while the energy and angle are changed, these two functions, or form factors as they are called, can be measured. Unfortunately such complications as recoil effects and Lorentz contraction do not allow for an unambiguous connexion between the charge and magnetic moment distributions and suitable combinations of the measured form factors. The modern canonical identification is made by considering the experiment from a frame of reference in which the proton is seen to move with the same speed before and after the interaction (thus at least balancing out Lorentz contraction effects) and distinguishing between spin-flip (magnetic) and non-flip (electric) terms. This choice has the deliberately contrived effect of minimizing error correlations in the measurements, and the unexpected simplifying feature (Barnes, *Phys. Lett.*, **1**, 166; 1962) that the electric and magnetic form factors have the same shape. Despite several ambitious claims in the literature, this scaling law has never been satisfactorily explained from a theoretical point of view, but is by now extremely well verified experimentally.

In the present experiment, where the momentum transfers are as high as 25 $(\text{Gev/c})^2$, only one of the form factors contributes significantly to the cross-section which is so low that as few as seven events in a day were recorded at the extreme of the energy range. Thus the scaling law could not be checked, but the results (assuming this relation) extrapolate smoothly from a previous phenomenological fit to the form factors. Once again experiment is ahead of theory, for there is so far no reasonable unambiguous theory leading to this particular shape, known as the dipole fit. The irony of the situation lies in the fact that theoretical fits to the very early data on form factors led to successful searches for spin-one mesons such as the ρ and ω, but that these same apparently reasonable concepts seem completely incapable of explaining the new more detailed data, particularly at high energies.

The new machine at the Stanford Linear Accelerator Center has a very much larger beam energy than any other electron machine in existence. So much greater is the energy that it has already forced a change in the units used by the experimenters (from the inverse fermi to Gev/c) which has long been advocated by many theoreticians, and which brings electron scattering into line with the other methods of studying the strongly interacting particles. It is now very much to be hoped that the detailed results of experiments such as this will force the theoreticians into much more significant progress.

Drugs against Plasmodia

from a Correspondent

A NEW chapter in the history of malaria was opened in 1926 when Schulemann and his colleagues discovered plasmochin, the first synthetic anti-malarial drug, soon followed by atebrine (mepacrine). During the next quarter of a century, intensive research activity in France, Germany, the United Kingdom and the United States produced a small number of valuable compounds which appeared to meet all our needs. These compounds were: amodiaquine, chloroquine, primaquine, proguanil and pyrimethamine. Recently the sulphones, sulphonamides and injectable triazines were added to the list. Some of these drugs are better for the treatment of malaria, others for prevention of the infection, but it seemed that no new anti-malarial drugs were necessary. But with the prospect of malaria eradication, which relies to an increasing extent on chemotherapy in addition to the insecticidal attack on the vector, it became obvious that in developing countries, with their well-known shortages of basic health services, new drugs more suitable for large-scale administration were needed. In addition to this, the problem of resistance of malaria parasites to some drugs causes concern.

Resistance of malaria parasites to proguanil or pyrimethamine, observed some 15 years ago, was of limited importance, but the more recent reports on resistance of *P. falciparum* to 4-amino-quinolines (chloroquine and amodiaquine) are of greater consequence since these are our most valuable drugs for treatment of acute malaria. The situation may become serious if the resistant strains spread more widely from South-East Asia and parts of South America where their presence has been confirmed during the past few years.

Successful research on anti-malarial drugs depends on exploiting subtle differences between the metabolism of the plasmodium and of the tissue of the host; this is difficult as long as our knowledge of these processes at the cell level is meagre and unsatisfactory. Most of the previous successes were due to large scale screening of thousands of compounds prepared according to some more or less informed guesswork. This is a costly and time-consuming enterprise and the results are unpredictable. The final assessment of the value of anti-malarial drugs, released for medical use after a most careful screening on animals, can be made only on human infections usually seen in highly endemic areas of the world.

A review of the present resources and needs of chemotherapy of malaria is necessary. The recent report of a scientific group convened by WHO to discuss the present situation of chemotherapy of malaria and to advise on the most important problems covers this very wide field (*Chemotherapy of Malaria*, Technical Report Series No. 375). It summarizes the results of laboratory studies and of field trials and reassesses the place of various drugs in the prevention and treatment of malaria. It discusses the spectrum of response of malaria parasites to various compounds, indicates the geographical distribution of resistant strains and proposes new criteria and procedures for recognition of drug resistance in the field.

Finally, the report provides some perspectives of future research and of field applications of new, promising compounds or their combinations.

The authors of this report have succeeded in presenting in 90 pages (including 10 useful annexes) a comprehensive and balanced review of one of the most important problems of preventive and clinical medicine which is particularly relevant to those parts of the world where malaria eradication meets with serious technical and other obstacles.

High Pressure Oxygen in Radiotherapy

from a Radiobiology Correspondent

THE results of treatment of malignant disease at many sites have shown a steady improvement with the passage of time. The main reasons are probably the accumula-