OBITUARY

JOHN JOSEPH CARTY—AN APPRECIATION

WHEN in the early morning hours of Tuesday, December 27, General John J. Carty died in the Johns Hopkins Hospital, after a valiant but unsuccessful fight to overcome the shock of a major operation, the field of science, the profession of engineering and the community of intellectual life in the United States suffered a great loss. Nor was this loss confined to the nation of which he was a citizen, which he loved with that intellectual fervor which only the great possess, and which throughout his life he had served with such steadfast devotion. In many countries, from those of Europe to far-off Japan, Carty, his works and achievements and his philosophy of life were known and admired.

From every country which has felt during the past half century the stirring of that new force which science and its application has brought into human living, men have at one time or another made the pilgrimage to New York to sit at Carty's feet and to learn and profit from his wisdom. It mattered not what language the pilgrims spoke, all profited from the contact and all returned whence they came not only with a realization of this profit, but also with the realization that they had acquired the lasting friendship of a wise man.

Nor were these contacts one-sided affairs. General Carty had an insatiable desire to enlarge his own fund of information and understanding. All who came in contact with him, from the most wise to the most frivolous and shallow, were subjects for his inquiry. He gave much and willingly of his store of knowledge and wisdom but in return, and frequently in ways unknown to his vis-à-vis, he exacted payment in full measure. At times this payment was in kind; more frequently than not it was in values quite foreign to the main subject-matter of the conversation. At the termination of the contact General Carty had invariably something new added to his already great store of knowledge—a bit of social history or custom, a hitherto unknown item of science, a peculiar slant of political thinking, or any other of the thousand and one things which involve the working of human emotions or the human mind.

His relentless search into the way human beings react and into the motives which guide their thought and action, and whose results he continually marshaled and remarshaled under the guidance of his incisively analytical mind, became a main source of his extraordinary capacity for being always at home in any company. Few men possess the capacity which General Carty had for meeting on a plane of complete understanding men and women of every social and intellectual gradation. It was a capacity which enabled him in every situation to give and receive knowledge and to influence the outcome of events in ways and in a manner which were frequently uncanny.

More than most men, General Carty had at one time or another actually put himself in the position of the other man in the wide variety of situations in which men exercise their powers, their frailties, their hopes and aspirations and their emotions.

For one who attained to such eminence, whose counsel and advice were so sought after in so many fields, and whose opinion always carried such weight, even with those who dissented from his conclusions, the record of General Carty's own writings, even in the field of his profession or that part of it which was his specialized interest—electrical communication—is surprisingly meager. Of course during his long active and creative career he produced a vast volume of letters, memoranda and reports, each bearing the imprint of a master mind but each concerned primarily with some specific question of the moment. At the same time lectures, addresses and articles of the kind which go commonly to build up a reputation for wisdom and which produce a far-reaching and lasting influence were remarkably few in number. Such as do exist are almost without exception just what one would expect from their author.

Why was it that a man who possessed and deserved the reputation which General Carty acquired made so little use of the tool which most men of ability esteem their most powerful weapon? The answer is clear to those in position to know him best. In part it was because he was always too busy seeking to solve the vast array of problems crying for solution, even though he always promised himself and others that he would some time write out something of what he had learned. In part also it was because the act of authorship was for him an incredibly laborious task. Only those of us who have been witness to this labor have any real appreciation of just how difficult and time-consuming it was for him to prepare an important document which would be a permanent record of his thoughts and conclusions and to which he would be willing to sign his name. This labor was not because he in any way failed to have a perfectly definite and clear picture of just what he wished to say, nor because he lacked the full vocabulary in which to express his thoughts. Rather it was because he did have complete clarity of mind and a full vocabulary. To him words and their arrangement were powerful tools which should not be lightly nor thoughtlessly employed. Every word and every sentence in any document of importance must, when finally chosen and ar-

ranged, convey to the reader the exact shade of meaning—no more, no less—that he had in mind. This habit and insistence made serious writing far too time-consuming an operation to be indulged in frequently.

