make up for that which they will never get in terms of money.

In the course of my trip I traveled over hundreds of miles of trails made by the CCC boys. I saw millions of young nursery trees tended by CCC boys. I talked from a region inaccessible except on horseback or on foot over a phone line put up by the CCC boys. I saw beautiful camp sites which they had fixed up with necessary facilities. Here and there I met them responding to fire drill in a regular camp or in a spike camp. As a result I gained the impression that the public for two generations to come will be reaping the reward from work done by CCC in 1933, 1934 and 1935 in the national forests of the United States.

HENRY A. WALLACE,
Secretary of Agriculture

SCIENTIFIC BOOKS

FAMILIES OF FLOWERING PLANTS

The Families of Flowering Plants. II. Monocotyledons. By J. HUTCHINSON. xiii + 243 pp. 107 figs. Macmillan and Company. London. $6.00.

THE first volume of this work, that dealing with the Dicotyledons, came out in 1926 and was reviewed in SCIENCE by the present reviewer. Sir Arthur Hill, in a rather over-enthusiastic foreword to the present volume, says that the lapse of time between the first and second volumes has been an advantage, "since it has allowed botanists time to study and digest the earlier volume and to realize that not only do they appreciate the value of his researches, but that they are also generally in agreement with his conclusions."

One wonders where and how Sir Arthur learned this. I would concede that no matter where they lead, such general surveys as the author has attempted are about the most valuable contributions that a botanist can make towards our understanding of the plant kingdom, but that Hutchinson's conclusions with regard to the Dicotyledons have been generally accepted is incomprehensible, even though they had been brought down from Mount Sinai. Botanists, and especially taxonomists, usually do not find it so easy to see the forest on account of the trees.

The present volume on the Monocotyledons seems both more easy and more difficult to evaluate than did Volume I. I find myself more inclined to agree with the author's conclusions, but I can not be sure that this is because of their soundness or due to my own relative ignorance. At any rate, comparisons with the schemes of Bentham and Hooker, Engler and Prantl, Hallier, Lotsy or others are overwhelmingly in favor of Hutchinson.

The general plan of the present volume consists of an introduction, all too brief, followed by an outline of the sequence of families with brief notes on general tendencies. All this takes but 25 pages. The bulk of the work, pp. 26–229, is given over to a systematic description of the orders and families, under which are given keys to all the genera except those of the Gramineae and Orchidaceae. Thus we have in one small book all the genera to date, which in itself is exceedingly useful, particularly since botanical exploration has been so active in recent years. The book concludes with a short glossary and a complete index.

The author's conclusions may be stated as follows, largely in his own words: The Monocotys are regarded as monophyletic and as showing a close resemblance to the Dicotys at but one point, that between the Butomales-Alismatales and the Ranales. Hence the last order is considered as the stock which gave rise to the Monocotyledonous evolution, with the two orders mentioned as the most primitive. Such resemblances between members of the two classes as that of the Arales to the Piperales, the Menispermaceae to the Dioscoreaceae, etc., are regarded as homoplastic and not genetic.

The hypothetically most ancient known Monocot had an apocarpous gynoecium, a biseriate perianth of sepals (often green) and petals (often white), and the rootstock was a rhizome. This group, termed the Calyciferae or calyx-bearers, is made to include 12 orders, and reaches its zenith in the Zingiberales. A line of reduction among the Calyciferae leads to the almost wholly aquatic groups, Juncaginales and Aponogetonales, climaxing in the Najales.

Somewhere among the Calyciferae (Commelinales or Butomales) there was evolved a more terrestrial race—the Liliales—and these are considered the source of the remaining 16 orders. Their chief features are the development of the corm or bulb, and an attractive uniseriate perianth. This group is termed the Corolliferae or corolla-bearers because of the resemblance of the combined whorls of the perianth to the corolla of the Dicotys. The Corolliferae are considered to comprise six lines of descent which originated among the Liliales. These are: (1) Haemodorales-Burmanniales-Orchidales; (2) Agavales-Palmales-Pandanales-Cyclanthales; (3) Arales; (4) Typhales; (5) Dioscoreales-Alstroemeriales-Amaryllidales-Iridales; (6) Juncales-Graminales-Cyperales.

As among the Dicotys, or, for that matter, among