Absence of a voluminous printed record does not mean, however, that General Carty left no substantial material evidence of his great creative ability. Modern telephony, whose development owes so much to him, has in the last analysis a very limited number of elements which are prime to its existence. Some, like the telephone itself, or the loading coil or the vacuum tube amplifier, are spectacular and well known. Others of equal or greater importance have become so much the commonplace of telephone engineering that few realize their fundamental character or that their creation was ever looked upon as an outstanding achievement.

The three most important of these foundation stones which are in use wherever telephony is employed are creations of General Carty. His invention of the "common battery" for supplying operating current from a single central office battery to any number of interconnected telephones made practical the commercial development of telephony in metropolitan areas.

His development of the high resistance bridging signal bell for subscribers substations to replace the theretofore universally employed low resistance series bell, tore the hampering shackles from a wide-spread extension in the use of the telephone. Every telephone set now in use employs such a signal.

Equally revolutionary and of a more distinctly scientific character was his discovery that the principal cause of cross interference between telephone circuits was electrostatic and not electromagnetic unbalance. This discovery and the rules which General Carty worked out for the proper construction of adjacent telephone circuits are now universally employed.

A characteristic of each of these achievements is that each came as the direct and logical result of what was one of General Carty's most powerful intellectual weapons—his ability to brush aside non-essentials and grasp the kernel of the problem. Many men had worked on each of the three things just mentioned. They were obvious obstacles to progress. They yielded readily to solution once General Carty had formulated simply and accurately the essentials of the problem and the nature of the answer required.

These things and a host of others similar but less important were personal creations. They belong to his earlier years. The great achievements of his later life and for which he is best known in the field of electrical communication are the achievements of a generalissimo. Long distance telephony over land, transoceanic radio telephony, the coordination of factors which render present-day telephony so marvelously easy bear scarcely a trace of General Carty as a creator of any essential new element. They are, however, almost as surely his creations as any of his earlier work.

He analyzed the problems, picked out the essential elements to be attacked, mobilized just the right forces, provided the supplies by selling confidence in ultimate success to those who must provide the supplies and inspired a sort of fanatic determination in those who looked on him as captain.

Although primarily concerned with scientific, engineering and organization matters in the field of electrical communication and most of all in the well-being and reputation of the Bell System, General Carty looked upon the whole field of science as his hunting ground. Many of his closest friends were men of distinction in fields of science far removed from those of electrical engineering or physics. Denied the privilege of any formal training in science he nevertheless acquired such an understanding in many fields of knowledge and research that masters there sought discussion with him.

Consideration of everything General Carty did shows always the same technique. Painstaking analysis of the problem; exact formulation of the questions to be solved; full consideration of every ascertainable obstacle, human or material, likely to be encountered; assembly of just the right forces and then when all was ready a feverish onslaught quite in contrast with the slow and methodical preparations. But no matter how feverish the attack once all was ready, there was never any lessening of meticulous attention to detail where he thought that detail important. This technique he applied with infinite variations and shades to the material problems of electrical communication; to the delicate political problems involved in the daring attempt to demonstrate transatlantic telephony in the midst of the World War; to the essentially human problems of organization which created the perfect battalions which made the Signal Corps Reserve preeminent; to his part in creating the National Research Council, or to making certain that the solemn ceremonies of the burial of the Unknown Soldier should be broadcast to expectant thousands across the continent unmarred by accident.

Who but General Carty would have realized that the most probable cause of disaster in these august ceremonies would lie in forgetfulness on the part of the great participating personages under the emotional stress of the occasion? Or who but he would have known that insurance of success lay in the little piece of carpet which he himself tacked in exactly the right place where each speaker was to stand?

The lasting record of General Carty's character and

achievements is in the art of communication, of which for nearly fifty years he was an outstanding leader; in the citations by which a large number of great institutions justified their grants to him of honorary degrees or medals of distinction and in the archives of the Departments of State of his own and other nations which conferred upon him high orders in recognition of services rendered in the cause of making this world a better place in which to live.

To General Carty, science and the methods of scientific thought were never narrow things or things apart from the great problems of a fuller life. Nor were the great institutions and academies of science mere machinery for putting the capstones of acknowledged success on recognized achievement. To him their raison d'être was their unique opportunity for service.

It was in this light that he looked upon the National Academy of Sciences, an essentially undemocratic institution in a democratic country. It was knowledge of this feeling which caused his associates to create there the medal which bears his name and of which the academy later made to him its first award. It was for him the most pleasurable and satisfying token of love and esteem which those associates could render since it gave assurance of enhanced opportunity to the academy for lasting service. That he did not live to receive the medal is a source of regret to his friends. To him it mattered little.

F. B. JEWETT

SCIENTIFIC EVENTS

THE NATURAL HISTORY OF MOUNT EVEREST

IN view of the forthcoming Everest Expedition, a small selection of the specimens brought back by the expeditions of 1921, 1922 and 1924 has been arranged at the British Museum (Natural History), South Kensington, to illustrate conditions upon the mountain. According to the London *Times*, the general appearance of the upper ranges of Everest is excellently illustrated in a number of enlarged photographs. One of these shows how the high winds, even outside the seasons of the monsoon, give rise to whirling clouds of dry snow. The article in the *Times* continues:

A sectional elevation shows the altitudes up to which various forms of life were found, and objects from every department indicate the peculiarities of the natural history of the mountain. Beetles were found at a height of 16,500 feet, butterflies up to 17,000 feet, moths as far up as 18,000 feet. Each of these specimens had its idiosyncrasies; the butterflies and moths clung with their wings to the mountain side against the high wind; the beetles stiffened out and rolled; and even the ants were remarkably torpid.

The grasshoppers shown from the higher altitudes are all wingless, but are related, save for one endemic group, to winged varieties elsewhere. It is curious to note how much smaller were two specimens, within the same species, which were found at 10,000 feet, than two similar examples from the 7,000-foot level. Spiders were found above the snowline and up to 22,000 feet; they live, apparently, upon diminutive insects which themselves must exist on inconspicuous vegetable life.

Sheep were found up to 20,000 feet on the borders of the lichen-zone, but the highest recorded altitude to be reached by a mammal (20,100 feet) was attained by the Royle's pika or Wollaston's pika (mouse-hare), of which a number are on view.

In general, the fauna below 16,000 feet is of essentially the same type as that of the adjacent areas of Central and Southern Asia, while above 16,000 feet its affinities are predominantly Palearctic. The animals are, however, frequently of smaller size than their lowland relatives. The highest nesting birds were found at 17,000 feet; finches were seen migrating at 21,000 feet, and choughs followed the climbers as high as they went.

The plants found on Everest include willows, primulas, gentians, blue poppies and others known to Western gardeners. The short duration of the growing season (three to four months), the exposure to wind and cold, the brightness of the light, the pressure of snow, the distance of water from surface, the scarcity of insects and the poorness of soil, however, all help to make plant life difficult. The plants on screes and cliffs have a very long, spongy taproot, enabling them to reach down to the moisture and to resist the movement of the loose stony material.

The Himalayan range is comparatively Recent, and reached its present form only in Pliocene times. Fossil ammonites from the 14,000-foot level of the Tibetan plateau show the creatures which formerly lived in the sea, which covered the site of the great range. Examples of Recent rocks were collected up to 27,000 feet.

The exhibition, which has been arranged in the Insect Gallery by Dr. Anna B. Hastings and M. M. Burton, will remain open between six months and a year.

FORESTRY PROGRAM FOR THE SOUTH-EASTERN STATES

A FORESTRY program designed to meet the needs of the eight southeastern states has been adopted by the Southeastern Council according to an announcement made by Colonel J. W. Harrelson, director of the North Carolina State Department of Conservation and Development. This program is given below.

1. Encouragement of teaching forestry in public schools and colleges and the development of an appreciation on the part of the general public of the benefits of forest conservation.